Studies in Public Choice

Joshua Hall
Bryan Khoo *Editors*

Essays on Government Growth

Political Institutions, Evolving Markets, and Technology

Springer

Studies in Public Choice

Volume 40

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ISSN 0924-4700
Studies in Public Choice
ISBN 978-3-030-55080-6 ISBN 978-3-030-55081-3 (eBook)
https://doi.org/10.1007/978-3-030-55081-3

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Acknowledgements

The authors would like to thank the Penguin Random House for permission to use materials from Tyler Cowen's book *The Great Stagnation* in his paper in this volume. Gordon Tullock's chapter could not have been reprinted here without the assistance of Mary Lou Gunderson (on behalf of Tullock's estate) and Hsin-Yi Lin, Professor and Department Chair at the National Chengchi University (whose department published the journal it originally appeared in). The assistance of Dan Houser and Peter Boettke in contacting Mrs. Gunderson is appreciated. Finally, we acknowledge the general research support from the Center for Free Enterprise in the John Chambers College of Business and Economics at West Virginia University.

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Chapter 1
Accounting for the Growth of Government

Gary S. Becker and Casey B. Mulligan

Abstract Why has government grown in so many countries during the twentieth century? We present a simple model of political competition and show how different sources of the growth of government have different effects on the amount and structure of taxes, spending, and regulatory programs undertaken by the government. Those sources include: demographic shifts, more efficient taxes, more efficient spending, a shift in the "political power" from those taxed to those subsidized, shifts in political power among taxed groups, and shifts in political power among subsidized groups. We also show how the effects of each source varies according to the model of public decision-making. Based on a variety of empirical indicators of regulation, we suggest that regulation has grown from 1890 to 1990, but less rapidly than tax revenues. Regulation grew more slowly during the 1980s and, according to some measures, declined. We suggest that the long term regulatory and budgetary trends are consistent with growth in the political power of those subsidized—especially the elderly. The 1980s decline in regulation together with its growth in taxes is not consistent with any one of the theories of government growth.

1.1 Introduction

Why has government grown in so many countries during the twentieth century? Many explanations have been proposed, explanations ranging from an increased demand for government services to changes in the distribution of skill. Our study helps estimate the importance of each theory by partitioning the set of

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J. Hall, B. Khoo (eds.), *Essays on Government Growth*, Studies in Public Choice 40, https://doi.org/10.1007/978-3-030-55081-3_1

possible explanations according to their implications for the quantity, composition, and incidence of taxes, spending, and regulation. The partition is the following categories:

(i) increases in the efficiency of taxes, spending, and/or regulation
(ii) decreases (increases) in the political power of taxpayers (those subsidized)
(iii) changes in the political power of particular taxpaying or subsidized groups
(iv) demographic shifts

We begin with an interest group model to derive the implications of (i)–(iv) for the quantity, composition, and incidence of taxes, spending, and regulation. The "social redistribution" and "merit good" models often have similar implications for the effects of (i)–(iv) on taxes, spending, and regulation; we discuss those cases when the three models differ.

We present some evidence on the growth of American federal, state and municipal spending together with some crude aggregate measures of federal regulation over the period 1890–1990, and the sub-periods 1890–1930, 1930–1980, 1980–1990. Improvements in the measurement of the quantity, composition, and incidence of regulation are desperately needed, but the empirical analysis serves three purposes. First, it illustrates how one might account for the growth of government using our framework. Second, we compare a variety of aggregate measures of federal regulation and show how each of them apparently grows less rapidly than taxes and spending. Third, we offer some tentative conclusions regarding the sources of the growth of government. Growth in the "political power" of the elderly appears to be an important source of the growth of government because both spending and regulation benefitting the elderly has grown relatively rapidly over the entire period—and probably over each of the sub-periods. More efficient means of tax collection may have facilitated the growth of government between 1890 and 1980, since non-elderly government programs have also grown (albeit less slowly) and spending apparently more rapidly than regulation. The 1980s witnessed a reduction in regulation, an increase in government spending (although at a slower rate than for previous periods), and a constant share of government spending on the elderly despite their substantial growth in numbers, which we cannot explain with any single one of the theories we consider.

We show how, in principle, a study of the quantity, composition, and incidence of taxes, spending, and regulation can not only distinguish among potential causes for the growth of government, but also among the various models of public decision-making by which those causes affect public policy. This proves to be difficult in practice because each of the models considered—interest group competition, social redistribution, and merit goods—have in common the majority of their implications for public policy responses to various stimuli. If, as our evidence suggests, increased tax efficiency and power of the elderly are the main stimuli, then all three public decision models predict the same changes in the composition of spending and regulation. The three models do differ according to their predictions for the amount and incidence of non-elderly regulation, but not enough is known about regulation for us to favor one model over the others.

1.2 The Basic Interest Group Model

Consider a simple model of competition for political power between two interest groups, "Taxpayers" and "Beneficiaries" (this is an extension of the political competition model developed by Becker 1983 and Becker and Mulligan 2003). At the equilibrium, Taxpayers are made worse off in order to make Beneficiaries better off. Let I denote an "index of interference", which measures how much the government is doing to interfere with Taxpayers in order to benefit Beneficiaries. The index might denote amounts of taxes collected or regulations imposed on Taxpayers. Taxpayers spend resources, A, on lobbying legislators, influencing voters, etc. to persuade them to vote to keep taxes or regulations relatively low. Conversely, Beneficiaries spend resources, B, also trying to influence legislators and the electorate to vote to raise the transfers to them or beneficial (from Beneficiaries' point of view) regulation of Taxpayers.

We bypass an explicit discussion of the process involved in reaching government decisions on spending, taxes, and regulation. Instead, we assume a reduced form "influence function" that is the end result of what may be a very complicated process of electoral voting, legislative decisions, and executive branch initiatives. In this reduced form, government spending and regulation directly depend on the amounts A_I and B_I spent on gaining political influence:

$$I = F_I(\theta A_I, \lambda B_I) \tag{1.1}$$

where $F_a < 0$, $F_b > 0$, $F_{aa} > 0$, and $F_{bb} < 0$. θ and λ are parameters indexing the "political power" of A and B, respectively. The derivatives mean that increased political pressure by the taxed Taxpayers lowers government spending and regulation, while increased pressure by Beneficiaries raises government spending and regulation of Taxpayers, and both effects are subject to diminishing returns.

Each group is assumed to spend the amount on influencing the political outcome that maximizes its net income, given political spending by the other group. In the non-cooperative equilibrium, each group is maximizing, given the equilibrium level of spending by the other group. Therefore, Taxpayers minimize the sum of its political spending and the cost to members of its group of the taxes or regulations assessed against it. The cost of government activity per group member is $C(I/\alpha, \delta I)$, where α is Taxpayers' share of the population and δ_I is the parameter indexing the dead weight cost (dwc) of each dollar of taxes (or each unit of regulation) used to achieve the index of interference I/α per Taxpayer. So Taxpayers (collectively) minimize $AI/\alpha + C(I/\alpha, \delta_I)$.

Because per member costs are likely to be nonlinear in interference per member, aggregate costs for the group are likely to depend on the group's size α as well as aggregate pressure A and the aggregate index of interference I.

Similarly, Beneficiaries maximize the difference between the value to Beneficiaries of the subsidies it receives and the amount it spends on political activity. The value of the subsidy is $S(I/\beta, \sigma_I)$, where β is Beneficiaries' share of the population

($\alpha + \beta = 1$) and σ_I is a parameter indexing the dwc to Beneficiaries of each dollar of taxes (or each unit of regulation) used to achieve the index of interference I/β per Beneficiary. So Beneficiaries (collectively) maximize $S(I/\beta, \sigma_I) - B_I/\beta$.

We interpret aggregate pressures A_I and B_I, aggregate costs αC, and aggregate benefits βS as fractions of potential aggregate GDP. Although we recognize that actual GDP responds to the amount of government interference, henceforth we hold potential GDP fixed and suppress any reference to it.

1.2.1 Regulations vs Taxes and Subsidies

Although textbook analyses often suggest that cash transfers dominate regulation, this is no longer true once the deadweight costs of raising and spending the cash are taken into account: a taxpayer changes his behavior to avoid the taxes and a subsidized person changes his behavior to increase his subsidy. The reduction in labor supply occurring in order to reduce incomes and thereby decrease tax liabilities or increased subsidies is one well-known example of such change behavior. Hence, we assume that income is redistributed by two means in a political equilibrium: taxes and regulations. We let T and R denote these two indices of interference, which are determined according to the political pressures (A_T, A_R, B_T, B_R) applied by the two groups: $T = F_T(\theta A_T, \lambda B_T)$ and $R = F_R(\theta A_R, \lambda B_R)$.

We assume for simplicity that each index of interference is measured in the same units (say, dollars) as the pressures A_T, A_R, B_T, and B_R. This is more natural when taxes are the means of interference, but might also apply to regulation if the index R were measured in the right way. We also decompose the costs and benefits of interference I into a "transfer" I and a "deadweight loss" so that the functions C and S are:

$$\begin{aligned} C(I/\alpha, \delta_I) &= (I/\alpha) + \delta_I \Delta_I(I/\alpha) \\ C(I/\beta, \sigma_I) &= (I/\beta) - \sigma_I \Sigma_I(I/\beta) \\ \Delta_I'', \Sigma_I'' &\geq 0, I = T, R \end{aligned} \tag{1.2}$$

Notice that, when Δ and Σ are positive, I costs group A more than I and benefits group B less than I.

The social deadweight cost of government is $\alpha\delta_T\Delta_T + \alpha\delta_R\Delta_R + \beta\sigma_T\Sigma_T + \beta\sigma_R\Sigma_R$ plus the resources groups devote to influencing policy, $A_T + A_R + B_T + B_R$. We do not assume that $\alpha\delta_T\Delta_T + \alpha\delta_R\Delta_R + \beta\sigma_T\Sigma_T + \beta\sigma_R\Sigma_R$ is positive for all government activities or even that marginal social deadweight cost be positive for all government activities. Taxes, subsidies, and mandates "correcting market failures" or "providing public goods" are government activities which may have negative average and marginal social deadweight cost. We only assume Δ_T'', Σ_T'', Δ_R'', and $\Sigma_R'' \geq 0$—that the marginal government tax, transfer, or regulation has the largest marginal deadweight cost.

Our notation (Eq. (1.2)) and interpretation suggest that the government has a budget constraint for interference that balances—namely that, other than the dead-weight costs, every unit of interference enjoyed by Beneficiaries is a unit of interference suffered by Taxpayers. Our suggestion is quite natural when "interference" refers to taxes and spending, but less natural when interference refers to regulation. However, another legitimate interpretation of Eq. (1.2) is as *definitions* of the deadweight costs as a function of the total costs C and surpluses S—that the "dwc" suffered by each Taxpayer (each Beneficiary) from interference I/α per A (I/β per B) is defined to be the difference between $C(I/\alpha, \delta_I)$ and I/α (the difference between I/β and $S(I/\beta, \sigma_I)$). What is crucial for our results that this difference be a convex function of I.

Each group knows the "political process" F_T and F_R and applies pressures A_T and A_R (or B_T and B_R) to maximize their net surplus per member taking as given the pressure applied by the other group and the number of group members. Taxpayers minimize $C_T(T/\alpha, \delta_T) + C_R(R/\alpha, \delta_R) + (A_T + A_R)/\alpha$ while Beneficiaries maximize $S_T(T/\beta, \sigma_T) + S_R(R/\beta, \sigma_R) - (B_T + B_R)/\beta$.

A few relevant assumptions have been made above. First, given the parameters δ_T, δ_R,σ_T, and σ_R, the costs of taxes are independent of the costs of regulation. It is unclear whether, in fact, the marginal deadweight cost of taxes is increasing in the amount of regulation (as in the case of payroll taxes and minimum wage regulations) or vice-versa, although an interesting analysis of such interactions is possible.[1] Second, since A_T, A_R, B_T, B_R are separate choice variables, groups are assumed to be able to perfectly target their political pressure towards either taxes or regulation.[2] In other words, political pressure is "specific" to an index of interference. We explore the consequences of this assumption by imposing the constraints $A_T = A_R$ and $B_T = B_R$ on the problems describing the groups' political behavior, which means that pressure is "general" rather than "specific".

The first order conditions describing the optimal pressures are:

$$-\theta(\partial F_T/\partial A)(1 + \delta_T \Delta_T^{'}) = 1, -\theta(\partial F_R/\partial A)(1 + \delta_R \Delta_R^{'}) = 1$$
$$\lambda(\partial F_T/\partial B)(1 - \sigma_T \Sigma_T^{'}) = 1, \lambda(\partial F_R/\partial B)(1 - \sigma_R \Sigma_R^{'}) = 1 \tag{1.3}$$

The left-hand-side of each first order condition is the marginal benefit (in "dollars") of pressure, which depends on four factors: (1) the group's political power index (θ or λ), (2) the magnitude of the first derivative of the influence function F_T or F_R, (3) the deadweight cost parameter (δ_T, δ_R, σ_T, or σ_R), and (4) interference per group member.

[1] Summers et al. (1993), for example, suggest that some labor market regulations decrease the marginal deadweight cost of labor income taxes. The Council of Economic Advisors (2019b) concludes that entry regulations increase the marginal deadweight cost of taxes by, in effect, allowing the businesses in the industry to jointly administer an excise tax.

[2] Another way of stating this assumption is that F_T is independent of A_R and B_R while F_R is independent of A_T and B_T.

The first two factors each increase the marginal benefit. Because Taxpayers are trying to decrease interference and Beneficiaries increase it, an increase in the relevant deadweight cost parameter increases the marginal benefit of pressure for Taxpayers and decreases it for Beneficiaries. Of particular interest is the fourth factor, interference per group member. The deadweight cost functions (Δ_T,Δ_R,Σ_T, or Σ_R) are nonconcave, so more interference tends to increase marginal deadweight costs. This is an important source of the dependence of political outcomes on group size (and one emphasized by Becker 1983). Furthermore, aside from nonzero cross-derivatives of the influence functions, the fourth factor is the way in which one group's pressure affects the other groups marginal benefit of pressure. More pressure by one group tends to increase the marginal benefit of pressure by the other group unless the cross-derivative of the relevant influence function is sufficiently far from zero.

Because we place no restrictions on the magnitude of the first derivatives of the influence functions F_T and F_R or even the sign of the marginal deadweight costs, the first order conditions (3) show that our definition of "political equilibrium" does not imply that there is necessarily too little, or too much, government interference. Negative equilibrium average and marginal deadweight costs are perfectly consistent with our model.

Before deriving the effects of the various parameters on equilibrium taxes and spending, we mention some examples of changes in those parameters. Aging and increased retirement in an economy where taxes are on labor income and subsidies are mainly for the elderly is an example in the growth of the fraction of people subsidized (i.e., a decrease in α and an increase in β). The invasion of an enemy army can be a circumstance of a decrease in average and marginal deadweight cost (equivalently, and increase in average and marginal benefits) of spending and regulation—namely those that help defend against the enemy. Technological and structural economic changes—such as increased urbanization and monetization of the economy or decreased monitoring costs—can allow taxes, subsidies, and regulations to be administered more efficiently.[3]

1.2.2 Equilibrium Mix of Regulations and Cash Transfers

Our model is convenient for analyzing the effect of various parameter changes on the quantity, composition, and incidence of regulations and cash transfers. A few of the parameter changes have been derived in the literature and used to explain the growth of government—as in Kau and Rubin (1981), Turner (1984), Wilson (1990), and Becker and Mulligan (2003)—but our purpose here is to contrast the

[3]Becker and Mulligan (2003) emphasize that δ parameterizes "tax efficiency" in the sense that (for $\Delta' > 0$) a lower δ means lower average and marginal deadweight costs of taxes for any given amount of taxes to be collected.

implications of various theories from the literature. As we show below, the theories have substantially different empirical implications.

The first order conditions with respect to A_T and B_T alone determine the reaction functions and the Nash equilibrium A_T, B_T, and T. These equations are studied more carefully by Becker and Mulligan (2003). The first order conditions with respect to A_R and B_R alone determine the reaction functions and the Nash equilibrium A_R, B_R, and R.

Proposition 1.1 *With perfectly "specific" pressure, an exogenous change in the efficiency of taxes δ_T or the efficiency of spending σ_T affects the Nash equilibrium A_T, B_T, and the size of the budget T, but not A_R, B_R, or the quantity of regulation R. An exogenous change in the efficiency of regulation (δ_R or σ_R) affects the Nash equilibrium A_R, B_R, and the amount of regulation R, but not A_T, B_T, or the size of the government budget T.*

Proposition 1.1 is a strong result and obviously depends on our assumption that dwcs are important and that groups can expend resources to change taxes without changing regulation and vice versa. But the qualitative result—that δ_T and σ_T have a greater effect on taxes than on regulation—is quite general and, as we demonstrate below, allows us to distinguish changes in tax or spending efficiency from changes in the political power of those taxed or subsidized.

Henceforth, we restrict our attention to particular Nash equilibria: those that are "stable" and "strategically separable". The stability condition is familiar from game theory and restricts how Beneficiaries' reaction function might cross Taxpayers' in the $[A, B]$ plane. Unfamiliar is "strategic separability", by which we mean an exogenous increase in A's pressure or an exogenous decrease in B's pressure decreases equilibrium interference.[4] Our "strategic separability" restricts the magnitude of the cross-derivative F_{ab}, but is weaker than additive separability (i.e., is weaker than $F_{ab} = 0$).

The stability and strategic separability of the equilibrium gives us a Corollary to Proposition 1.1,

Corollary 1.1 *An increase in efficiency of taxes or spending increases T relative to R. An increase in the efficiency of regulation increases R relative to T.*

1.2.3 Causes of the Growth of Government Budgets

A number of reasons for the growth of government budget can be analyzed, which we do in Propositions 1.2, 1.3, and 1.4:

[4] $(F_{ab})^2 - F_{aa}F_{bb} > 0$ at an equilibrium is sufficient for the equilibrium to be "stable." $-F_bF_{aa}/(-F_a) < F_{ab} < F_aF_{bb}/F_b$ at the equilibria is necessary and sufficient for the equilibria to be "strategically separable." If the influence functions are either additively separable or homogeneous of degree zero, then any Nash equilibrium is stable and strategically separable.

Proposition 1.2 *A decrease in the political power of the taxed group (θ) or an increase in the power of the subsidized group (λ) increases aggregate taxes.*

Proposition 1.3 *An increase in the efficiency of taxes or spending (which is a decrease in δ_T or σ_T when $\Delta_T^{'}$ or $\Sigma_T^{'}$ are positive) increases taxes and spending. If political pressure is somewhat "general," an increase in the efficiency of regulation (which is a decrease in δ_R or σ_R when $\Delta_R^{'}$ or $\Sigma_R^{'}$ are positive) increases taxes and spending.*

Proposition 1.4 *An increase in the efficiency of regulation increases regulation. If political pressure is somewhat "general," an increase in the efficiency of taxes or spending increases regulation.*

Propositions 1.3 and 1.4 point out that, when pressure is somewhat "general", the amount of taxation depends on the efficiency of regulation and the amount of regulation depends on the efficiency of taxation. Even with completely specific pressure, these dependencies would arise if the marginal deadweight costs of taxation (regulation) were decreasing in the amount of regulation (taxation).

We begin to summarize these results of the interest group (IG) model in Table 1.1 and the Appendix Table A.1. The Tables also summarize results for two other models of government activity: the social redistribution (SR) model and the merit goods (MG) model. The SR and MG models are discussed in Sect. 1.3. In order to simplify the exposition, we look ahead to our empirical findings and report in Table 1.1 theoretical results for only three sources of government growth (more efficient taxes, more efficient regulation, and growing political influence of one subsidized group) and the empirical measures that might be used to distinguish them (the amount of regulation, the composition of taxes and spending taxes per regulation, and the relative incidence of taxes and regulation). Our framework can also distinguish among five other sources of government growth, which we compare in the Appendix Table A.1.

According to our Table 1.1, data on the amounts and composition of taxes, spending, and regulation are not enough to say whether growing government derives from increases in the efficiency of taxes or of spending. We can, however, distinguish these causes from a mere increase in the (relative) power of those subsidized because the former predict an increase in taxes per regulation. With measures of the efficiency of taxes and spending, we can begin to distinguish increased tax efficiency from increased spending efficiency, and show elsewhere how to do so (see Becker and Mulligan's (2003) analysis of wartime and "flypaper" effects).

It is also easy to show that the effects of tax and spending efficiency on tax collections increases with the relative political power of those subsidized. From Young's theorem, it then follows that more relative political power for those subsidized leads to a greater increase in government when efficient means of redistribution are available. Hence, increased efficiency of redistribution (the "supply" of government) and increased political power of those demanding redistribution (the "demand" for

Table 1.1 Accounting for the growth of government (both general and specific pressure)

Source of growing spending and taxes	Model of public decisions[b]	Changes in amount of regulation	Changes in composition of spending and regulation	Changes in taxes per regulation	Correlation between regulation and tax incidence
More efficient taxes or spending	IG	+	0	+	+
	SR	−	0	+	+
	MG	+	0	0	−
More efficient regulation[a]	IG	+	0	−	+
	SR	−	0	+	+
	MG	+	0	0	−
Power of one subsidized group	IG, SR	+[c]	Yes	0	+

[a]SR model predicts growing government budgets when regulation becomes *less* efficient
[b]Models of public decisions: *IG* interest group, *SR* social redistribution, *MG* merit goods
[c]Result requires somewhat stronger assumptions than stability and strategic separability ($F_{AB} = 0$ sufficient)

government) may be complementary explanations for the growth of government rather than competing (Kau and Rubin 1981).

How do demographic shifts affect aggregate interference, interference per taxpayer, and interference per person subsidized? Holding fixed aggregate interference I, a movement of some people from the subsidized group to the taxed group increases I/β which decreases the marginal benefit of \$1 of pressure by Beneficiaries. But the same movement of people decreases I/α and, because the marginal deadweight cost of taxes is lower for the larger taxpaying group, decreases the marginal benefit of \$1 of pressure by Taxpayers. With both groups reducing their pressure, we cannot sign the effect on aggregate interference. The reduced pressure by Taxpayers is likely to dominate when deadweight losses are more convex on the taxpayer side or when the taxpaying group is relatively small.

It is unambiguous, however, that I/α must fall and I/β increase. There is a large literature suggesting that group size is an important determinant of taxes per taxpayer and subsidies per person subsidized, with smaller subsidized groups enjoying more subsidies (or beneficial regulation) per member and larger tax paying groups enjoying fewer taxes or (less costly regulation) per member.[5]

1.2.4 Predictions for the Composition of Spending, Taxes, and Regulation

In order to analyze the composition of spending and taxes, we introduce an additional taxed group for a total of three groups: Taxpayers1, Taxpayers2, and Beneficiaries with population shares $\alpha_1, \alpha_2, \beta$ with $(\alpha_1 + \alpha_2 + \beta = 1)$. Let $A_{Ti}(A_{Ri})$ denote the political pressure applied by taxpaying group i against Beneficiaries in order to reduce taxes (regulation) and let $T_i(R_i)$ denote the amount of taxes (regulation) levied against taxpaying group i. Let $B_T(B_R)$ denote the political pressure applied by Beneficiaries in order to increase taxes (regulation).

$$T_i = F_T(\theta_i A_{Ti}, \lambda B_T),\ R_i = F_R(\theta_i A_{Ri}, \lambda B_R),$$

$$A_i \quad \text{minimizes}: \quad C_{Ti}(T_i/\alpha_i, \delta_{Ti}) + C_{Ri}(R_i/\alpha_i, \delta_{Ri}) + (A_{Ti} + A_{Ri})/\alpha_i, \quad i=1,2$$

$$B \quad \text{maximizes}: \quad S_T((T_1 + T_2)/\beta, \sigma_T) + S_R((R_1 + R_2)/\beta, \sigma_R) - (B_T + B_R)/\beta$$

We interpret the parameters as in the two group case, and point out that a similar set of assumptions are made about the nature of politics and interference: costs of taxes are independent of the costs of regulation and political pressure is specific to either taxes or regulation. We also assume that the subsidized group cannot target its pressure against a particular taxpaying group.

[5] See Wittman (1989, p. 77) for a discussion. Demsetz (1982), Friedman and Friedman (1980), Becker (1983) and others derive this result.

We continue to restrict our attention to stable and strategically separable Nash equilibria.[6] Proposition 1.5 states the familiar separability result which, of course, would not hold if political pressure were general:

Proposition 1.5 *With perfectly "specific" pressure, an exogenous change in the efficiency of taxes (δ_{T1} or δ_{T2}) or the efficiency of spending (σ_T) affects the Nash equilibrium A_{T1}, A_{T2}, B_T, and the size of the budget $T = T_1 + T_2$, but not A_{R1}, A_{R2}, B_R, or the quantity of regulation $R = R_1 + R_2$. An exogenous change in the efficiency of regulation (δ_{R1}, δ_{R2} or σ_R) affects the Nash equilibrium A_{R1}, A_{R2}, B_R, and the amount of regulation R, but not A_{T1}, A_{T2}, B_T, or the size of the government budget T.*

Although complete separability of the politics of taxes and regulation would not occur if political pressure were general to some degree, we still expect δ_{T1}, δ_{T2} and σ_T to have greater effects on taxes than on regulation and δ_{R1}, δ_{R2} and σ_R to have greater effects on regulation than on taxes.

Some other familiar results can be obtained from the three group model and are reported in Propositions 1.6 and 1.7:

Proposition 1.6 *An increase in the power of the subsidized group (λ) increases taxes and regulations levied on both taxpaying groups.*

Proposition 1.7 *A decrease in the political power of taxed group $i(\theta_i)$ increases taxes and regulation paid by i. The change in $i(\theta_i)$ must either increase aggregate taxes or decrease taxes paid by the other taxed group (and either increase aggregate regulation or decrease regulation paid by the other taxed group). If the influence functions are additively separable, then aggregate taxes and regulation increase and taxes and regulation paid by the other taxed group decrease.*

Stability and strategic separability are not sufficient to guarantee that less power by *some* taxpayers (and more taxes paid by them) decrease taxes and regulation levied against other taxpayers. This can be seen in the special case that $\Sigma'' = 0$ and F_{ab} is negative (but not so negative so as to violate strategic separability): the decrease in A_i increases the marginal product of pressure for the subsidized group. The subsidized group raises its pressure. Since strategic separability has been assumed, B's increase cannot be enough to increase T_i. However, to the extent that Beneficiary pressure cannot be targeted towards a particular taxed group, more pressure is applied against the other taxed group which can increase taxes paid by that group (and thus aggregate taxes).

Additive separability of the influence functions ($F_{ab} = 0$) and strict convexity of Beneficiary deadweight costs ($\Sigma'' > 0$) is sufficient to guarantee that less power by some taxpayers increase aggregate taxes and regulation and decrease taxes and

[6] With three groups, more complicated restrictions on the pressure and deadweight cost functions are required to guarantee that any Nash equilibrium is stable and strategically separable. Additively separable influence functions and nonconcave deadweight cost functions are sufficient but not necessary.

regulation levied against other taxpayers. Our Table 1.1 assumes that aggregate taxes and regulation increase and, more weakly, that the composition of taxes and regulation changes.

"Political power" is relative in our model, so it is important to notice that we model a decrease in the power of taxed group i (θ_i) as a decrease relative to the other taxed group and relative to those subsidized. In other words, the relative power of those subsidized and the other taxed group is unchanged. A decrease in the power of taxed group i that does not change the power of i relative to those subsidized will still change the composition of taxes as indicated in Proposition 1.7, but need not lead to an increase in total taxes and spending.

Propositions 1.3 and 1.4 considered "exogenous" changes in the efficiency of taxes, subsidies, and regulation. Our results in this regard are most interesting when there are "exogenous" differences over time or across governments in technology, industrial composition, or government knowledge of public finance that permit exogenous differences in tax efficiency. But a government's system of taxes, subsidies, and regulations may become more efficient because those harmed by the more efficient taxes and regulations lose political power, or because those benefiting from more efficient subsidies and regulations gain political power. These possibilities can be worked out in the version of our model with two taxed (or two subsidized groups) by shifting the index of political power for the group with the lower δ_T or δ_T (or σ_T or σ_R) and applying Proposition 1.7. Even if λ were decreased so as to remain unchanged relative to an average of θ_1 and θ_2, we expect government to grow because resistance by the efficiently taxed group is relatively more important while that group is least willing to resist because it suffers relatively few deadweight costs for a given amount of revenue to be extracted from it. But this endogenous increase in tax efficiency is different from the exogenous increase considered in the first row of Table 1.1 because: (a) the composition of taxes changes, (b) the composition of spending changes, and (c) there is no change in taxes per regulation.

Proposition 1.8 *An increase in the efficiency of spending (which is a decrease in σ_T when $\Sigma_T^{'}$ is positive) increases taxes levied on both taxed groups. An increase in the efficiency of regulation for Beneficiaries (which is a decrease in σ_R when $\Sigma_R^{'}$ is positive) increases regulation levied on both taxed groups. If political pressure is somewhat "general," an increase in the efficiency of regulation for Beneficiaries increases taxes levied on both taxed groups and an increase in the efficiency of spending increases regulations levied on both taxed groups.*

Proposition 1.9 *An increase in the efficiency of taxes for one taxed group (which is a decrease in δ_{Ti} when $\Delta_{Ti}^{'}$ is positive) increases taxes levied on that group. An increase in the efficiency of regulation for one taxed group (which is a decrease in δ_{Ri} when $\Delta_{Ri}^{'}$ is positive) increases regulation levied on that group. If political pressure is somewhat "general," an increase in the efficiency of regulation for one taxed group increases taxes levied on that group and an increase in the efficiency of taxes for one taxed group increases regulations levied on that group.*

Proposition 1.7 suggests that stronger assumptions are required to sign the effects of one group's tax efficiency on the other taxed group and on aggregate taxes. Proposition 1.10 makes a sufficient assumption.

Proposition 1.10 *Let $F_{ab} = 0$. An increase in the efficiency of taxes for one taxed group decreases taxes levied on the other group and increases aggregate taxes. An increase in the efficiency of regulation for one taxed group decreases regulation levied on the other group and increases aggregate regulation. If political pressure is somewhat "general," an increase in the efficiency of regulation for one taxed group decreases taxes levied on the other group and increases aggregate taxes while an increase in the efficiency of taxes for one taxed group decreases regulation levied on the other group and increases aggregate regulation.*

By introducing an additional taxed group into the two group model, we have derived results for the composition of taxes. An analogous set of results could be derived for the composition of spending by introducing an additional subsidized group. We do not present the details of the analysis here, but enter the analogous results in the Appendix Table A.1.

1.3 Interest Group Approach Compared with Other Models of Public Decisions

We model public decisions as an outcome of a competition among interest groups, but there are a number of other models of public decisions in the literature. Three of those—the efficiency maximization, social redistribution, and merit good models—have in common the majority (but not all) of their implications for public policy responses to various stimuli. Hence, in principle, accounting for the growth of government requires identifying a growth stimulus *and* a model of the effect of that stimulus on public policy. In practice, the different implications of the public decision models are too subtle for us to test with our data.

1.3.1 Efficiency Maximization

Many have suggested that government policy can be described as maximizing efficiency (taking as given that each person paying taxes and being subsidized will act in his individual interest). The literature includes Wittman's (1995) claim that democratic institutions are efficient and Barro's (1987) argument that U.S. federal government debt policy efficiently allocated tax burdens over time. Efficiency can be defined in our model as the set of transfers (T_1, T_2, R_1, R_2) minimizing the sum of deadweight costs across those paying taxes and receiving subsidies (although this ignores the costs associated with attempts to influence policy in our model): $\alpha_1\delta_{T1}\Delta_{T1}(T_1/\alpha_1)+\alpha_2\delta_{T2}\Delta_{T2}(T_2/\alpha_2)+\alpha_1\delta_{R1}\Delta_{R1}(R_1/\alpha_1)+\alpha_2\delta_{R2}\Delta_{R2}(R_2/\alpha_2)+\beta\sigma_T\Sigma_T((T_1+T_2)/\beta)+\beta\sigma_R\Sigma_R((R_1+R_2)/\beta)$.

A necessary condition for efficiency maximization is the equation of marginal deadweight costs across various taxes described by Ramsey (1927).

Although there are no influence functions F_T and F_R satisfying our assumptions (Eq. (1.1)) for which the equilibrium is the efficient set of transfers, there are functions that would approximate it arbitrarily closely. Thus we consider efficiency maximization as a limiting case of our analysis.[7]

In addition to equating marginal dwc across types of taxes and regulations, efficiency maximization has strong implications for the level of taxes and regulation. Namely, the aggregate marginal dwc of each tax and each regulation is zero:

$$\delta_{T1}\Delta'_{T1}(T_1/\alpha_1) + \sigma_T \Sigma'_T((T_1 + T_2)/\beta) = 0$$

$$\delta_{T2}\Delta'_{T1}(T_2/\alpha_2) + \sigma_T \Sigma'_T((T_1 + T_2)/\beta) = 0$$

$$\delta_{R1}\Delta'_{R1}(R_1/\alpha_1) + \sigma_R \Sigma'_R((R_1 + R_2)/\beta) = 0$$

$$\delta_{R2}\Delta'_{R1}(R_2/\alpha_2) + \sigma_R \Sigma'_R((R_1 + R_2)/\beta) = 0$$

In other words, taxes and regulations are used only because they enhance efficiency.

In that limiting case, the amount of regulation is independent of the efficiency of taxes and the amount of taxation is independent of the efficiency of taxes or spending, as in our Propositions 1.1 and 1.5. However, not all interest group pressure is general so, in the interest group model, we expect more efficient taxes to increase regulation and more efficient regulation to increase taxes. The other qualitative results reported in Table 1.1 are shared by the efficiency maximization model. The efficiency maximization model has been modified in the literature in two important ways, which we refer to as the "social redistribution" and "merit good" models.

1.3.2 Social Redistribution

The efficiency model has been enhanced, most famously by Mirrlees (1971), by allowing for a social objective for redistribution. In our notation, this might be thought of as maximizing a monotonic "social welfare function" of each group's surplus.[8] Groups do not enter symmetrically in the social welfare function, because some group's surplus is assumed to contribute more to "social welfare" than others. For example, as in the utilitarian models, the surplus of each group contributes to social welfare in proportion to its average marginal utility. Political power and other

[7] The limiting case is $F(A, B)$ proportional to $B - A$.

[8] It has been shown (e.g., Mueller 1989 and Ledyard 1984) how democratic and other political institutions might deliver policies as if a social welfare function were being maximized.

considerations can also be reflected in the form of the social welfare function. We refer to this model as the social redistribution (SR) model.

Adding a social welfare function to the efficiency model has important implications for the amount of tax, spending, and regulation. Taxes and regulations can be used *beyond* the point of efficiency—so that equilibrium aggregate marginal deadweight costs are positive—in order to transfer resources from groups receiving less importance in the social welfare function to groups receiving more importance.

It is straightforward to derive implications from the SR model for the effect of changes in the relative size of the taxpaying and subsidized groups, and those implications are similar to those of the IG model. Some implications differ between the SR and IG models, and we discuss those in Sect. 1.4.

1.3.3 Merit Goods

Over some range, the aggregate marginal deadweight cost of regulation $\Delta_R^{'} + \Sigma_R^{'}$ may be negative. For example, some regulations may be used to discourage activities with negative external effects ("demerit goods") and encourage activities with positive external effects ("merit goods"). The merit and demerit goods can have external effects in the technical sense—as with pollution or donating blood—or it may be that some citizens prefer to see other citizens consume merit goods and avoid demerit goods. Regulations encouraging merit behavior and discouraging demerit behavior may harm some individuals, even though they enhance aggregate efficiency.

This environment is included as a special case of our interest group model, because nowhere have we ruled out the possibility that $\Delta_R^{'} + \Sigma_R^{'} < 0$. As a special case, our Table 1.1 predictions for the amount, mix and incidence of taxes, spending, and regulation are the same even if most of regulatory activity is motivated by efficiency considerations (i.e., $\Delta_R^{'} + \Sigma_R^{'} < 0$) rather than as a means of redirecting resources to the politically powerful. In particular, the existence of such regulation does not, according to the IG model, tell us anything about the quantity or composition of taxes and spending.

As long as there are losers from the marginal regulation, political competition as we have modeled it does not guarantee that the efficient amount of regulation will occur (i.e., to the point where $\Delta_R^{'} + \Sigma_R^{'} = 0$). Indeed, there will tend to be less regulation than is efficient (i.e., equilibrium R is such that $\Delta_R^{'} + \Sigma_R^{'} < 0$) unless those who benefit most from efficient regulation also happen to be the politically powerful. The negative marginal deadweight costs mean that, starting from zero regulation, those who gain from regulation have more incentive to fight for regulation than those who lose have incentive to fight back—political competition can move regulation in the direction of efficiency.[9] However, the gainers run into

[9]This point is made by Becker (1983).

diminishing returns to political pressure and hence have a lesser incentive to fight for additional regulation. Only if the gainers also enjoy more than average political power can it be expected that they will continue to pressure for regulation up to or beyond the point where aggregate efficiency is maximized.

Hence, even ignoring the inefficient "rent-seeking" nature of political action, our interest group model leaves some gains from trade in the case when $\Delta_R^{'} + \Sigma_R^{'} < 0$. This leaves open the possibility that, excluded from our model, are political institutions which can arrange for those who lose from regulations (say, Beneficiaries) to be granted a cash transfer from those who gain (say, Taxpayers). Some (e.g., Harberger (1984), Sala-i Martin (1996), Mulligan and Philipson (1999), and many others) have argued that the bulk of government spending can be understood as payment by those who want changes in behavior to those changing their behavior (which Mulligan and Philipson call "purchasing merit goods"). The authors argue that schooling, health expenditures, and an early retirement are important examples of merit goods.

One institution that might exploit these gains from trade is a protocol for bargaining between the two interest groups (Taxpayers and Beneficiaries in our model). A social redistribution model would also predict these gains from trade to be realized and, assuming that the social motives for redistribution discussed in Sect. 1.3.3 are relatively unimportant (i.e., each group's surplus enters the social welfare function symmetrically), those who benefit from regulation would pay taxes to subsidize those harmed. This mechanism for public decisions analyzed by Mulligan and Philipson (1999), which we refer to as the merit good (MG) model. It is really a special case of the social redistribution model, but a different case than we consider above, for which redistribution of resources to the poor and/or the politically powerful are the primary motives for policy. We refer to this latter case as the social redistribution (SR) model.

Sala-i Martin (1996) has argued that one of the largest government programs, Social Security, is an exchange of cash transfers for merit goods. The merit good is elderly leisure (because, he argues, more leisure by the old enhances productivity for the young), the cash transfer is a Social Security check, and regulation requires that recipients of the cash transfer exit the labor force. Olsen and York (1984) and Mulligan and Philipson (1999), have argued that housing assistance, public medical insurance, public retirement savings programs, and other subsidy programs are also an exchange of cash transfers for merit goods.

1.4 Explanations from the Literature as Special Cases of Our Model

The analysis summarized in Table 1.1 and Appendix Table A.1 allows a reader to categorize various explanations for the growth of government according to their

implications for the level and composition of taxes, spending, and regulation. We illustrate this with a number of examples from the literature.

1.4.1 Better Technologies for Tax Collection

Building on the insights of Brennan and Buchanan (1980), Wilson (1990), and others, Kau and Rubin (1981) and Becker and Mulligan (2003) blame some of the growth of government over time on the emergence of better means of tax collection. Theirs is an increase in the efficiency of taxes for all taxpayers (a reduction in the parameters δ_{T1} and δ_{T2} when $\Delta_T^{'} > 0$) and results in more spending, more taxes, more regulation, more taxes per regulation, and no change in the composition of taxes, spending, and regulation.

As long as there are multiple policy instruments for achieving the socially optimal distribution of income, the SR model equates aggregate marginal deadweight costs across each instrument—as in the efficiency maximizing model. For example, if the poor, or the elderly, or some other preferred group can be assisted with both cash transfers and regulations, the aggregate marginal deadweight cost of transfers will be equated to the aggregate marginal deadweight cost of regulation. This means that an exogenous enhancement of the efficiency of taxes (regulation) decreases the use of regulation (taxes). This is an important difference from the predictions of the IG model, so we enter separate rows for the SR model in Table 1.1 and in the top part of Appendix Table A.1.

Taxes, spending, regulation are simultaneously determined in the MG model. Taxes are levied in order to compensate losers from regulation, and regulation is politically acceptable because the losers can be compensated with subsidies. Hence, an increase in the efficiency of taxes increases the scope for compensating the losers from regulation, and thereby increases regulation. Regulation also increases in the IG model, but the incidence of the regulatory and tax changes are different. The same group gains from additional taxes and regulation (namely, Beneficiaries) in the IG model while those who gain from the additional regulation in the MG model are those who lose from additional taxes and spending. The IG and MG models differ in similar ways according to the public policy response to an increase in the efficiency of regulation.

La Porta et al. (2008) suggest that the efficiency of regulation is affected by legal origins, with the French legal origins associated with the most efficient regulation. The IG model says that French legal origins would be associated with higher taxes too (although less taxes per regulation—see Table 1.1) whereas the SR model says that taxes would be lower.

1.4.2 Changes in Military Spending

Military spending is, of course, affected by domestic political forces. But, with the intention of explaining government policies during wars like World War II or the policies of a threatened state like Israel or Egypt, consider an increase in military spending motivated by "efficiency" considerations. This fits into our analysis as an increase in the efficiency of spending and, because the efficiency of nonmilitary spending is roughly unchanged, an increase in efficiency for only a subset of those subsidized (i.e., a reduction in σ_{T1} holding σ_{T2} and other parameters constant). As shown in Appendix Table A.1, we predict an increase in spending, a reduction in nonmilitary spending, and an increase in taxes.

The need to fight a war may also be associated with an increase in the efficiency of regulation,[10] but we presume that relatively more wartime "needs" are for Treasury revenue rather than increased mandates. Thus we cannot predict whether regulation increases or decreases, but any increase should be less than the increase in Treasury revenue.[11]

1.4.3 Changing Political Influence

Some argue that government has grown because particular subsidized groups have gained political influence. Examples from the literature include Peltzman's (1980) theory of the homogeneity of subsidy groups, Lott and Kenny's (1999) analysis of female suffrage and Mulligan and Sala-i Martin's (1999) study of the growing political influence of the elderly. We model this as an increase in the political power index λ for a subset of those subsidized (or in Peltzman's case, perhaps an increase in λ for all those subsidized). As reported in Table 1.1, we expect an increase in total spending and regulation and an increase in spending and regulation for the group gaining influence, a decline in spending and regulation benefiting others, and no change in the relative amount of spending and regulation.

As our analysis has shown, it is important in these applications that a subsidized group's power increases relative to taxpayers and relative to those not in the group and being subsidized. If the increase in political influence were only relative to other subsidy recipients, there may only be a reallocation of spending but not an

[10] For example, Warner and Asch (1996) and others have suggested that conscription is efficiency enhancing.

[11] In order to sign the effect of war on regulation, we need to make additional assumptions about the effect of war on the struggle between A's and B's. If, holding pressure constant, the effect of war is to increase total taxes and spending without reducing nondefense spending, then the increased resistance by taxpayers will result in a net decrease in regulation. If, holding pressure constant, the effect of war is to reduce nondefense spending without increasing taxes, then the increased pressure by those subsidized will result in more regulation.

increase in total spending and taxes. Some in the literature (e.g., Browning 1975, Boadway and Wildasin 1989) have derived an increase in elderly influence relative to taxpayers from the fact that many taxpayers expect to become elderly themselves. Mulligan and Sala-i Martin (1999) also suggest that the elderly have become more "single-minded" or "group-conscious" relative to taxpayers.

The social redistribution approach typically offers an ethical rather than a positive interpretation of the marginal importance of each group's contribution to social welfare, but changes in the social welfare function, for whatever reason, might be used to explain the growth of government. The qualitative implications of, say, increased social importance of those subsidized are similar to those of the IG model in response to the growth of the political power of those subsidized. We therefore enter these implications of the SR and IG models in the same rows of Table 1.1.

1.4.4 "Corporatism"

Summers et al. (1993, pp. 385–386) and Olson (1982) explain that "corporatist" economies might make labor supply decisions collectively, and collective labor supply decisions reduce the marginal deadweight cost of labor income taxes.[12] In other words, the marginal dwc of taxes and subsidies decrease with the amount of regulation. This means that taxpayers are less enthusiastic about resisting regulations against them, because such regulations have the benefit of reducing dwcs of taxes. And, given an additional amount of regulation, taxpayers have less reason to resist spending because the marginal dwc of taxes has fallen. We leave it to the reader to prove that the results in our interest group (IG) model obtain when the function Δ_T and Σ_T depend on R in this way, because the added interaction between taxes and regulation only reinforces the positive correlation between the two predicted by the model.

The "corporatism" theory may modify one of the implications of the social redistribution (SR) model of public decisions. It explains how an *increase* in the efficiency of regulation might lead to a growth in taxes and spending. As explained above, the "social planner" reacts to more efficient regulation by increasing regulation but, rather than substituting away from cash transfers, the planner may increase them because the additional regulation has reduced their marginal dwc.

[12]Olson (1986) appropriately qualifies the argument, pointing out that free-riding among sub-coalitions of a "collective" organization might be just as important as the free-riding among organizations.

1.4.5 Slow Productivity Growth in the Public Sector

Baumol (1976) and others have suggested that some of the goods purchased by the public sector have become relatively expensive—perhaps because of relatively slow productivity growth in that sector—which, because the "demand" those goods is price inelastic, has led to an increase in public expenditure. Our accounting framework includes Baumol's explanation. To see this, define the "utility" u of the "Baumol" goods by the public sector to be the difference between their cost and the dwc of spending:

$$u(T/(\beta p)) \equiv T - \Sigma_T(T/\beta; p) \tag{1.4}$$

where p denotes the price of the Baumol goods. Here our notation explicitly allows for the possibility that the dwcs of public expenditure depending on the price of the Baumol goods. Equation (1.4) also shows how Baumol's restrictions on the utility function are equivalent to restrictions on the dwc function Σ_T. In particular, the effect of the Baumol price p on equilibrium expenditure T has the same sign as the difference between one and the magnitude of the price elasticity of demand (represented by u).[13] In this case, higher spending occurs because higher p decreases the marginal dwc of spending for any given amount of spending, an effect which we have referred to as an increase in (marginal) spending efficiency. Hence, as shown as Table 1.1 and Appendix Table A.1 (see especially the second-to-last row), we predict more spending, more taxes, more taxes per regulation. Appendix Table A.1 also reports how Baumol's explanation, and other government growth explanations based on increased marginal spending efficiency, differ from an efficient tax explanation because the former predict a change in the composition of spending (in this case, relatively more spending on the Baumol goods) and little effect on the composition of taxes.

1.4.6 Marxist Theories

Marxist theories of government also fit into our framework, where the interest groups might be labeled as "labor" and "capital". One rendition of that theory (Foley 1978) supposes that capitalists tend to control government and limit subsidies to which laborers are entitled, but that the degree of capitalist control changes over time. Growing government could then be explained by a reduction in the political power of capital which we would predict to be associated with a less favorable regulatory environment for capital as well as capital's bearing a greater share of the tax burden. A full analysis of the functional incidence of taxes (including questions

[13] Proof available upon request.

whether short- or long-run incidence drive government behavior), and how that incidence has changed over time, is beyond the scope of this paper, but the decline over time in the importance of property and corporate income tax revenues (Barro 1987) suggest that capital is not bearing an increasing share of the tax burden. We suggest in the next section that business regulation has increased over the century, although the trend for recent decades is more ambiguous.

1.5 Evidence from the US

It is well known that government spending has grown over time in developed countries. We present time series measures of the quantity and composition of government spending, taxes and regulation in the U.S. The time series are compared with the predictions from Table 1.1 to evaluate which explanation(s) for the growth of government might be the primary explanation. Our preliminary empirical findings are summarized in Table 1.2.

Table 1.2 Summary of preliminary empirical measures of the amount, composition, and incidence of taxes, spending, and regulation

Change in	Measured by	1890–1930	1930–1980	1980–1990	1890–1990
Amount of spending	Gen gov spending/GNP	0/+	+	+	+
Amount of regulation	Committee staff size	0	+	−	0
	Federal civilian employment/POP	+	+	0	+
	Federal civilian employment/GNP	0	+	−	0
	Member staff size		+	−	
	Regulatory costs/GNP			−	
	Regulatory costs/POP			0	
	US code pages		+	+	
	Gen gov civilian employment/POP		+	0	
	Gen gov civilian employment/GNP, court cases, FR pages		+	−	
Taxes/regulation	All indicators	0	+	+	+
Elderly spending	Spending/GNP, fraction of all spending	−	+	0	+
Elderly regulation	Business regulation	−	+	−	+
	Elderly labor regulation	0	+	+	

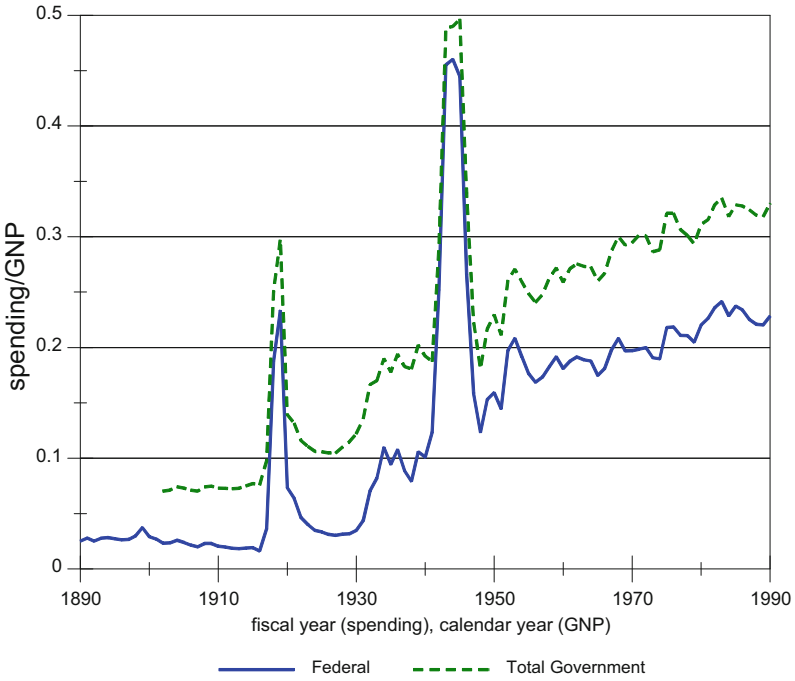

Fig. 1.1 US spending measures 1890–1990, normalized by real GNP

1.5.1 Spending over Time

Figure 1.1 shows how American government spending has grown over time, especially at the federal level. Over the period 1890–1990, the fraction of GNP spent by the Federal government (including grants to state and local governments) has grown from 0.023 to 0.23 while real GNP grew by a factor of 25. Thus federal government spending grew by a factor of 250 in real terms and by a factor of 10 relative to GNP. We measure general government spending (federal plus state and local, net of intergovernmental transfers) back to 1902 when the fraction of GNP spend by all levels of government was 0.066 (0.022 Federal plus 0.044 state and local). General government spending reach 34% of GNP by 1990—an increase by a factor of five since 1902. Interrupted only by WWII and the Korean War, the increase in government spending is spread pretty evenly over the period 1932–1990. The Reagan and post-Reagan periods are not a quantitatively important interruption of this trend, although some of the spending has been shifted to state and local governments during this period. Government spending growth was slow for a longer period of time prior to 1930.

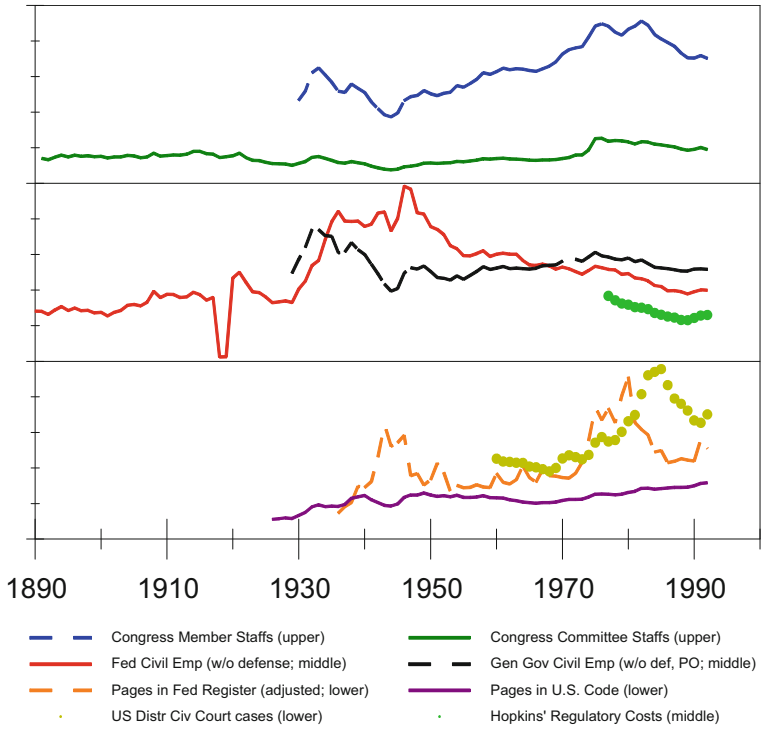

Fig. 1.2 US regulation measures 1890–1990, normalized by real GNP

1.5.2 Regulation over Time: Five Indicators

Regulation is more difficult to quantify, but Fig. 1.2 displays eight indicators of the quantity of regulation relative to GNP over the period 1890–1990. Each of the measures is displayed in one of the frames (upper, middle, and lower). Since we are interested in the growth of regulation rather than its level, we have multiplied each measure by its own constant so that the changes over time might be seen more easily in the graph. Each frame's scale begins at zero, so a movement of a series from the first tick to the second represents a doubling of regulation, a movement from the second to the third a 50% increase, etc.

Two of those indicators—Congressional Committee Staff sizes and the number of Federal civilian employees excluding defense—are available for most of the period and do not show any substantial trend relative to GNP.[14] Variations on these two series—Congressional Member Staff sizes and General Government

[14]We have only computed Congressional Committee Staff sizes for the years 1891, 1914, 1930, 1935, 1947, 1950, 1955, 1960, 1965, and 1970–1990 so any high frequency variation in the associated regulation measure is from the real GNP series used in the normalization.

Civilian Employment (excluding federal defense and Post Office employees)—are available for fewer years. The postwar trend relative to GNP has been downward for Federal employees and slightly upward for Congressional Committee and Member Staff sizes. General Government Civilian Employment does not trend down since the War—unlike Federal Civilian Employment—mainly because of the increased school-related employment by states and localities. Both the Congressional Committee Staff and Congressional Member Staff Size series suggest a postwar regulatory peak in the 1970s. The fastest growing of these indicators—Congressional Committee Staff sizes has grown by only a factor of 1.7 relative to GNP since 1930.

Three other indicators of regulation are pages in the Federal Register (FR), pages in the *US Code*, and the number of US District Civil Court cases commenced. Pages in the FR is an interesting measure of federal regulation since, with only a few exceptions, all federal regulations are recorded there. The FR consists of laws passed by Congress, executive orders, and federal government agency reports. The inclusion of agency reports is of interest because federal agencies often interpret and elaborate on fairly vague statutes, although changes in FR rules have resulted in some increase in agency reporting that is not associated with increase regulation.[15]

1.5.3 Regulation over Time: Two Refinements of FR Pages

There are a variety of other reasons why FR pages are not a perfect quantitative measure of the amount of federal regulation. For example, extensive *de*regulation or *re*regulation might actually temporarily increase the number of pages in the FR without increasing—or even decreasing—the stock of Federal regulation. And the amount of regulation might increase substantially with a decrease in the number of pages. It can also be argued that each volume of the FR reports *increments* to the stock of regulation rather than the stock itself. We suggest several alternative measures that might alleviate some of these problems with FR pages.[16] The first alternative is the number of pages in the *US Code*. The *US Code* has been issued every 6 years since 1926 and reports the federal statutes in effect at the time of

[15]Figure 1.2 includes an adjustment for the passage of the Freedom of Information, the Privacy, and the Sunshine Acts between 1967 and 1974. The Acts require additional reporting in the FR by Federal government agencies of their activities and contributed to the tripling of the page counts between 1967 and 1975 (United States Office of the Federal Register 1980, p. 1). We adjust all page counts after 1970 by a factor of 0.8, an adjustment which implies that 20% of the pages would not exist in the absence of the acts and that the Acts were responsible for roughly one third of the 1967–1975 page count growth. Otherwise, our examinations suggest that the font size and legalese of the FR have been constant over time.

[16]As a measure of regulation, Congressional Staff Sizes also share many of the shortcomings of FR pages: large Congressional staffs might indicate an increased flow of regulation rather than a larger stock; staff sizes might be larger when lots of deregulation or reregulation occurs.

publication. Hence, it is a more direct measure of the stock of federal regulation than is FR pages. Unlike the FR, the *US Code* excludes executive orders and agency reports, which can be an advantage when comparing regulation before and after the period 1967–1975 (see the previous footnote). Pages in the *US Code* have increased less than pages in the FR since the 1930s and, unlike FR pages, have continued to increase since 1980. Nevertheless, pages in the *US Code* have not increased as much as real tax revenue.[17]

Other alternatives to FR pages are resources devoted to the enforcement of regulation—government employees and the number of civil court cases. Because we believe that some categories of government employees are not typically involved with enforcing government regulations, we try to exclude employees such as uniformed military personnel, defense civilian employees, postal employees, and (in a series not shown in the figure) municipal school employees. Including or excluding the categories of government employees does not substantially affect the estimation of trends from the data. Court cases did not trend relative to GNP for the years 1930–1970, but have increased at least 50% relative to GNP since.

None of the regulation measures increase as rapidly as real tax revenue. But it is presumed that, without any change in interference, both real tax revenue and regulation measures would increase proportionally with real GNP. Perhaps real tax revenue should be normalized by real GNP and the regulation measures by population? We let the reader answer this question and display in Fig. 1.3 the alternative population normalization (see also Mulligan and Shleifer 2005). We see that Federal Civilian Employment (excluding defense) increases by a factor of 3 or 4 during the period 1890–1990, with most of the increase from 1890–1950. Congressional Committee Staff sizes increase by a factor of 5.5, but most of its increase is since 1950. Factor of 3 or 4 increases relative to population are fairly typical for the regulation measures available only for the latter part of the period 1890–1990. Because federal government spending's share of GNP increased by a factor of 10 and general government's by a factor of 5, it is difficult to refute our conclusion that taxes have grown more rapidly than regulation merely by renormalizing the regulation series.

1.5.4 Regulation over Time: How Well Do the Seven Indicators Track Regulatory Costs?

It may well be that FR pages, Federal employees, and our other regulation indicators are related to the dollar cost of regulation in nonlinear way, so that the our indicators grow relatively slowly while the dollar cost grows rapidly. Hopkins (1996) much

[17] Tax law is part of the *US Code*, so growth in government revenues could lead to an increase in US Code pages without a real increase in regulation. We have therefore measured the nontax pages in the *US code* (i.e., excluding Title 26) for the years 1970–1994, and find nontax pages to increase by the same proportion as total pages over the entire period. Relative to nontax pages, Title 26 pages grew somewhat more 1970–1982, and somewhat less 1982–1994.

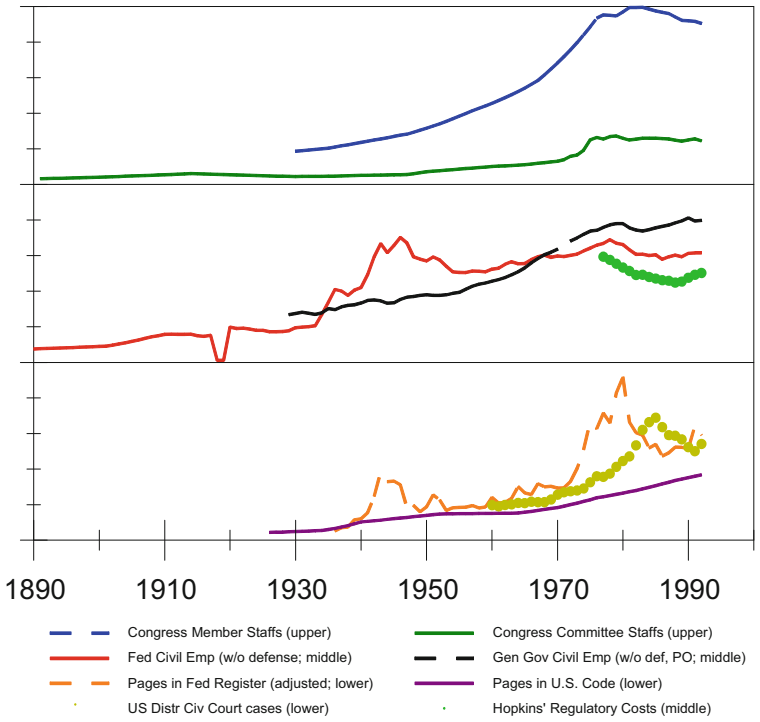

Fig. 1.3 US regulation measures 1890–1990, normalized by population

more detailed study of Federal regulatory costs for the period 1977–1994 provide a needed check on our rough indicators. Hopkins attempts to measure the total yearly dollar costs of federal regulations to those businesses, governments, and individuals "harmed" by adding together independent measures of regulation of different areas. He breaks total regulation down into three parts: (1) Environmental and Risk Reduction, (2) Price and Entry Controls, and (3) Paperwork. For (1), he relies largely on EPA and Dept. of Commerce Bureau of Economic Analysis data. The calculation of (3) involves straightforward multiplication of a $26 dollar estimated wage rate, with the "annual accounting of burden hours published by the Office of Management and Budget" (Hopkins 1996, p. 8).[18] We expect this approach to yield more accurate results because it attempts to measure actual dollar costs incurred. This method also has the advantage of differentiating meaningless, unenforced, verbose regulations from those which are concise but applicable and tightly regulated.

[18]For a discussion of the validity of this approach, see US General Accounting Office (1995). We have been unable to determine how Hopkins estimated the cost of Price and Entry Controls.

Hopkin's and other attempts to measure the cost of regulation have the advantage of expressing cost in the same units as are taxes and spending, dollars, and hence we have some additional confidence when we find that, say, the dollar-denominated regulation series grows less rapidly than dollars collected in taxes. However, it would be even better to compare the cost of regulation with the *cost of* taxes, rather than with the amount of taxes. The cost of taxes may well be greater and increase more rapidly than the amount of taxes (i.e., there is a deadweight cost of taxes which is a positive, increasing, and convex function of taxes).

We see in middle panels of Figs. 1.2 and 1.3 that Hopkins' regulatory costs closely track the number of Federal employees (excluding defense and postal) over the period 1977–1994. Their close association suggests that Federal Employees might be a good indicator of regulatory costs over longer time periods, or that Hopkins has not succeeded in uncovering a nonlinear relationship between number of employees and regulatory costs.

In summary, it is appears that regulation has increased from 1890 to 1990, although probably less than taxes. The increase appears slow from 1890 to 1930, and rapid from 1930–1978. However, some of the regulation indicators have *decreased* from 1978 to 1990, a period when taxes continued to increase. Part of the difference between the spending and regulatory trends may be that our regulation measures are mainly federal and federal tax revenue has not really increased over this recent period.

Our Table 1.1 includes two stories for the growth of taxes that includes reductions in regulation—greater exogenous tax efficiency in the social redistribution model and greater power of those subsidized in the merit good model. Although it is true that Reagan increased the efficiency of the personal income tax by reducing marginal tax rates and eliminating deductions, should this be viewed as an exogenous change since it is hard to identify, say, a technological source of greater tax efficiency? We suggest below that both stories are inconsistent with apparent changes in the incidence of taxes, spending, and regulation.

Hence it seems that the 1980s must be explained with a combination of theories. For example Peltzman (1993) has suggested that the recent deregulation movement was motivated by decreases in the efficiency of regulation (a reduction in σ_R in our notation), while government revenue increased for other reasons—perhaps an increase in the number of elderly. This is consistent with our estimates of the incidence of government spending (see below) during the 1980s: total government spending grew more slowly during the 1980s, with the elderly receiving a constant share of that spending despite their substantial increase in numbers, and probably benefitting from the 1980s regulatory changes.

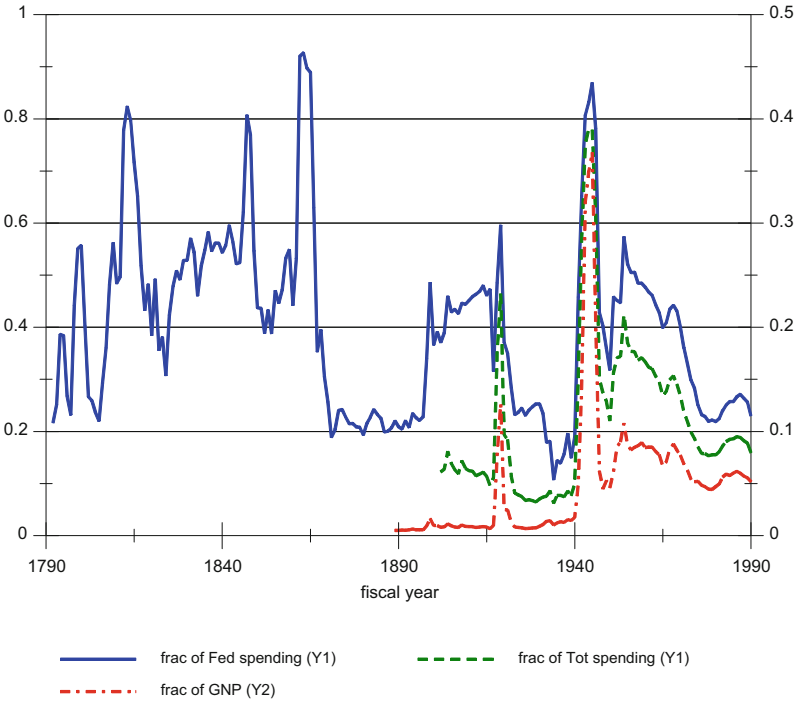

Fig. 1.4 Relative magnitude of defense spending, 1790–1990

1.5.5 Defense vs. Nondefense Spending

Figure 1.4 displays an indicator of the composition of US government spending—it division into defense and nondefense. The long term trend in the defense share of spending is slightly downward as government has grown somewhat more rapidly in nondefense areas. The medium term fluctuations are much more substantial and are relevant for our analysis.

While defense spending grew as a fraction of GNP from 1900 the 1930s, its share of spending fell. Thus an increased "need" for defense spending cannot explain the growth of government over that period because nondefense spending grew more rapidly. Increased defense spending can explain some of the growth of government from the interwar to the postwar period. However, because nondefense spending also grew during the period, an increased "need" for defense spending can only explain a fraction of the growth of government.

The end of the Cold War is another medium-term change in the need for defense spending for which we predict a decline in overall spending and an increase in nondefense spending. These predictions are consistent with our data, except that the end of the Cold War has not (yet?) produced a decline in total government's spending as a fraction of GNP.

Wartime growth of government can be well explained as an "increase in the efficiency" of defense spending or an increase in the marginal deadweight cost of nondefense spending. Consistent with Table 1.1, Becker and Mulligan (2003) find that nondefense spending's share of trend GDP declined substantially during World War II.

1.5.6 Elderly vs. Nonelderly

1.5.6.1 Trends in Relative Spending and Taxes

According to Mulligan and Sala-i Martin (1999), US Federal government spending for the elderly grew over the period 1950–1996 from 1.1% to 8.8% of GDP while their share of the population grew from 8.1% to 12.8% and all other federal spending fell from 15% to 14% of GDP. The same is true (although somewhat less dramatically) for total U.S. government spending: elderly spending grew from 1.7% to 9.4% of GDP while nonelderly spending stayed constant at 25% of GDP.

Becker and Murphy (1988) suggest that while government dollars spent per person over age 65 have grown over time and are greater than the government dollars (mainly education) spent per person under age 22, the rates of growth have not been different for government spending on the average elderly person and government spending on the average young person. For two reasons, their findings are not enough to conclude that the relative political power of the elderly has remained constant. First, Becker and Murphy's calculations exclude some important expenditures on the elderly (expenditures which have grown over time)—medical, welfare, and veteran's expenditures. When these items are included, Mulligan and Sala-i Martin (1999) show that total elderly spending grows at the same rate as total youth spending over the period 1950–1970, much more rapidly over the period 1970–1983, and slightly more rapidly over the period 1983–1996. When the elderly government spending *per elderly* is compared with youth spending *per youth*, the former grows much more rapidly over the period 1950–1983—the ratio of elderly spending *per elderly* to youth spending *per youth* tripled. The ratio falls somewhat over the period 1983–1996. Even if this were not the case that elderly spending per elderly grew more rapidly than youth spending per youth, a finding that spending per elderly has kept up with spending per young even when the former population has grown so much more rapidly may itself be evidence that the political power of the elderly has grown.

The elderly apparently do not pay a larger share of the tax burden, certainly not enough to offset their growing subsidies. Capital taxes seem to have become a relatively less important source of Federal revenue, and the elderly own relatively more capital. The Corporate Income Tax is a much less important source of Federal revenue now (roughly 10% of revenue) than it was 50 years ago (roughly 30% of revenue), while payroll taxes have grown dramatically (United States Office of Management and Budget 1997, Table 2.2). The elderly enjoy some special Personal

Income Tax treatment such as a larger standard deduction (Internal Revenue Service 1997, p. 18), property tax exemptions, and special tax treatment of housing sales proceeds.

Because state and local spending is relatively more concerned with education and AFDC, results reported by Becker and Murphy (1988) and Mulligan and Sala-i Martin (1999) show that spending on the young has also grown, although probably at a slower rate. This, together with a growing reliance on relatively efficient payroll taxes suggests that growing tax efficiency might be credited with some of the growth in government.

1.5.6.2 Trends in Relative Regulation

There are three areas of regulation that we might categorize as favoring the elderly or taxing the elderly:

(i) regulation of business, especially environmental regulation
(ii) retirement and disability regulation
(iii) age discrimination laws

A careful analysis of the incidence of regulation (and whether a regulation even promotes its advertised objective) is well beyond the scope of this paper, but we might guess that older people own most of the capital so that regulations that tax current capital and benefit labor are harming mainly the current elderly. Perhaps this is especially true for environmental regulations which restrict the operations of current business and convey benefits decades in the future. New retirement regulation, such as the prohibition of mandatory retirement, and age discrimination laws might be seen as allowing older workers to renegotiate previous implicit contracts. Young workers, of course, would like to promise not to engage in this kind of regulation when they are older but, once they become older and the implicit contracts are given, the older worker will benefit by renegotiation.

It is unclear whether regulations of type (i) have increased or decreased over time. Over the last 100 years, it seems clear that the amount of environmental and anti-business regulation has increase more rapidly than population and probably more rapidly than GNP. This trend may have reversed with the massive deregulation around 1980. Hopkins (1996) data shows that, while the per capita costs of environmental regulation have risen 1977–1994, the per capita costs of paperwork and price and entry controls have fallen enough the total per capita cost of Federal Regulation (and perhaps also the portion of that cost falling on business) may have fallen over the period. Thus Hopkins' data suggests that the elderly may have been net gainers from regulation over the period 1977–1994.

Retirement legislation and age discrimination laws (eg., the 1990 Americans with Disabilities Act, Regulation B of the 1975 Equal Credit Opportunity Act, and the prohibition of mandatory retirement) have undoubtably increased over time. On indicator of the increased retirement-related regulatory activity is the number of Federal District Civil Social Security court cases commenced, which increased

from less than 1% to more than 5% of all Federal District Civil court cases 1960–1987. Our overall impression is therefore that the elderly have been net losers from regulation over the long period but net gainers over the last couple decades.

1.5.6.3 Interpreting the Trends

Although a lot more empirical work is needed, our preliminary evaluation of the age-incidence of taxes, spending, and regulation, suggests three conclusions:

(i) Despite their increase in numbers, elderly have enjoyed substantially more government spending per capita, even when compared to government spending on youth. This trend is most pronounced over the period 1950–1983.
(ii) The elderly share of government spending is constant in the 1980s, despite their increase in numbers over this period.
(iii) Prior to 1970, it is unclear whether regulation favored the elderly. Since 1970, changes in regulation have tended to favor them.

Explanations for the postwar growth of elderly *spending* have been proposed in the literature. Some attribute the change to the growing political power of the elderly. Others (e.g., Sala-i Martin 1996) argue that old age programs have grown because their potential for enhancing efficiency has grown. Still others (e.g., Becker and Mulligan 2003) attribute the growth of government—and the growth of old age programs in particular—to increased reliance on relatively "efficient" taxes such as flat-rate payroll taxes.

As shown in Table 1.1, each of these explanations have different predictions for the amount and composition of regulation affecting the elderly. A growth in political power should be accompanied by increasingly favorable regulation, which is consistent with our evaluation of spending and regulation for the period since 1970. However, we see little evidence of regulation favoring the elderly prior to 1970. Second, growing elderly power alone would predict important reductions in nonelderly spending while in fact these reductions, if any, were modest. Third, the source of the growing elderly political power remains unexplained.

The payroll tax was introduced in the 1930s and withholding payroll at the source began in 1943. It might therefore be argued that redistribution to the elderly became more efficient during that period, which would explain why tax and spending programs favoring them grew relative to other tax and spending programs and relative to regulations favoring them. The SR model even predicts regulation to increasingly hurt the elderly.

Whether or not the increased tax efficiency is "exogenous" or the result of reductions in the political power of those more burdened with the efficient taxes can be tested by looking at changes in the level and composition of regulation. A complete analysis of the incidence of payroll taxes is beyond the scope of our paper, but it is possible that employers are among those harmed (at least in the short run) by payroll taxes. If it were the case that employers were losing their political power, then we should also see growing regulation harming employers. With the Americans

with Disabilities Act, the Medical Leave Act, and increasing minimum wages, it does appear that employers are losing political power. However, these labor market interventions are quite recent. It might be argued that employers enjoyed increased political power over most of the period since 1950—minimum wages fell and unions lost their influence. Hence, it appears that least part of the growth of spending on the elderly must be attributed to their growing political power, or to "exogenous" increases in tax efficiency, rather than a reduction in the political power of those harmed by payroll taxes.

We have also noted that growing political power of those subsidized and increasing efficient taxes are complementary explanations for the growth of government. The growing political power would have had little effect on government spending unless that spending could be expanded without sizable dwcs. And the increasing efficiency of taxes would not have increased subsidies for the elderly unless they were powerful enough to obtain them.

1.6 Summary and Conclusions

Beginning with an interest group model of government interference, we partition potential explanations for the growth of government into four categories: increases in the efficiency of taxes, spending, and/or regulation, decreases (increases) in the political power of taxpayers (those subsidized), changes in the political power of particular taxpaying or subsidized groups, and demographic shifts. We then derive implications of each type of explanation for the quantity and composition of taxes, spending, and regulation.

Our own interpretation of the interest group model of public decisions and initial investigation of American measures of government interference suggest that the two biggest contributors to the growth of U.S. government are the increased efficiency of means of tax collection and increased political power of the elderly. The reasons for our conclusions can be seen by comparing Tables 1.1 and 1.2. According to Table 1.2, spending and regulation have grown, and spending more rapidly than regulation—as if in response to more efficient means of taxation.[19] However, Table 1.2 also suggests the composition of spending and regulation has tilted toward the elderly, which is consistent with a growth in their political power.

We suggest that the public policy responses to efficient of means of tax collection, increased political power of the elderly, and other stimuli would be different in other models of public decisions, such as the social redistribution and merit good models. Various models of public decisions do differ according to their predictions about the effect of efficient tax collection and increased elderly power on the amount and

[19] Substitution of taxes for regulation is more apparent in the cross-country data—see Appendix Tables A.2 and A.3.

incidence of nonelderly regulation, but the available data seems too crude to conduct such a test.

We believe our partition can usefully guide future empirical and theoretical work on the long standing question "Why has government grown?" Some of the many remaining questions are: How might the quantity and composition of regulation be measured? What are some of the important taxed and subsidized groups and why has their influence changed over time? How might the efficiency of taxes and subsidies be measured? Why has the political influence of the elderly grown over time?

Acknowledgments We appreciate the comments of John Dawson, Dan Kahan, Ed Laumann, Bill Landes, Sam Peltzman, John Wallis, and seminar participants at Clemson University, and the research assistance of John Allread and Rob McMillan. This article is an unfinished draft from April 2000, plus an Appendix section on accounting for other sources of government growth drafted in December 2002. Since then much progress has been made on measuring regulation, including text processing methods (Al-Ubaydli and McLaughlin 2017), selection based on comments (Council of Economic Advisors 2019a), and questions of how to normalize regulation relative to population (Mulligan and Shleifer 2005).

Appendix

Data Sources

- **Congressional Staff Sizes** 1980–1990: Bibby et al. (1980). 1891–1979: Bibby et al. (1980, citing Fox and Hammond 1977). For all years, Congressional Member staff size is computed as the sum of House and Senate Member Staff sizes; Congressional Committee staff size is computed as the sum of House and Senate Committee Staff sizes.
- **Congressional Staff Sizes** 1980–1990: Bibby et al. (1980). 1891–1979: Bibby et al. (1980, citing Fox and Hammond 1977). For all years, Congressional Member staff size is computed as the sum of House and Senate Member Staff sizes; Congressional Committee staff size is computed as the sum of House and Senate Committee Staff sizes.
- **Federal Register Pages** Total number of pages in the each year's *Federal Register*, multiplied by 0.8 after 1970 (an adjustment for the passage of the Freedom of Information, the Privacy, and the Sunshine Acts between 1967 and 1974). With the exceptions of 1936, 1937, and the first 1100 pages of 1938, all of the years appear to be of the same font, point, and format: three column pages, 78 lines to the column, approx. seven words to the line. Source: United States Office of the Federal Register (Various issues).
- **GNP** 1965–1990: Citibase GNP series, calendar year average of quarterly values. 1890–1964: US Bureau of the Census (1975), Series D-802 (calendar year values, multiplied by 1.034 to merge with Citibase series).
- **Government Employment, Federal (w/o Military and Post Office)**. 1971–1990: US Office of Management and Budget (1996), Tables 17.2 and 17.3

(Legislative and Judicial Branches plus Civilian Agencies). 1890–1970: US Bureau of the Census (1975), Series Y-315, Y-316, Y-317 (Executive Branch, excluding military and Post Office, plus Legislative and Judicial Branches).

- **Government Employment, All Levels (w/o Military and Post Office)**. 1971–1990: Federal series plus State and Local from US Office of Management and Budget (1996), Table 17.3. 1890–1970: Federal series plus US Bureau of the Census (1975), Series Y-332 (State and Local government employment).
- **Government Expenditure, All Levels**. 1947–1990: US Office of Management and Budget (1996), Table 15.2 (fiscal year expenditures). 1890–1946: US Bureau of the Census (1975), Series Y-522 (fiscal year expenditures, multiplied by 1.131 to merge with OMB series). Series Y-522 available only in the years 1902, 1913, 1922, 1927, and in the even years 1932–1946; missing years linearly interpolated as a fraction of GNP.
- **Government Expenditure, Federal Defense**. 1965–1990: US Office of Management and Budget (1996), Table 4.1 (fiscal year "military-defense" outlays), minus $1.624 (the average difference between the OMB and Census Bureau series for the overlapping years 1963–1970). 1890–1964: US Bureau of the Census (1975), Series Y-458 and Y-459 (fiscal year outlays for Departments of Army and Navy).
- **Government Expenditure, Elderly**. Mulligan and Sala-i Martin (1999).
- **Regulatory Costs**. Hopkins (1996).
- **U.S. Code Pages**. Total number of pages in each volume of the *U.S. Code of Federal Regulations* (which has been issued every six years since 1926). Words per page appear to be the same in each volume. As explained in the text, we also look at U.S. Code pages net of (tax) Title 26. Source: United States Office of the Law Revision Counsel (Various issues).
- **U.S. District Civil Court Cases, all categories**. U.S. District Civil Court cases commenced in the year ending June 30 (1960–1990) or September 30 (1991–), according to Judicial Conference of the United States (a.k.a. Judicial Business of the United States) Tables C-2 and C-3. Source: Judicial Conference of the United States (Various Years).
- **U.S. District Civil Court Cases, Social Security**. U.S. District Civil Court Social Security cases commenced in the year ending June 30 (1960–1990) or September 30 (1991–), according to Judicial Conference of the United States (a.k.a. Judicial Business of the United States) Tables C-2 and C-3

Accounting for Other Sources of Government Growth

See Table A.1.

Table A.1 Accounting for the growth of government (both general and specific pressure)

Source of growing spending and taxes	Model[b]	Changes in amount of regulation	Changes in composition of spending	Changes in composition of regulation	Changes in composition of taxes	Changes in taxes per member	Changes in taxes per regulation	Correlation between regulation and tax incidence
Efficient taxes or spending—exogenous[e]	IG	+	0	0	0	+	+	+
	SR	−	0	0	0	+	+	+
	MG	+	0	0	0	+	0	−
Eff. regulation—exogenous[a,e]	IG	+	0	0	0	+	−	+
	SR	−	0	0	0	+	+	+
	MG	+	0	0	0	+	0	−
Less power by all taxpayers	IG, SR	+	0	0	+	+	0	+
	MG	−	0	0	+	+	+	−
Relatively more taxpayers[a]	IG, SR, MG	?	0	0	0	−	0	+, +, −
Relatively more subsidized[a]	IG, SR, MG	?	0	0	0	−	0	
Efficient taxes (some taxpayers)—exogenous	IG, SR	+[c],−	0	Yes[d]	Yes	+[c]	+	+

(continued)

Table A.1 (continued)

Source of growing spending and taxes	Model[b]	Changes in amount of regulation	Changes in composition of spending	Changes in composition of regulation	Changes in composition of taxes	Changes in taxes per member	Changes in taxes per regulation	Correlation between regulation and tax incidence
Power of one taxed group	IG, SR	$+^{c}$	0	Yes	Yes	$+^{c}$	0	+
Efficient spending (some)—exogenous	IG, SR	$+^{c}$,−	Yes	Yes	0	$+^{c}$	+	+
Power of one subsidized group	IG, SR	$+^{c}$	Yes	Yes	0	$+^{c}$	0	+

[a]Whether aggregate spending and taxes are increased by relatively more taxpayers or more of those subsidized depends on the parameters of the model
[b]Models of public decisions: *IG* interest group, *SR* social redistribution, *MG* merit goods
[c]Result requires somewhat stronger assumptions than stability and strategic separability ($F_{AB} = 0$ sufficient)
[d]Composition changes are different from those for the IG model
[e]"exogenous" changes in efficiency are reductions for δ_T, σ_T, δ_R, or σ_R

Table A.2 OECD regression estimates of the links between tax efficiency, government revenue, and regulation

Independent variable	Taxes	Product regulation	Labor regulation	Taxes	Product regulation	Labor regulation	Taxes	Product regulation	Labor regulation
Tax efficiency	0.04	0.53	1.36	-0.01	0.69	1.65	0.38	-2.16	-8.44
	(0.04)	(0.29)	(0.51)	(0.03)	(0.32)	(0.55)	(0.13)	(1.75)	(2.76)
Measured as	BMa	BMa	BMa	BMa	BMa	BMa	BMb	BMb	BMb
Other controls									
Fr elderly				2.08	−6.91	−12.20	1.75	−0.53	5.22
				(0.56)	(5.51)	(9.60)	(0.42)	(5.62)	(8.85)
Openness	0.09	−0.13	−0.46	0.04	0.03	−0.19	0.03	0.10	0.12
	(0.04)	(0.27)	(0.46)	(0.03)	(0.29)	(0.50)	(0.02)	(0.33)	(0.51)
Politicalinstitutions	−0.02	−0.11	−1.47	−0.05	−0.00	−1.29	−0.09	0.02	−0.94
	(0.05)	(0.41)	(0.71)	(0.04)	(0.41)	(0.71)	(0.03)	(0.47)	(0.73)
Political meas	pres	pres	pres	pres	pres	pres	pres	pres	pres
Tax source	OECD	OECD	OECD	OECD	OECD	OECD	OECD	OECD	OECD
Countries	20	20	20	20	20	20	20	20	20
R squared	0.41	0.18	0.45	0.69	0.26	0.50	0.80	0.76	0.51

Notes: Tax efficiency measures (tax revenues and tax revenue ratios average 1970–1990 or 1973–1990 in the OECD and GFS samples, respectively) are BMa: social security, payroll, and sales taxes, as a ratio to other tax revenue; BMb: the ratio of the "economy-wide" average individual income tax rate to the top statutory individual income tax rate (average of 1974, 1979, 1984, and 1989). For some countries, GFS averages exclude years with missing data. GDP per capita is measured in 1985 dollars and is from the Penn World Tables. "political institution" measures: pres = "presidential" dummy, democ = 1970–1990 average POLITY democracy index (on 0–1 scale)

Table A.3 Regression estimates of the links between tax efficiency, government revenue, and regulation

Independent variable	Taxes	Taxes	Taxes	Regulation	Taxes	Taxes	Taxes	Regulation
Tax efficiency	−0.03	−0.03	−0.04	0.63	0.37	0.29	0.43	−4.83
	(0.04)	(0.04)	(0.04)	(0.21)	(0.16)	(0.17)	(0.20)	(1.12)
Measured as	BMa	BMa	BMa	BMa	BMb	BMb	BMb	BMb
Other controls								
Fr elderly	2.17	2.38	2.70	−4.74	1.58	1.64	1.77	3.45
	(0.26)	(0.32)	(0.43)	(2.38)	(0.34)	(0.37)	(0.38)	(2.12)
Openness	0.07	0.06	0.05	−0.17	0.07	0.07	0.07	-0.13
	(0.01)	(0.02)	(0.02)	(0.11)	(0.02)	(0.02)	(0.02)	(0.12)
Political institutions			−0.04	−0.48			−0.06	−0.06
			(0.04)	(0.21)			(0.05)	(0.25)
Political measures			democ	democ			democ	democ
Tax source	GFS	GFS	GFS	GFS	GFS	GFS	GFS	GFS
Countries	91	52	52	52	61	48	48	48
R squared	0.61	0.65	0.66	0.66	0.67	0.69	0.70	0.76

Notes: Tax efficiency measures (tax revenues and tax revenue ratios average 1970–1990 or 1973–1990 in the OECD and GFS samples, respectively) are BMa: social security, payroll, and sales taxes, as a ratio to other tax revenue; BMb: the ratio of the "economy-wide" average individual income tax rate to the top statutory individual income tax rate (average of 1974, 1979, 1984, and 1989). For some countries, GFS averages exclude years with missing data. GDP per capita is measured in 1985 dollars and is from the Penn World Tables. "political institution" measures: pres = "presidential" dummy, democ = 1970–1990 average POLITY democracy index (on 0–1 scale).

Tax-Regulation Substitution Across Countries

The time series data suggest that growing tax efficiency can be only part of the reason for tax revenue growth, because regulations are growing at the same time. But some recent cross-country regulation data sets seem to tell a somewhat different story. One of them is Nicoletti et al. (1999), whose OECD measures of labor and product market regulation are weakly, and negatively, correlated (−0.12 and −0.09, respectively) with total government revenue/GDP (averaged for the years 1970–1990). Djankov et al. (2002) have a measure of business entry regulation for a broader cross-section of countries, and it is strongly negatively correlated (−0.48) with tax revenue/GDP.

Becker and Mulligan (2003) use two measures of tax efficiency—the ratio of efficient tax revenue (i.e., revenue from payroll and sales taxes) to other government revenue and the ratio of the average individual income tax rate to the top marginal rate—which tend to be positively correlated with taxes/GDP, holding constant GDP per capita, the fraction of the population elderly, trade openness, and other variables. But is tax efficiency correlated with regulation? Appendix Table A.2 explores this question in the OECD sample with Nicoletti et al.'s (1999) product and labor regulation measures, and Appendix Table A.3 uses the broader country sample with

the business entry regulation measure. We see that both measures of tax efficiency predict the amount of regulation—better than they predict taxes/GDP (!)—although the sign of the relation is different for the two tax efficiency measures. We also see that variables predicting taxes/GDP, such as the fraction elderly and trade openness, do not predict regulation.

References

Al-Ubaydli O, McLaughlin PA (2017) Regdata: A numerical database on industry-specific regulations for all United States industries and federal regulations, 1997–2012. Regul Gov 11(1):109–123

Barro RJ (1987) On the determination of the public debt. J Polit Econ 87(5):940–971

Baumol WJ (1976) Macroeconomics of unbalanced growth: The anatomy of an urban crisis. Am Econ Rev 57(3):415–426

Becker GS (1983) A theory of competition among pressure groups for political influence. Q J Econ 98(3):371–400

Becker GS, Mulligan CB (2003) Deadweight costs and the size of government. J Law Econ 46(2):293–340

Becker GS, Murphy KM (1988) The family and the state. J Law Econ 31(1):1–18

Bibby J, Ornstein N, Mann T (1980) Vital statistics on congress. American Enterprise Institute for Public Policy Research, Washington, D.C.

Boadway RW, Wildasin DE (1989) A median voter model of social security. Int Econ Rev 30(2):307–328

Brennan G, Buchanan JM (1980) The power to tax: analytic foundations of a Fiscal Constitution. Cambridge University Press, Cambridge, MA

Browning EK (1975) Why the social insurance budget is too large in a democracy. Econ Inq 13(3):373–388

Council of Economic Advisors (2019a) The economic effects of federal deregulation since January 2017: an interim report. US Government Printing Office, Washington, D.C.

Council of Economic Advisors (2019b) Economic report of the President. US Government Printing Office, Washington, D.C.

Demsetz H (1982) Economic, legal, and political dimensions of competition. North-Holland, Amsterdam

Djankov S, La Porta R, Lopez-de Silanes F, Shleifer A (2002) The regulation of entry. Q J Econ 117(1):1–37

Foley DK (1978) State expenditures from a marxist perspective. J Public Econ 9(2):221–238

Fox HWJ, Hammond SW (1977) Congressional staffs: the invisible force in American lawmaking. The Free Press, New York

Friedman M, Friedman RD (1980) Free to choose. Harcourt Brace Jovanovich, New York

Harberger AC (1984) Basic needs versus distributional weights in social cost-benefit analysis. Econ Dev Cult Chang 32(3):455–474

Hopkins TD (1996) Regulatory costs in profile. Center for the Study of American Business at Washington University, St. Louis

Internal Revenue Service (1997) Tax expenditures FY 1997. US Department of Treasury, Washington, D.C.

Judicial Conference of the United States (Various Years) Annual report of the Director. Statistics Division of the Administrative Office of the United States Courts, Washington, D.C.

Kau JB, Rubin PH (1981) The size of government. Public Choice 37(2):261–274

La Porta R, Lopez-de Silanes F, Shleifer A (2008) The economic consequences of legal origins. J Econ Lit 46(2):285–332

Ledyard J (1984) The pure theory of large two-candidate elections. Public Choice 44(1):7–41
Lott J, Kenny L (1999) Did women's suffrage change the size and scope of government? J Polit Econ 107(6):1163–1198
Mirrlees JA (1971) An exploration in the theory of optimal income taxation. Rev Econ Stud 38(2):175–208
Mueller DC (1989) Public choice II. Cambridge University Press, Cambridge
Mulligan S, Philipson TJ (1999) Policy design and incidence in a merit good economy. Working Paper, University of Chicago Department of Economics
Mulligan CB, Sala-i Martin X (1999) Gerontocracy, retirement, and social security. Working Paper 7117, National Bureau of Economic Research
Mulligan CB, Shleifer A (2005) The extent of the market and the supply of regulation. Q J Econ 120(4):1445–1473
Nicoletti G, Scarpetta S, Boylaud O (1999) Summary indicators of product market regulation with an extension to employment protection legislation, Working Paper 226, OECD
Olsen EO, York KA (1984) The effect of different measures of benefit on estimates of the distributive consequences of government programs. In: Moon M (ed) Economic Transfers in the United States. Studies in Income and Wealth, Chicago and London: University of Chicago Press, pp 177–198
Olson M (1982) The rise and decline of nations. Yale University Press, New Haven
Olson M (1986) An appreciation of the tests and criticisms. Scand Polit Stud 9(1):65–80
Peltzman S (1980) The growth of government. J Law Econ 23(2):209–287
Peltzman S (1993) George Stigler's contribution to the economic analysis of regulation. J Polit Econ 101(5):818–832
Ramsey FP (1927) A contribution to the theory of taxation. Econ J 37(145):47–61
Sala-i Martin XX (1996) A positive theory of social security. J Econ Growth 1(2):277–304
Summers L, Gruber J, Vergara R (1993) Taxation and the structure of labor markets: the case of corporatism. Q J Econ 108(2):385–411
Turner JA (1984) Population age structure and the size of social security. South Econ J 50(4):1131–1146
United States Office of Management and Budget (1997) Historical tables, budget of the United States government, fiscal year 1997. US Government Printing Office, Washington, D.C.
United States Office of the Federal Register (1980) Federal register: what it is and how to use it. Office of the Federal Register, Washington, D.C.
United States Office of the Federal Register (Various issues) Federal register. Office of the Federal Register, Washington, D.C.
United States Office of the Law Revision Counsel (Various issues) US code. Office of the Federal Register, Washington, D.C.
US Bureau of the Census (1975) Historical statistics of the United States: colonial times to 1970, Bicentennial Edition. United States Department of Commerce, Washington, D.C.
US General Accounting Office (1995) Regulatory reform: information on costs, cost-effectiveness, and mandated deadlines for regulations. US Government Printing Office, Washington, D.C.
US Office of Management and Budget (Various issues) Historical tables, budget of the united states government. U.S. Government Publishing Office, Washington, D.C.
Warner JT, Asch BJ (1996) The economic theory of a military draft reconsidered. Def Peace Econ 7(4):297–312
Wilson JD (1990) Are efficiency improvements in government transfer policies self-defeating in political equilibrium? Econ Politics 2(3):241–258
Wittman D (1989) Pressure group size and the politics of income redistribution. Soc Choice Welf 6(4):275–286
Wittman DA (1995) The myth of democratic failure: why political institutions are efficient. University of Chicago Press, Chicago

Chapter 2
Government Growth

Gordon Tullock

Abstract Explanations for the growth of the government that imply that it always grows are obviously destroyed by the early period histories. Something must have happened to change the way in which we respond to our governments or our governments respond to us. I have offered Bismarckism as a possible explanation, but I should emphasize that is all it is—a possible explanation.

2.1 Introduction

I am not noted as a prominent econometrician and, in particular, I have written a number of things criticizing bare foot empiricism.[1] This paper is an example not of barefoot empiricism but of accidental empiricism. My former research assistant, twice, misunderstood instructions and in consequence produced some data which I feel require an explanation. This paper presents the data he discovered on the United States and some further data on other countries. It also discusses possible explanations. There is no test of a hypothesis, indeed the main purpose of the paper is my hope that one of its readers can suggest an explanation.

The author "Gordon Tullock" is deceased at the time of publication.

[1]This article originally appeared as Tullock (1995). It is reprinted here to make it more widely available. We thank the Department of Economics at National Chengchi University and the estate of Gordon Tullock for permission to reprint this paper. Minor edits to correct typographical errors have been made, as well introducing and labeling of sections.

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J. Hall, B. Khoo (eds.), *Essays on Government Growth*, Studies in Public Choice 40, https://doi.org/10.1007/978-3-030-55081-3_2

2.2 The Puzzle

The American data with which I started are only suggestive. Fortunately there are few other countries which have similarly long data series, and they show the same phenomena. This more or less rules out the possibility of accident, but doesn't help explain what is happening. My specialized expertise is not suitable for this kind of research, so my purpose here is to challenge my readers to take up the burden that I lay down.

But to turn to the problem, Fig. 2.1 shows the United States federal government's expenditures as a percentage of GNP from 1790 until the latest date we could get data. From mere inspection it is obvious that here was a sharp regime change sometime in the 1930s. Let us begin with the early regime.

You will note that with the exception of wartime, the size of the federal government in share of GNP was more or less constant until 1930. It is true that right after the wars there is a period in which the expenditure remained somewhat higher than it was before and this period means that the 1920s never got down to the standard 2–3% of GNP, but basically this is a purely temporary phenomenon. The upward slant of the regression line is an artifact resulting from the high number at the right end. I reran it using the period from 1865 to 1929, thus putting both ends in post-war periods and it actually slanted down.

As a digression from the main theme of the paper, I should say that until World War II we always borrowed money to finance our wars and then paid the debt off. Indeed, in the 1920s repayments on the debt were a substantial expenditure of the federal government.

Looking only at the part up to 1930, we immediately eliminate a number of popular explanations of why government grows. There is first a sort of general

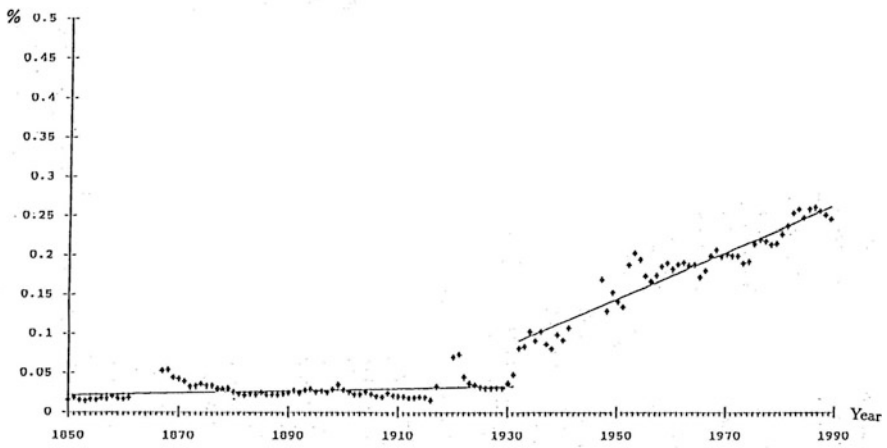

Fig. 2.1 Government spending as a percentage of GDP: United States

feeling that somehow or another democracy leads to government growth because the politicians find expenditures a good way of purchasing votes. As a theoretical matter, I have always found this a little difficult to understand since it would seem that reducing taxes would be an even better method of buying votes. In any event, it is clear that up to 1930 politicians were not doing that on any large scale.

Since the United States was clearly as democratic (and its politicians as interested in pork) before 1930 as afterward, this theory would seem to be disposed of. As a digression here, I should also perhaps say that dictatorial governments seem to grow as fast as democratic governments, which also raises questions about this particular theory.

The second theory, which is widely popular and which is inconsistent with this series, is the rachet theory which holds simply that every time government expands sharply through war or possibly a great depression, the drop in expenditure after the war is not great enough to bring the basic level of expenditures back to normal. Clearly that cannot be used as an explanation of the long period of stability in spite of some very great crises which involved very large increases in government expenditure. It is only since 1930 that the government has shown signs of growth.

Even then, although after World War II the expenditure of the government was higher than it had been before and after the Korean War it was higher than it had been in 1949, the basic upward slant does not seem to be much affected by these two "rachets." It continues after 1953.

Another theory proposed in the late nineteenth century by a German economist and called "Wagner's law" after him, is simply that modern society, industrialization, urbanization, and so on, causes the government to grow. If the growth in the German government in the 1880s was explained by this, then one would have to deduce from looking at these figures that the United States in the 1920s was less industrial, advanced, and so on, than Germany in the 1880s, which is obviously absurd. Thus, once again, we have a widely held theory that is contradicted by this data.

As a final general theory, we have Baumol's disease. Baumol has pointed out; or at least alleged, that the government is essentially a service industry and efficiency is harder to obtain in such areas. The improvement in efficiency in the rest of the economy means that wages rise and the general demand for all goods, including government goods, grows so that the government expenditures must grow faster than the private sector. This, again, does not fit the data.

The break between 1929 and 1945, between two straight lines, is some evidence for the rachet theory, but not very strong. In any event, this was a very disturbed period and I have thought of various possible explanations for the shifting size of government growth during it, but none of them seem to be either particularly coherent or good fits to the data. When we turn to other countries a little later, it will be seen that it seems to be a problem for the United States only.

We could say that the existence of this break may be one of the reasons why a number of other people have gone astray; indeed, I did in my chapter in the book *Deficits* by Buchanan et al. (1987). Thus, the short period from 1900 to about 1970 is quite deceptive and I think may have led a number of people, in addition to myself,

astray. I think we can accept the view that fundamentally the federal government expenditures as a share of GNP were more or less constant in non-wartime periods from 1790 to 1929.

The period from 1929 to 1945 involves two major disturbances: the Great Depression and a major war. That the period would have high expenditures is not surprising, and, of course, as a matter of fact, the New Deal even went Mr. Hoover better in raising domestic expenditures.[2] If we look at these figures in more detail, we observe that the depression period itself involves a very sharp rise in expenditures and then a period during the latter part of the depression in which the expenditures were relatively constant. Again it should be pointed out that although our recovery from the depression was slow, nevertheless the depression was so deep that the GNP increased very considerably between 1933 and 1939. Thus, a stable level of expenditures as a share of GNP is equivalent to a rise in actual expenditures as a share of something we might perhaps call potential GNP.

World War II, of course, was a very major rise in total expenditure and even though wars are dummied out in the lines shown in Fig. 2.1, we would not be surprised to find a higher level of expenditure at the end of it, either because of the tendency of wars to only gradually go away shown after earlier wars or if we happen to believe in the rachet effect. Thus, the 1946 level could be regarded as a genuine rachet effect although he rise after that effect, which you will notice is relatively stable and even, can hardly be explained as an after effect of World War II.[3]

There is a small bump represented by the Korean War in 1951–1952, but the Vietnamese War is not even visible in the data. Basically what we have from 1946 on is a rise which can be regarded as steady; although there is, of course, some variance around that line.

As another digression, if you look at the line carefully you will see a number of cases in which there seems to be a slightly declining trend for a few years followed by a jump up again. I have been unable to correlate these small regularities with anything either political or economic in the history of the time, but perhaps some reader can do better.

Basically, then, we see clearly that there was a regime change of some sort in the period 1930–1945. Exactly when it started is not obvious. I could, for example, start with 1930 and run through to 1933 for the sharply rising area on the theory that Mr. Hoover was a transition stage to Mr. Roosevelt. The Roosevelt regime, then, would

[2]I should say here, just as an expression of personal opinion, that I do not believe the various measures undertaken by either Mr. Hoover or Mr. Roosevelt were well designed to deal with the depression. Indeed, the fact that the United States had the deepest depression except for Germany and had the slowest recovery from that depression (with another depression in 1937 before recovery was completed) seems to me a result or these injudicious measures. The matter is, however, not very relevant here.

[3]As another change, this was the first time that we did not repay our war debt in the period after the war. In the 1920s we had not completely repaid the debt when the depression broke but sizable payments on it were made.

be a relatively stable area much like the period before 1929 in which the economy and the government grew at the same speed. Since in this case a large part of the growth is recovery from depression, of course it would be rather different from standard growth type model which would fit the earlier data. Since I disapprove of data torturing, I have not experimented here.[4] The period after 1946, however, is clearly different from the previous period.

To repeat, we have two regimes here, one of which runs from the foundation of the central government to 1929 and the other of which starts in 1946 and runs to the present. What caused. this change?

We must begin by noting that either period seems inconsistent with the rachet theory mentioned before because the growth in the latter period is relatively stable and does not seem to be connected to the sharp spurt upward.

Once again what we have, then, is a regime change with one regime certainly going from 1790 to 1930 and the other regime certainly running from 1946 to the present, with the period from 1929 to 1945 being some kind of independent period of severe stress. Of course, is it perfectly possible that the severe stress of that period is what caused the regime change, but the effect cannot be anything as simple as the Wagner's law, Baumol's disease, the rachet effect, or democracy because none of them can explain both the long period of stability and the rise.

We are thus driven to the question of what happened that caused the growth in government to begin at that time. This is an effort to determine the cause of a single event and that is always very difficult to do. Further, statistical methods are in general not suitable if you are analyzing such a single change. It may be possible; however, to test such a hypothesis by looking at other countries where the same things occurred. Some preliminary steps to that end will be discussed below. It is my hope that the steady growth of statistical series will permit further tests in the future.

Looking to possible explanations, the reader may know that I have always felt that the adoption of the civil service was a great disaster for the United States and one of its characteristics would undoubtedly be to give greater voting power to the bureaucracy which might quite reasonably favor expansion of its power. There are two problems with this explanation for the data we have; the first of which is that although the civil service came in rather gradually over a long period of time, it is a little hard to avoid the impression that it was too early. It might, of course, be that the great expansion of the civil service during the New Deal put the number of civil servants over some necessary threshold; hence, from then on the effect was significant. I can think of no obvious way of testing that possibility. It would fit what data I have from other countries as will shortly be seen.

The second possibility is what I might call a Keynesian hypothesis which is that during the efflorescence of Keynesian economics, which we roughly will say was from 1937 to maybe 10 years ago, government growth was favored by various intellectual currents. The problem with this, of course, is that Keynes was

[4] "If the data is tortured long enough, it will confess," in the famous worlds of Ronald Coase.

not particularly in favor of government growth; He discussed the need for deficit financing under some circumstances; hence, the book *Deficits* by Buchanan, Rowley and Tollison, but he did not specifically urge larger governments.

It should be said, of course, that Keynes, as a matter of fact, did suggest, as a way of producing the deficit, various expansions of the government. But that was not the main theme of his argument. In any event, the growth in England (Fig. 2.2) started while Keynes was still a student.

A third possible explanation is the introduction of the income tax in 1914. This assumes a fairly sizeable lag but is certainly possible. The basic difficulty here, however, is that government growth in other countries can hardly be blamed on changes is our tax regime. Further, some of them make little use of the income tax.

Going off the gold standard has been suggested by members of the audience in oral presentations of this paper. For the United States it is much too late, coming in the Nixon administration. The same time problem arises in other countries.

The last possible explanation, and, once again, one that can only be tested by looking at other countries, is Bismarckism. The welfare state was invented by Prince Bismarck in Germany and has spread from Germany. From the standpoint of testing, Germany is an unfortunate country. We do not have the necessary long period of comparable statistics. The central government was only formed in the 1870s and then drastically changed by war, revolution, and the Nazi regime.

The Bismarckism thesis has a particular suitability for explaining the continued growth of the government since the bulk of that growth has been transfers, not increase in structure. Indeed, since about the end of the Korean War the largest single non-transfer activity of the government, the military, has with intermittent interruptions—for example, with the elections of Kennedy, Nixon and Reagan—steadily shrunk as a share of U.S. GNP. Most other cases where the American government performs a service or produces something have not actually shrunk,

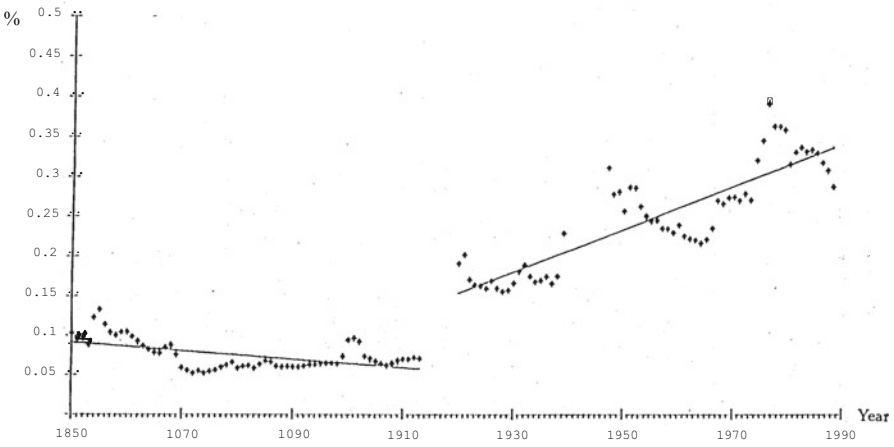

Fig. 2.2 Government spending as a percentage of GDP: United Kingdom

but have remained more or less stable, whereas the transfer portion of government has increased sharply.

This would, of course, be what we would expect if Bismarckism was the cause, but we require a little complication here. Why would the adoption of the welfare state lead to continuous growth of the government? I think there has to be some kind of political argument here in which direct cash payments to citizens somehow have priority over tax reductions.

It should, of course, be pointed out that the old-aged pensions as a portion of the welfare state had the interesting characteristic that the people who are really injured by it are too young to vote. The injury inflicted by the present discounted value of taxes be paid in the future and the present discounted value of payments to be received is sharply negative at the age of one. It remains negative although steadily less so up to somewhere in the forties. The details here depend on various special factors, but, counting the already paid taxes as sunk costs, the present discounted value of future taxes and benefits become positive beyond roughly fifty.

The medical and the unemployment insurance aspect of the welfare state, of course, are really insurance policies. The only question is whether they are good insurance policies in the sense that people would buy them voluntarily. Congressmen apparently attempt to get a bundle of taxes and insurance in this case which attracts more votes than it repels. The bulk of the United States population, however, has other kinds of medical insurance obtained in the private market. Whether President Clinton will succeed in changing that is unknown at time of writing. Unemployment insurance is not a very attractive area for private insurance companies because of the moral hazard.

There is also the rather deceptive method of finance. Prince Bismarck was a political genius and his decision to pay for most of these programs by a regressive payroll tax which appears to be split between the worker and the employer was an example of this genius. Most workers think that they pay only half of the cost of these programs. Employers are probably not sufficiently economically sophisticated to realize that the workers pay the whole tax, but they do notice that it does not hurt the companies much. It thus looks like a bargain to most voters and there is no "interest" which realizes it is hurt.

Speaking for myself, I find this Bismarckism argument the most attractive, but this may simply represent personal bias. Furthermore, I certainly would not like to argue that no one will be able to invent a better explanation. It should be said, however, that the Bismarckism does have the characteristic that somewhat the same kind of thing seems to have occurred somewhat similarly in other countries who adopted the Bismarckian state.

We now turn to Figs. 2.2, 2.3, and 2.4. Figure 2.2 shows England and the data there are particularly good and go back to 1640. Using the whole period, the extremely belligerent nature of the English state mean that much of the early period would have to be dummied out. I have chosen to start with 1850, but using the earlier data makes little difference.

For England one can argue for the ratchet effect up to about 1960. Given the similarity of the pre and post 1960 data, however, that can hardly be the whole

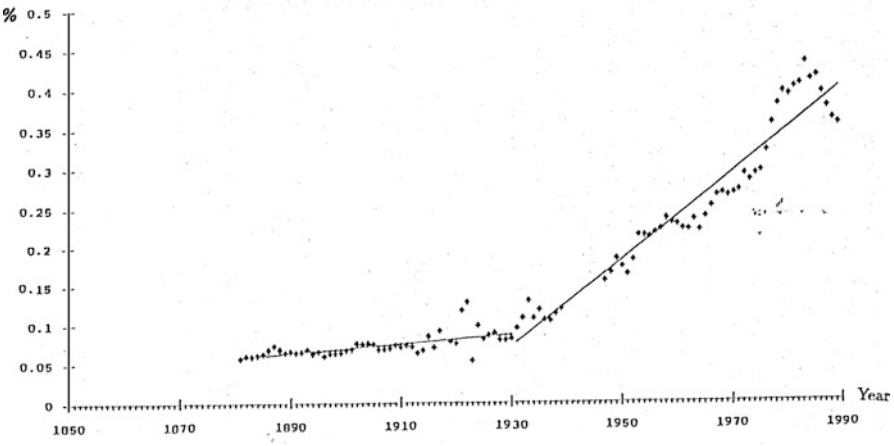

Fig. 2.3 Government spending as a percentage of GDP: Sweden

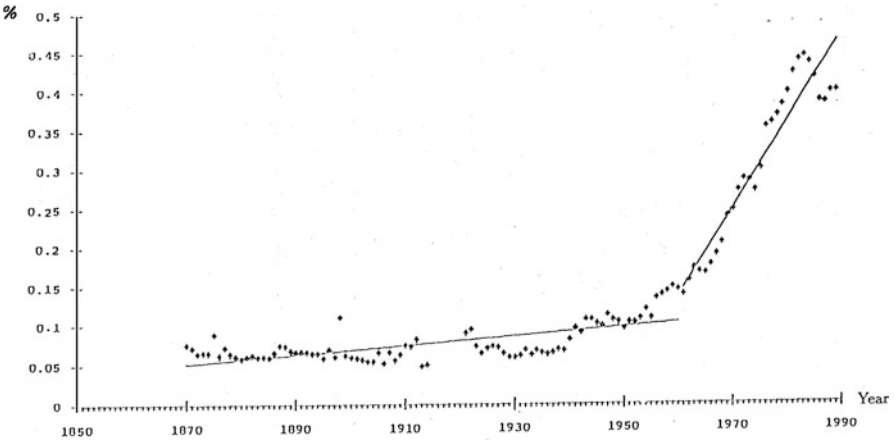

Fig. 2.4 Government spending as a percentage of GDP: Denmark

explanation. Note that if we simply connect the very early period to the period before he Boer War the line has an upward slant but not a very pronounced one.[5] Indeed, if we start at Waterloo, this line would slant down.

In any event, clearly the existence of two regimes, one in the early period and one in the later period, is every bit as clear in the English data as it is in the American. Note again that if you take only a short period, the rachet effect does appear to have at least some explanatory value.

[5]Note the size of the Boer War's increase in expenditures. The fact that some 30,000 farmers could impose this kind of cost on the immense British empire shows what good fighters they were.

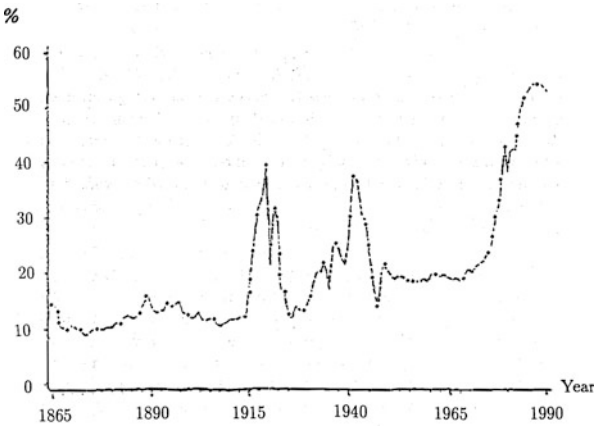

Fig. 2.5 Government spending as a percentage of GDP: Italy

Figure 2.3 is for Sweden and, in this case, the break occurs in the 1930s, but, once again, we clearly have two regimes. The same is true with Denmark which is shown as Fig. 2.4.

Italy is a most interesting case as shown by Fig. 2.5. In this case, ignoring wars, there is general stability but with some slight gradual growth up to the 1960s. At that point a very, very rapid growth of government began. For a while Italy had the worlds largest deficit as a percentage of per capita income.

In this case I have a rather unique explanation for the stability in the period after World War II. For much of that period Luigi Einaudi was President of Italy. He was a founding member of the Mont Pelerin Society, and also a skilled politician. The combination may account for this stability in a time when the other countries had rapidly growing governments.

There is one problem with all of this data which is that it is the central government rather than the total government that is shown. The basic reason for this is simply that the data series on local government do not go very far back. I can say from having looked at them that they are on the whole not likely to lead to a basic change in this picture if we ever do succeed in computing them back far enough so that we can get the earlier periods. Of course, that is a guess based on what data we have and it is conceivable that if we had more data of the earlier periods, I would turn out to be wrong.

Due to data limitation, we only have these five countries. I hope that further data will permit seeing if the phenomenon is truly general. But, it should also be said that even if it turns out that these are the only five countries in the world with this kind of abrupt regime shape change, it is nevertheless an important phenomenon and we must have some kind of an explanation. It does not seem very likely that these five countries would of all had this very sharp change for separate reasons, so even if they are the only five, which I do not think is likely to be true, it still requires explanation.

In fact, of course, casual reading indicates that this phenomenon is found in many other countries, too. The Bismarkism hypothesis has incidentally another attraction which is that this kind of large-scale transfers are found among the dictatorships as well as among the democratic countries. This, once again, implies that the situation is something that develops simply by passage of time after the adoption of the welfare state. But to repeat, I certainly have not proved this hypothesis and its close correlation with my political views may arouse suspicion.

2.3 Conclusion

I would hate to argue that I have demonstrated the actual cause of the phenomenon shown on Figs. 2.1, 2.2, 2.3, 2.4, and 2.5. It is clear that there was a change of regime. For the United States, it is not clear exactly when the regime change occurred because of the existence of many other factors in the period 1930–1945, but clearly after 1945, the regime was different than it had been before 1929. Looking at our figures, the time of change seems much more definite in the other cases, but it may be that careful investigation will indicate that it is a little vague there, too. I would particularly expect that to be true in the case of Sweden and Denmark because of the Great Depression at that time although these countries were not as badly hurt as many others.

Those explanations for the growth of the government that imply that it always grows are obviously destroyed by the early period histories. Something must have happened to change the way in which we respond to our governments or our governments respond to us. I have offered Bismarckism as a possible explanation, but I should emphasize that is all it is—a possible explanation. I would very much appreciate someone else inventing a better explanation.

References

Buchanan J, Rowley C, Tollison R (eds) (1987) Deficits. Basil Blackwell, Oxford
Tullock G (1995) Government growth. Taiwan J Polit Econ 1(1):21–36

Chapter 3
Does Technology Drive the Growth of Government?

Tyler Cowen

Abstract I consider technology as a partial explanation of the historical shift towards big government. The late nineteenth century and early twentieth century saw a fundamental change in the production technology for large government, and for large institutions more generally. Large institutional structures require a certain degree of communications, organization, and coordination. Only in the late nineteenth century did these structures become possible and big government was one result of that expansion of the production possibilities frontier.

3.1 Introduction

Why is government so large in the Western world?[1] This has been a question of central importance to the Mont Pelerin society since its very beginnings. I start with what Tullock (1995) has called the paradox of government growth. Before the late nineteenth century, government was a very small percentage of gross domestic product in most Western countries, typically no more than 5%. In most cases this state of affairs had persisted for well over a century, often for many centuries. The twentieth century, however, saw the growth of governments, across the Western world, to forty or fifty percent of gross domestic product. Other measures of government intervention, such as the regulatory burden, have grown as well. Whether or not we think these developments are desirable, they are among

[1]This chapter contains Excerpt(s) from "The Great Stagnation: How America Ate All the Low-Hanging Fruit of Modern History, Got Sick, and Will (Eventually) Feel Better" by Tyler Cowen, copyright ©2011 by Tyler Cowen. Used by permission of Dutton, an imprint of Penguin Publishing Group, a division of Penguin Random House LLC. All rights reserved.

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J. Hall, B. Khoo (eds.), *Essays on Government Growth*, Studies in Public Choice 40, https://doi.org/10.1007/978-3-030-55081-3_3

the most important features of the last one hundred and 50 years and they cry out for explanation. My basic focus is on the United States, although a comparative perspective can help us make sense of the evidence. I'd like to address the key question of why limited government and free markets have so fallen out of favor. Of course this investigation is only one small piece of that larger puzzle.

3.2 Extant Hypothesis

A complete account of the causes of government growth would have a very large number of historical variables. But historically contingent explanations fail to address why government growth has proven the universal equilibrium for the developed Western nations and also for Japan. I thus consider some more general reasons for government growth, keeping in mind that economic and historical approaches should be seen as complements, not substitutes.

Public choice analysis has generated many theories of why government grows and why that growth is inevitable. Special interest groups, voter ignorance, and the pressures of war all are cited in this context. Those theories, however, at best explain the twentieth century, rather than the historical pattern more generally. Until the late nineteenth century, governments were not growing very rapidly. The standard public choice accounts do not contain enough institutional differentiation to account for no government growth in one period and rapid government growth in another period. Some structural shift occurred in the late nineteenth and early twentieth centuries, and has remained common to the Western capitalist democracies.

A number of partial explanations have been suggested. One line of inquiry focuses on ideology and the shift in the intellectual climate. According to this claim, the philosophy of classical liberalism declined in the mid-to late nineteenth century. This may be attributed to the rise of socialist doctrine, internal contradictions in the classical liberal position, the rise of democracy, or perhaps the rise of a professional intellectual class. While the ideology hypothesis has merit, it is unlikely to provide a final answer to the Tullock paradox. To some extent ideology stems from broader social conditions. Ideologies changed, in part, because intellectuals perceived a benefit to promoting ideas of larger government, rather than promoting classical liberalism. It remains necessary to identify the change in social conditions that drove this trend.[2]

Some authors attribute the rapid governmental growth of the twentieth century to war, international conflict, and crisis more generally. Higgs (1987) argues this position. He postulates a ratchet effect. For instance, state activity invariably expands

[2]This point does not suggest that all intellectuals cynically court power. Many changed their minds sincerely, due to some change in objective conditions. Or perhaps few individuals changed their minds, but some change in objective conditions caused socialists to win larger audiences at the expense of classical liberals.

in wartime, if only to fight the war. Taxes increase, resources are conscripted, and economic controls are implemented. When the war is over, some of these extensions of state power remain in place. The twentieth century, of course, has seen the two bloodiest and most costly wars in history, the two World Wars.

Wars and crises no doubt play an important role in the history of the twentieth century, but again that is not the end of the story. The ratchet effect becomes much stronger in the twentieth century than before. Furthermore most forms of governmental growth probably would have occurred in the absence of war. The example of Sweden is instructive. Sweden avoided both World Wars, and had a relatively mild depression in the 1930s, but has one of the largest governments, relative to the size of its economy, in the developed world. The war hypothesis also does not explain all of the chronology of observed growth. Many Western countries were well on a path towards larger government before the First World War. And the 1970s were a significant period for government growth in many nations, despite the prosperity and relative calm of the 1960s.

A third answer to the Tullock paradox attributes governmental growth to the expansion of the voter franchise. In the early nineteenth century, voting rights typically were restricted to a small percentage of the population, typically wealthy male landowners. In many European countries there were no voting rights at all and no democracy. By the 1920s, this state of affairs had changed. Almost all of Western Europe was democratic. Men had voting rights in all the democratic countries, without regard for income or property qualifications. Women had the franchise in many of the democracies and would shortly win it in others. Under this hypothesis, widespread voting was the central force behind the move to larger government. The small governments of the early nineteenth century are portrayed as the tools of ruling elites. But once the franchise was extended, the new voters demanded welfare state programs, which account for the bulk of government expenditure.[3]

The hypothesis of franchise extension, however, again leaves much unexplained. First, non-democratic regimes, such as Franco's Spain, illustrate similar patterns of government growth as do the democracies. Second, much of the Western world was fully democratized by the 1920s. Most governmental growth comes well after that date, and some of it, such as Bismarck's Germany, comes well before that time. Third, and most fundamentally, white male property owners today do not favor extremely small government, though they do tend to be more economically conservative than female voters. So the extension of the franchise, while perhaps a contributing factor, cannot be the driving reason for government growth. The franchise extension was typically a temporally limited process, based on a few major events. Governmental growth is an ongoing process, spanning a century or more.

[3] Along these lines, Husted and Kenny (1997), looking at data from state governments, find that the elimination of poll taxes and literacy tests leads to higher turnout and higher welfare spending. Lott and Kenny (1999) find that women's suffrage had some role in promoting greater government expenditures. Internationally, we observe that the relatively free Hong Kong was ruled by a British mandate for much of the twentieth century, rather than having democracy.

No matter how incomplete it may be, there clearly must be something to the voter hypothesis. That is, there must be some demand for big government. If all or most voters, circa 2009, wanted their government to be 5% of gross domestic product, some candidate would run on that platform and win. Change might prove difficult to accomplish, but we would at least observe politicians staking out that position as a rhetorical high ground. In today's world we do not observe this. Voter preferences for intervention are therefore a necessary condition for sustained large government. Democratic government cannot grow large, and stay large, against the express wishes of a substantial majority of the population.

I therefore start with the notion of an ongoing demand for big government, both in absolute terms and as a percentage of Gross Domestic Product (GDP). I then consider why twentieth century technology might have changed supply-side factors to make big government more possible, and might have intensified the demand for big government. I do not consider this technology hypothesis to be a monocausal theory of government growth, as the theories surveyed above all have some validity or some explanatory power. Nonetheless I hope to argue that a focus on technology has been the missing element in the government growth story.

3.3 The Role of Technology

I consider technology as a partial explanation of the historical shift towards big government. The late nineteenth century and early twentieth century saw a fundamental change in the production technology for large government, and for large institutions more generally. Large institutional structures require a certain degree of communications, organization, and coordination. Only in the late nineteenth century did these structures become possible and big government was one result of that expansion of the production possibilities frontier.[4]

Government was small in previous eras, in part, because the technologies for supporting large government simply did not exist. In other words, big government might have always "been in the cards," for demand-side reasons, but only the twentieth century has brought large government on a national scale. Furthermore, technology brought governmental growth across the world. The Western countries all have had access to (roughly) the same technologies, and at roughly the same points in time.

[4]Finer (1997a,b) first suggested that technology was behind the rise of big government, though he did not consider this claim in the context of public choice issues. DeLong's (2019) unpublished manuscript, "Slouching Towards Utopia," appears to cover related themes.

3.3.1 Which Technology?

If technology drove the growth of modern government, starting in the late nineteenth century, which particular technologies have been responsible? What is the technological "smoking gun," so to speak?

The period from 1880 to 1940 brought numerous technological or technologically-based changes into daily life. The long list of new developments includes electricity, automobiles, airplanes, household appliances, the telephone, vastly cheaper power, industrialism, mass production, and radio, to name just a few examples of many. The railroad was not new but expanded greatly during this time period. A bit later the 1950s brought television into many American homes. I do not pinpoint any one of these factors as the root technology of importance, as a number of them appear to have played significant roles. They both made big government more possible on the supply side and they increased the demand for big government. What follows are several mechanisms that have been operating.

3.3.1.1 Transportation

Transportation. Transportation such as the automobile, airplane, and railroad, has made it possible to extend the reach of modern bureaucracy across geographic space. The railroad allowed the North to defeat the South in the Civil War. More generally, cheap transportation increased the reach and power of a central Federal government. Federal employees, police, and armies can travel to all parts of the country with relative ease. Transportation allows published bureaucratic dictates to be distributed and shipped at relatively low expense. "Government by ox-cart," so to speak, simply cannot be very large or very powerful.

Lower transportation costs also have allowed citizens, businesses, and organized groups to lobby Washington more easily. Individuals could now go to Washington, or could travel around their home region to generate political support for their lobbying. Transportation also increased national consciousness and encouraged people to think in terms of a large national government ruling a significant geographic expanse, thereby boosting the demand for big government as well.

3.3.1.2 Telegraphs and Telephones

The telegraph and telephone make it possible for a political center to communicate with a periphery at much lower cost, thus extending political reach. Telephones and telegraphs, like transportation, also "knit the nation together," and lead people to identify with their national political unit, rather than with their local political units.

3.3.1.3 Industrial Capital and Mass Production as Cash Cows

The industrial capital originating in the late nineteenth century, and extending into the twentieth century, was relatively immobile. Factories, smokestacks, power plants, and assembly lines are difficult to move, once put into place. These large and immobile assets provided a tempting target for taxation and regulation. They also provide a large enough surplus so that people can be taxed heavily, without facing the prospect of starvation or being forced into revolt. When most of the population lives from small-scale subsistence farming, and takes income in-kind, it is much harder both to levy taxes and put the in-kind revenue to good use.

The growth of large-scale industry created subsequent lobbies to influence the government and seek favors and protection. The resulting businesses and labor unions now had the wealth and motive to reach out to Washington for favors. It is well known that many Progressive-era businessman pushed for national regulation so they would not have to face separate regulations from each state (of course today we have ended up with both forms of regulation in many cases). When transportation costs were lower, and interstate commerce was less common, this trade-off did not exist.

3.3.1.4 Radio and Television

Radio entered U.S. households in the 1920s and gave people the opportunity to hear their leaders for the first time. The personal element allowed political leaders to tap into the human desire for stories and myths. Franklin Delano Roosevelt was the first American President to receive large numbers of letters from the American public, largely because he spoke so frequently on the radio (Levine and Levine 2002). Without radio and mass newspapers, the totalitarian movements of the twentieth century could not have mobilized so much mass support. Railroads and motorized vehicles allowed these governments to control large geographic areas. Mao's China was hardly a vanguard of advanced technology, but without railroads, radios, and telegraphs that level of centralized tyranny would not have been possible.

Television pushed the personalization of politics one step further. Television entered American homes in the 1950s. American television has mobilized numerous "popular" political movements, including opposition to the Vietnam War, the consumer protection movement, and the environmental movement. Television favors a politics based around simple and emotional issues that can be seen on screen. It favors narrative, discourages analysis, and discourages an emphasis on unseen "opportunity costs" of government policies. Nationally-based network television also led to a greater focus on national rather than local issues, again strengthening the power of the central authority.

3.3.1.5 Communications and Management

The mid-to late nineteenth century saw the growth of large-scale bureaucracy in the Western world. This development required advances in recording, processing, manipulating, and communicating data within an organization and also across organizations. Welfare states could not have arisen unless central governments had means of identifying, tracking, and monitoring potential recipients. In addition to the technological advances mentioned above, doctrines of "scientific management" arose to support the organizational use of information. These doctrines supported regulatory bureaucracies and enabled the widespread use of transfer payments.

We take the practices of modern bureaucracy for granted, but most of them are quite recent. Until the late nineteenth century, no large government had the capacity to keep, organize, order, access, and retrieve detailed records on all of its subjects. For instance, the British government did not organize its paper records in terms of "files" until 1868 (Finer 1997b, p. 1617). Subsequent advances in information management allowed Western governments to penetrate systematically into the lives of their subjects and today possibilities for electronic surveillance create further opportunities for government growth.

3.3.1.6 Tax-Collecting Technologies

The inability to collect taxes is a primary factor keeping many governments small in the developing world today. Most of the technological advances described above make it easier for governments to collect taxes, and thus make it easier for governments to grow. Perhaps most importantly, a wealthier economy will have many citizens working at legitimate, regular businesses with a distinct physical locale. Those institutions will have regular and reliable methods of accounting and reporting. The growth of the publicly owned, limited liability corporation, also helped create the systematic records that make corporate taxation possible. Collecting taxes is easier in an economically advanced environment.

3.3.2 Growing Wealth

Government is to some extent a luxury good. Wealth above subsistence allows people to vote to assuage their consciences, even if the collective result of such votes destroys wealth and opportunity (Lomasky and Brennan 1993). Wealthier societies appear to have a disproportionately greater demand for government interventions of many kinds, simply because they can afford them. In sum, no one of these technological advances serves as the cause of governmental growth. Taken as a group, however, these factors made very large government possible for the first time.

To see this, perform a very simple thought experiment. Assume that we had no cars, no trucks, no planes, no telephones, no TV or radio, and no rail network.

Of course we would all be much poorer. But how large could government be? Government might take on more characteristics of a petty tyrant, but we would not expect to find the modern administrative state, commanding forty to 50% of gross domestic product in the developed nations, and reaching into the lives of every individual daily.

Think also about the timing of these innovations. The lag between technology and governmental growth is not a very long one. The technologies discussed above all had slightly different rates of arrival and dissemination, but came clustered in the same general period. With the exception of the railroads and the telegraph (both coming into widespread use in the mid-nineteenth century), none predated the late nineteenth century, exactly the time when governmental growth gets underway in most parts of the West.

The widespread dissemination of these technologies often comes in the 1920s and 1930s, exactly when many Western governments grew most rapidly, leading sometimes to totalitarian extremes. The relatively short time lag suggests that strong pressures for government growth already were in place. Once significant governmental growth became technologically possible, that growth came quickly.

3.3.3 The Corporate Analogy

The technology hypothesis predicts that other organizations—not only governments—should have experienced a comparable expansion in size and at roughly the same time. This is exactly what we observe. Prior to the American railroads, which arose in the middle of the nineteenth century, private business corporations were not typically very large. The costs of control and large-scale organization were simply too high and no single business had a truly national reach.

The railroads paved the way towards larger corporate sizes. Not only did technology now make larger companies possible, but large corporate units were needed to manage and coordinate the new nationwide network of trains. In 1849 American railroads reached only 7365 miles. By 1870 this had increased to 52,922 miles; by 1919 it was up to 253,152 miles. The large railway companies rose in tandem with this growth in the size of the network.[5]

Following the railroads, large corporations arose in steel, oil, and later automobiles, to name a few examples. The United States Steel Corporation was the largest of the new behemoths. The J.P. Morgan banking syndicate created the company in 1901, through a merger of numerous smaller firms. The new company owned 156 major factories and employed 168,000 workers. The capitalization was $1.4 billion, an immense sum for the time, and the company's annual income soon exceeded that of the U.S. Treasury. For purposes of comparison, when the Erie and Champlain

[5]On the rail numbers, see Warren (1996). On the growth of large rail companies, see Chandler (1965).

canals were built for about $7.5 million each, earlier in the century (the nineteenth century had rough price stability), these projects exceeded the size of any business enterprise at the time.[6]

U.S. Steel was the largest company of its time, but it was hardly an isolated example. Merger waves swept most major American industries. Other very large companies followed, including General Electric, National Biscuit Company (Nabisco), American Can Company, Eastman Kodak, U.S. Rubber (later Uniroyal), and AT&T, among others. This corporate growth started during the late nineteenth and early twentieth centuries, precisely when government growth was taking off.

Large corporations and large governments have common technological roots. We cannot imagine large railroad firms without relatively cheap power, high demands for transportation, and the ability to process and communicate information effectively. The railways at first relied heavily on the telegraph and later used electricity and radio communications. Successor large corporations needed new technologies in similar fashion. Standard Oil, for instance, relied on advanced transportation systems, including railroads, to receive its inputs, to recruit labor, and to ship and sell its products. Radio and other technologies also enabled mass marketing, which led to the establishment of nationwide brands and thus larger firms.

We do see that some corporations grow large before government does, by several decades, but this should come as no surprise. We should expect that private firms are more adept at adopting new technologies than are governments.

3.4 History of Governments

The technology hypothesis also finds support from a broader swathe of human history. Consider a society of hunter-gatherers, as we still find in the Pygmies of Central Africa. Under some interpretations Pygmy society has a kind of anarchy. The reason for this state of affairs is obvious. It is not due to the Pygmy electoral system, Pygmy ideology, or the infrequency of Pygmy war. The Pygmies simply do not have any large-scale formal institutions of any kind. A typical Pygmy family (at least those who continue to live a traditional Pygmy existence; there are migrants to other cultures) will not own any more than its members can carry on their collective backs, when moving from hunting camp to hunting camp. Given this low level of technology, big government, for the Pygmies, simply is not an option.

The first large-scale empires required significant changes in technology to support their activities. The advent of writing, arithmetic, and large-scale cities is typically traced to the Sumerians, located in Mesopotamia (modern-day Iraq), in approximately 3500 B.C. Bureaucracy suddenly became possible, and it arose quickly. The Sumerian bureaucracy made extensive use of files, records, and

[6] On U.S Steel, see Chambers II (1982). On the canals, see Chandler (1965).

archives, all new technological developments at the time (Finer 1997a, pp. 105–131). A big leap forward in human history—made possible by technology—also led to a significant increase in state power, just as we find in the early twentieth century.

The Persian Empire was one of the more impressive absolute states of antiquity. It survived for more than two centuries (550–300 B.C.) and in size covered the equivalent of 70% of the current surface area of the United States. Herodotus cited it as an example of tyranny, relative to the liberty of the Greek city-states. But again we see that technology limited its daily control over the lives of its subjects. The problem is easy to see. It took a traveler 67.5 days to cross the empire, and it took an army 90 days. Special couriers on horses could do it in 7 days. The Persians therefore governed through a simple formula, as explained by Finer (1997a, pp. 297–298): "[They] set themselves the most limited objectives possible, short of losing control: in brief, to provide an overarching structure of authority throughout the entire territory which confined itself to two aims only: tribute and obedience. Otherwise nothing."

The Egyptian dynasties were among the most totalitarian of the great states of antiquity. They relied heavily on bureaucracy, formal taxation, and centralized record keeping. It was only through a fluke of nature, however, that the Egyptian empires grew to any significant size. The Nile ran through most of the Egyptian kingdoms and served as a highway, bringing the state rapidly within the reach of most of the population. It was possible to either float downstream with the current, or to move upstream with the wind, by hoisting a sail. Egypt therefore had the best communications system of the ancient world, and not surprisingly, as a result, the Egyptians lived under some of the strongest tyrannies (Finer 1997a, p. 135, passim).

We can imagine a "Tullock paradox" from the vantage point of 2000 B.C. or so. The paradox might run as follows: "For thousands of years mankind had no large-scale empires or bureaucracies. Suddenly government became much larger in Sumeria, Egypt, and other locales, and has stayed large." While our historical understanding of this period is incomplete, new technologies appear to have been central to the growth of empire in that time. The same advances that boosted living standards also boosted centralized rule.

The centuries to follow brought many tyrannies and empires, larger than what had preceded the technological revolutions of Sumeria and its immediate neighbors. Yet none of these regimes had the technology to support our contemporary idea of big government. Historian Jean Dunbabin (1985, p. 277) puts it starkly: "nobody was governed before the late nineteenth Century."

Imperial China presents another example. The ideology was highly statist and there were few legal checks and balances. Finer (1997a, pp. 73–74) wrote: "In principle the emperor knew no substantive or procedural limits to his authority, and the localities, down to the villages, were supposedly completely controlled and directed from his palace." In reality, however, the reach of the emperor was quite modest. Finer (1997a, p. 73) tells us that in Imperial China "the scope of the central government was, of course, very much narrower than in our own day."

Subsequent regimes took numerous forms, but we can see common patterns. Some regimes, such as many of the Greek city-states, were small-scale tyrannies. A tyrant or oligarchy would rule a city or a small geographic area. The ruling party or parties would control many aspects of city life, political, economic, or otherwise, but only on a small scale. In other words, the rule of government could be highly intensive, but it was not typically very extensive.

Larger-scale empires were mechanisms for extracting tribute rather than well-honed sources of detailed rule. A central set of rulers would oppress a much larger geographic area, as was the case with the Mongol or Aztec empires. Yet the reach of those central rulers was limited by modern standards. The central ruler could exercise greater control of outside areas only by occupying them and sending in troops. Troops were sent when tribute was not paid, revolution threatened, or the area became a frontier in a war with another political unit. Yet once the troops were gone, the local authority reasserted its control over daily life. The rulers did not have the capacity to extend regularized control over daily life for the entire empire. They could not issue, communicate, and enforce the kind of detailed laws and regulations that emanate from Western governments today. So for much of recorded human history we had a combination of oppressive local governments, on a small scale geographically, combined with the payment of tribute to an external central ruler (Finer 1997b, pp. 1615–1618).

If we look to American history, slavery is the greatest tyranny we find, and the greatest infringement of individual liberty. This institution came before the advent of big government. American governments, of course, supported slavery in many ways, but the primary enforcement mechanism was local, either the slave owner himself or his nearby supporters in the town. Government sanctioned a system of private violence and oppression, but the government of that time did not have the reach or the machinery to run a full-scale slave economy.

Today's low-technology countries, the poorer ones, tend to have governments that hearken back to times past. These governments may be highly corrupt and destructive, but they do not typically command a very large share of gross domestic product. They do not exercise direct and daily control over the lives of most of their citizens.

Haiti, for instance, is arguably the basket case of the Western hemisphere. Per capita income is under $2000, literacy rates run about 60%, and life expectancy barely exceeds 60 years. The rate of malaria infection is high by world standards and the World Health Organization (2018) estimates over 90% of the population is at risk. Haitian government, if that word can even be used, is little more than a group of thugs. Yet the Haitian government consumes under 10% of all consumption (Gwartey et al. 2019, p. 88), arguably half that percentage if we count black market activity, which does not show up in formal national income statistics. Haitian politicians are brutal and corrupt, but they do not have the power to control most of the country. Haiti, of course, also has a very low level of technology. Most parts of the country have neither electricity nor running water. Most of the country's roads are barely passable. Few people have cars. The country has an "oral culture," which

relies very little on newspapers or television (though radio is important). Most of the Haitian countryside lives in a state of virtual anarchy or there is rule by local gangs.

Botswana provides the contrasting case. Unlike most African polities, which stand closer to Haiti, Botswana has democratic government, a semblance of rule of law, and a developed market economy. Botswana also has a government that stands at about 40% of measured gross domestic product, comparable to the United States or Western Europe. Unlike Haiti and many of its African neighbors, Botswana has enough order and progress to allow government-generating mechanisms to take hold. The same institutions and technologies that make good government possible also tend to make government large.[7]

3.5 Implications for Reform

What does the technology hypothesis imply about the necessity of big government? Is large government inevitable in the developed countries? Or can reform procedures, at least in principle, bring about a smaller government?

We can see some immediate reasons why big government is hard to reverse, namely the difficulty of altering the underlying causes of big government. We could make government smaller by throwing away modern technology, but that is hardly a desirable recipe for political reform.

The technology hypothesis works best as an account of necessary conditions rather than sufficient conditions. The above arguments have stressed how technology made big government possible for the first time. But not every possible event comes to pass. I have largely taken the demand for big government as a given, but the question remains whether this demand is necessary or contingent.

The technology hypothesis does allow demand to be malleable to some extent. As discussed above, technology helps people develop a national consciousness, allows political leaders to make emotional appeals to people, and focuses public attention on national politics rather than on regional issues. But it remains an open question whether demand might be malleable in ways that lead to smaller government.

We also can identify some examples of "governmental overshooting." Political systems sometimes generate more government than can be sustained over a longer run. During World War I, the Wilson administration drew up systematic plans to collectivize the entire American economy in peacetime as well as war. Government was relatively small at this time, by contemporary standards, but arguably this moment represents the high-water mark of collectivist thinking in the United States. The plans did not last, although Roosevelt tried to resurrect a version of them with his New Deal NRA. Nazi Germany and Communist Russia both relied heavily on modern technologies for their forced collectivizations and conquests. They used

[7] On Botswana, see The Economist (2002).

the radio, the tank, and the modern bureaucracy for totalitarian ends. Both of these regions still have large government today, but of course in much more benign forms.

In these cases, it appears that new technologies enabled the spread of a fascist intoxication with power, both among leaders and the general citizenry. Both Hitler and Mussolini had considerable popular support, and even the New Deal had fascist (and popular) elements. Political and cultural institutions were not well equipped to handle the social implications of the new technologies of radio, electricity, and easy transportation. Those technologies made mass culture possible and in the realm of politics that mass culture translated into fascism. Only after bitter experience did fascist ideas become less popular and social and political norms subsequently evolved to protect electorates against the fascist temptation. In any case, these examples raise the question of whether we might see a subsequent evolution of institutions today, reversing how mass media and technology have shaped our politics.

If big government is to go away, we should not look to the past. Earlier times probably had no greater love of liberty than does the present. Previous eras simply could not afford big government, and did not have the technologies to support it. The analysis of this paper raises a possibility, namely that perhaps earlier individuals would have jumped on the big government bandwagon as soon as they had the chance to do so. For that reason, we should be skeptical of plans to recreate the historical or intellectual conditions behind "classical liberalism," whatever that might mean. Such a strategy probably would not bring about classical liberal outcomes in the modern world.

Classical liberal doctrine frequently identifies the growth of government as an enemy of human freedom. Indeed government often acts to restrict liberties. And it might be better, and more conducive to liberty, if we had a smaller government. Nonetheless when we examine the broader historical picture, big government has been one result of a more general increase in wealth and freedom. For this reason, a simplistic "liberty vs. power" story is unlikely to mirror reality or prove persuasive. Modern technology, combined with ongoing demands for big government, has brought us both more liberty and more power at the same time.

However it is one very distinct possibility that modern technology makes government a larger and larger percentage of GDP over time. In the United States recent job growth has been concentrated in the sectors of health care, education, and government itself. Both health care and education are, for better or worse, relatively "government-intensive" economic sectors. If they grow as a percent of GDP, government will probably grow as a percent of GDO as well. Very productive, lightly regulated segments of the private sector tend to shrink as a percentage of overall GDP because of their overall success in lowering costs, just as agriculture has shrunk as a percentage of GDP over the last few centuries.[8]

[8] Yglesias (2009) wrote an interesting blog post on related ideas.

3.6 Future Technologies?

I often hear it argued that new technologies will bring about greater possibilities for freedom. For instance cyberspace, technologies for on-line anonymity, and genetic engineering might someday disfavor large government (Friedman 2008). That being said, future technologies, and their effects, have been notoriously difficult to predict in the past. So we should be cautious in drawing conclusions here.

Others argue that greater competition across governments has brought greater freedom to the world, or will bring greater freedom in the future (McKenzie and Lee 1991). We hear how freer capital movements impose discipline on governments and force them to institute better policies. As resources become more mobile over time, we might expect such constraints to produce more freedom in the longer run.

Such hypotheses, however, do not find support in the data. The evidence shows that small open economies tend to be more interventionist rather than freer (Rodrik 1998). The more open the economy, the more risk that individuals face from the perturbations of larger world markets. These citizens then tend to favor more government intervention, not less, to protect themselves against those risks. As history progresses, we see more anecdotal examples to support this general statistical result. Global markets have punished many poorer countries, such as Argentina or Indonesia, for their bad interventionist policies. Often the end result is more government intervention, not less.

Canada is a more "open" economy than is the United States, yet it typically has greater government intervention and higher levels of government spending. The Nordic economies are both very open and have lots of government spending, although they also have a relatively light regulatory hand.[9]

More technology need not undo the politicization of societies. Future technologies may either increase or decrease the role of government in society, but if history shows one thing, it is that we should not neglect technology in understanding the shift from an old political equilibrium to a new one.

Acknowledgments Paper originally prepared for 2009 meeting of the Mont Pelerin Society in Stockholm Sweden. The author wishes to thank Pete Boettke, Mark Brady, Bryan Caplan, Paul Edwards, Jeff Friedman, Mark Grady, Wendy Gramm, Robin Hanson, Robert Higgs, Jeff Hummel, Laurence Iannaccone, Daniel Klein, Brian Mannix, Alex Tabarrok, Gordon Tullock, Tony Woodlief, and GMU seminar participants for useful comments.

[9]Openness does appear to help some countries, such as New Zealand. External constraints forced them to reform in the 1980s, if only to stave off disaster. Furthermore, in historical terms, competition between European governments played a critical role in encouraging liberalization and spurring the industrial revolution. Nonetheless, in today's world, the degree of economic openness, all other things held equal, predicts more intervention rather than greater liberty.

References

Chambers II JW (1982) The tyranny of change: America in the progressive era, 1890–1920. St. Martin's Press, New York
Chandler AD (1965) The railroads: the Nation's first big business; sources and readings. Harcourt, Brace & World, New York
DeLong B (2019) Slouching towards Utopia: the economic history of the world in the long twentieth century 1870–2010. Unpublished Manuscript, Berkeley
Dunbabin J (1985) France in the making. Oxford University Press, Oxford
Finer SE (1997a) The history of government from the earliest times (Ancient monarchies and empires), vol I. Oxford University Press, Oxford
Finer SE (1997b) The history of government from the earliest times (Empires, monarchies, and the modern state), vol III. Oxford University Press, Oxford
Friedman DD (2008) Future imperfect: technology and freedom in an uncertain world. Cambridge University Press, Cambridge
Gwartey J, Lawson R, Hall J, Murphy R (2019) Economic freedom of the world: 2019 annual report
Higgs R (1987) Crisis and Leviathan. Oxford University Press, New York
Husted TA, Kenny LW (1997) The effect of the expansion of the voting franchise on the size of government. J Polit Econ 105(1):54–82
Levine LW, Levine CR (2002) The people and the president: America's conversation with FDR. Beacon Press, Boston
Lomasky L, Brennan G (1993) Democracy and decision: the pure theory of electoral preference. Cambridge University Press
Lott JR Jr, Kenny LW (1999) Did women's suffrage change the size and scope of government? J Polit Econ 107(6):1163–1198
McKenzie RB, Lee DR (1991) Quicksilver capital: how the rapid movement of wealth has changed the world. Free Press, New York
Rodrik D (1998) Why do more open economies have bigger governments? J Pol Econ 106(5):997–1032
The Economist (2002) Economics focus: the African exception
Tullock G (1995) Government growth. Taiwan J Polit Econ 1(1):21–36
Warren K (1996) Triumphant capitalism: Henry Clay Frick and the industrial transformation of America. University of Pittsburgh Press, Pittsburgh
World Health Organization (2018) World malaria report 2018. World Health Organization, Luxembourg
Yglesias M (2009) The case for ever-bigger government. Think progress 31 January:blog post

Chapter 4
High Tax Compliance Results in *Smaller* Government

Michael McKee

Abstract High tax compliance will reduce rather than facilitate the growth of government spending. There are several reasons for this. First, tax evasion reduces the effective price of public programs thus increasing the quantity demanded. Second, tax evasion is not uniform across income classes and the mix of public programs will be altered in favor of services with higher income elasticities if those evading are those with higher incomes. Third, tax evasion contributes to other forms of non-compliance and raises the cost of enforcement of laws in general.

4.1 Introduction

Some proponents of the 'smaller government' school of thought argue that individual unwillingness to pay authorized taxes serves as a constraint on the growth of government spending. That is, tax evasion results in smaller government. In this short paper I demonstrate that it is *high* tax compliance that is necessary if government is to be constrained from its natural tendency to grow. I will organize the argument into a series of points, each of which is directed to a component of the argument that high tax compliance is necessary to the size of the government budget not being too large. The most basic factor behind the effect of tax evasion on the level of government expenditure is the manner of budget formation. A couple of *ceteris paribus* arguments follow. If the expenditure budget is revenue driven (the government spends what it raises in revenues) then, with evasion, the revenues are smaller and so is the level of expenditure. If the expenditure budget is demand driven (the government spends what the voters demand in the way of programs) then evasion will lead to a larger budget as those who evade will rationally choose to support (vote) higher expenditures. Since the federal government of the United States routinely spends beyond current revenues (incurs debt) it would appear that

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J. Hall, B. Khoo (eds.), *Essays on Government Growth*, Studies in Public Choice 40, https://doi.org/10.1007/978-3-030-55081-3_4

the latter view is more consistent with the facts. That is, revenues are generated to provide for a desired expenditure level.[1]

A second factor is the role of the government in the economy. Under the 'market failure' argument it is a given that government exists to provide goods and services that would be under-provided by the market—government functions to redress market failure associated with public goods and externalities. An alternative view is that government exists solely to transfer wealth (redistribution). It is true that even in providing public goods, the government effects redistribution. However, this taxonomy presents a somewhat false dichotomy. There are, for example, good arguments that individuals may view some amount of redistribution as a public good (Hochman and Rodgers 1969). That governments arise to provide goods and services is the cornerstone of the concept of fiscal exchange. Indeed, the need to have some goods and services provided (and financed) collectively, is the precondition for a constitution permitting for a coercive or non-voluntary tax system (Brennan and Buchanan 1977) as Wicksell ([1896] 1959) argued.

With a democratically elected government, the budget and its attendant tax structure is the result of a political process involving a set of trades (see Hettich and Winer 1988, for example). For the political market, as with all markets, information is essential to efficiency. However, government agents are assumed to be self interested and, left to their own devices, the result would be a government that was 'too large' in the sense of consuming an inefficient level of resources. Governments pursuing expenditure growth for its own sake have been described as 'Leviathan' and Niskanen's (1971) model of the expenditure maximizing bureau is a fundamental component of this model. Brennan and Buchanan (1977) have demonstrated that the tax structure may be used to constrain this tendency. I shall take this up below and will show that essential to the Brennan and Buchanan argument is that the level of tax compliance be high.

A third issue is the effect of tax evasion on the level of social capital in the nation. Social capital has recently been recognized as an input to economic growth and development and lower levels of social capital retard growth. A simplified definition of social capital is that it is the body of social norms that enable individuals in a society to trust each other to not behave in a purely opportunistic manner. The higher is the level of social capital, the lower is the required expenditure on enforcement of property rights. In the context of tax compliance, the notion is that individuals pay the bulk of their tax liabilities although the probability of an audit is so low as to make evasion a virtually riskless option. The higher the voluntary compliance levels, the lower the tax enforcement costs and the smaller the deadweight losses associated with the tax system. Again, lower collection costs translate into smaller government expenditures for a given level of service.

An important input to social capital is the notion that transgressors will be punished. However, the contribution of enforcement to social capital is not in

[1]It may be argued that the debt is incurred to finance capital projects. However, recent budgets would tend to refute this argument.

increasing the compliance through the fear of apprehension, it is that those who would voluntarily comply feel their behavior is vindicated if those who cheat are caught and punished. By increasing the obedience to laws, higher tax compliance is an important contributor to the level of social capital. As Cowell (1990) has argued, tax evasion is a unique crime since it reduces trust that the government will enforce social order. Thus, tax evasion raises the costs of other forms of enforcement since the probability of detection must be raised in these other areas.

In the following sections, I will construct my argument as a series of propositions that are central to an efficient system of fiscal exchange and to the notion of the social costs of tax evasion. I first argue for an essential tenet being that the (tax) price reflects the full cost of the public sector programs. Absent this, the demand side (citizens) will demand too much output of government services and the supply side (politicians and bureaucrats) will be justified in providing too much output. I then argue that the tax prices must not vary systematically by factors other than those represented by income and tastes. That is, if the ability to evade is not perfectly congruent with the characteristics that determine the legal tax burden, then the moral hazard problem resulting from tax evasion will lead to an inefficient mix of public services. Further, tax evasion represents a different sort of crime and leads to a decline in the level of social responsibility and social capital. A consequence is that enforcement costs in other areas may increase and this has the effect of increasing the size of the public sector (or reducing the quality of services). Thus, tax compliance may be viewed as a part of the social capital of the nation. To these ends, tax enforcement is in fact central to the size of the public sector being efficient since enforcement ensures higher compliance.

4.2 Proposition One: Voters Must Face the True Price of Public Programs

Public sector programs are generally introduced via enabling legislation. However, such legislation is often only a necessary condition for provision since sufficient budget must be approved through the appropriation process. It is at this point that the voters (through their elected representatives) express their preferences for the level of the program. That is, the public budget is the result of a political process that must ultimately reflect the preferences of the voters (although such preferences may be imperfectly translated to the political decision outcome). A key to the translation of such preferences is that the voters face the true price of public sector programs and that they see their price as that. The potential for tax evasion reduces the perceived link between the ‘tax price’ and the true price of the public services. The lowered price induces a moral hazard problem in which there is an increase in the quantity demand for publicly supplied services. This is inefficient and is the same behavioral argument that supports the fiscal illusion explanation for government growth.

In the public choice literature, a common factor blamed for the excessive growth of government is fiscal illusion (Oates 1998). Essentially the fiscal illusion argument asserts that government will conceal the true price of public services to encourage the voters to support a larger budget allocation, through voting to have more of the public services provided. If this argument applies to the government then it must also hold for taxpayers. If a taxpayer anticipates avoiding or evading taxes then he/she will vote for a larger level of public service provision, *ceteris paribus*.

The issue raised here is identical to that created by the moral hazard problems associated with the excess demand when perceived prices are below the opportunity cost of the service. Thus, tax evasion will lead to *greater* government spending.

4.3 Proposition Two: Evasion Affects the Menu of Public Programs

The potential fiscal illusion created by tax evasion is particularly troublesome should the taxpayers evading also be those for whom the income elasticity of demand for public sector services is high. Those most able to evade often have the highest incomes and are, thus, able to afford tax professional assistance such as tax accountants and attorneys. Many government services (including redistribution) are typically regarded as normal goods. The mix of public services will be affected by evasion—the more income elastic services will be over provided. Hence subsidies to the arts will be increased. We typically observe that art galleries, opera and symphony receive substantial subsidies while rock music does not.

The bottom line is that different populations demand different sets of public goods. If evasion is not uniform across segments of the population, those evading will vote to increase the level of public services that they value while those not evading will not be so inclined. The result will be a tendency to over provide those services demanded by the persons who evade and a tendency to under provide the services demanded by those who comply. There is considerable evidence that evasion is not uniformly distributed. Opportunities for evasion through under reporting of income and/or over reporting deductions are generally more available to particular income classes. The net effect of this difference is an imbalance in the public sector mix of goods and services.

Hettich and Winer (1988) argue that the structure of tax policy reflects the interaction between the tax authority and the electorate. That is, the tax base and rate structure are the consequence of a series of political exchanges that have the result of maximizing the net votes to the political sponsors. To the extent that the choice of base reflects perceptions of the ease of evasion, the tax structure will vary according to the opportunities for evasion rather than according to efficiency arguments.

Attitudes toward risk and social responsibility vary across individuals. The effect is that the tax burden will vary across individuals according to characteristics unrelated to the tax burden issues such as occupation, perception of government,

and attitude toward risk (Slemrod 1998). The situation may be exacerbated in federal systems since the propensity to evade will be higher in states with personal income tax—the return to evasion is an increasing function of the tax rate. Thus, location may affect the true tax burden.

4.4 Proposition Three: Evasion Weakens the Tax Constitution

Brennan and Buchanan (1977) describe a tax constitution that limits the growth of government. The essential features of this tax structure are that a key component be the personal income tax and that the tax rate be progressive. Evasion in the personal income tax may lead to the introduction of alternative revenue sources and this will have the potential of reducing the constraints on leviathan by broadening the tax base. Further, evasion implies that the *effective* tax rate may not be progressive. Thus, those who can evade will not be as concerned with limiting the growth of the government budget.

Among the possible sources of government growth is an increasing reliance on a tax base that is susceptible to evasion. Income taxes are more easily evaded than are consumption taxes. Further, the wealthier members of society are more able to evade income taxes. Thus, the progressivity of the tax structure is compromised by evasion. And, the effectiveness of the income tax, narrowly defined, as a constraint on government spending is lost.

The theory of fiscal exchange postulates that individuals vote on both an expenditure program and a tax structure. Unless evasion is built into the voters' expectations of the tax effect there will be a distortion since the modified taxation level will not cover the voted expenditure program. Such a distortion is clearly not immune to policy actions since the government establishes a tax collection and enforcement agency. Unless, that is, the government chooses a low level of enforcement for other reasons. This is unlikely given the consequences of evasion for the overall level of civil order and the costs of government business.

Evasion raises the cost of tax collection. Thus, it contributes to the dead weight loss created by distortionary taxation. Since the implementation of an optimal tax system is neither feasible (Alm 1999) nor politically desired (McKee and West 1981), the tax system will generate some dead weight losses and evasion will increase the extent of these.

4.5 Proposition Four: Tax Evasion Reduces Social Capital

Social capital (Putnam 1995) contributes to the productivity of the economy. Activities that reduce the level of social capital generate negative externalities since

social capital is productive. Knack and Keefer (1997) have shown that social capital and economic growth are positively correlated. Cowell's (1990) argument is that high tax evasion reduces the compliance with laws in general. Thus, tax evasion contributes to a decline in the level of social capital.

The tax base is eroded through evasion. To raise the same level of revenue then requires increased tax rates. The higher rates may induce greater evasion (as well as greater deadweight loses). Further, as rates are increased, the penalties for evasion (typically based on the unpaid taxes, increase. This increases the scope for corruption through bribes to the tax collection agents and/or the auditors. Such corruption further weakens citizens' trust in the government and this can have a deleterious effect on tax compliance. Tax evasion increases other forms of malfeasance by creating a culture in which breaking the law is considered acceptable.

The manner by which a given level of government expenditures affects tax compliance has several dimensions. One dimension is the process by which a community decides how to use its tax revenues to provide goods and services. If taxpayers feel that they have a voice in the way their taxes will be spent, then they are likely to feel more inclined to pay their taxes. Further, the public announcement of the outcome of the vote reveals information to the taxpayers about the level of group support for the collective decision, and this information may be useful to individuals in projecting the compliance behavior of the other taxpayers. Government decisions that are imposed are unlikely to generate such feelings of participation or to provide such information on overall compliance. Another dimension is the level of popular support for the government program, or more generally the types of public good programs over which the public must decide. If individuals are strongly in favor of specific government expenditures—and if they know that other citizens share their feelings—then they are likely to comply more willingly, regardless of the process by which the community makes the decision. Conversely, individuals seem less likely to pay their taxes voluntarily if they do not approve or value the use of their tax dollars, and if they do not know the level of support of the others. These conjectures have been verified in laboratory experiments (Alm et al. 1993, 1999) and though field observations of taxpayer sentiments (Yankelovich et al. 1984).

4.6 Conclusions

If your objective is to limit the size of government, advocating tax evasion is a poor strategy. In this paper I have presented a series of arguments in support of the proposition that tax evasion increases rather than reduces the size of the public sector. Tax evasion lowers the perceived price of public services thus increasing the quantity demanded—and, hence the size of government budgets. To the extent that tax evasion is correlated with elasticity of demand, this situation is exacerbated. Tax evasion raises the costs of enforcement of other laws and regulations and tax

evasion weakens the use of a progressive income tax structure as a constraint on the tendency of government to grow.

Acknowledgments I would like to thank Bob Tollison for providing the inspiration for this paper via a comment he made while I was presenting a paper on enhancing tax compliance. Jim Alm, Matt Murray, Walter Hettich and Stan Winer provided much useful discussion that has stimulated me to think about issues that are reflected in this paper. They bear no responsibility for any errors or omissions.

References

Alm J (1999) Tax compliance and administration. In: Hildreth WB, Richardson J (eds) Handbook on taxation. Marcel Dekker, New York, pp 741–768

Alm J, Jackson BR, McKee M (1993) Fiscal exchange, collective decision institutions, and tax compliance. J Econ Behav Organ 22(3):285–303

Alm J, McClelland GH, Schulze WD (1999) Changing the social norm of tax compliance by voting. Kyklos 52(2):141–171

Brennan G, Buchanan JM (1977) Towards a tax constitution for Leviathan. J Public Econ 8(3):255–273

Cowell F (1990) Cheating the government: the economics of evasion. MIT Press, Cambridge

Hettich W, Winer SL (1988) Economic and political foundations of tax structure. Am Econ Rev 78(4):701–712

Hochman HM, Rodgers JD (1969) Pareto optimal redistribution. Am Econ Rev 59(4):542–557

Knack S, Keefer P (1997) Does social capital have an economic payoff? A cross-country investigation. Q J Econ 112(4):1251–1288

McKee M, West EG (1981) The theory of second best: a solution in search of a problem. Econ Inq 19(3):436–448

Niskanen W (1971) Bureaucracy and representative government. Aldine, Chicago

Oates W (1998) On the nature and measurement of fiscal illusion: a survey. In: Brennan G, Grewal BS, Groenewegen PD (eds) Taxation and fiscal federalism: essays in honor of Russell Mathews. ANU Press, Canberra, pp 65–82

Putnam RD (1995) Bowling alone: America's declining social capital. J Democr 6(1):65–78

Slemrod J (1998) On voluntary compliance, voluntary taxes, and social capital. Nat Tax J 51(3):485–491

Wicksell K ([1896] 1959) Taxation in the monopoly case. In: Musgrave R, Shoup C (eds) Readings in the economics of taxation. Richard Irwin, Homewood, pp 156–77

Yankelovich, Skelly, White, Inc (1984) Taxpayer attitudes survey: final report. public opinion survey prepared for the public affairs division. Internal Revenue Service, New York

Chapter 5
Income Tax Evasion Prior to Withholding

Randall G. Holcombe and Robert J. Gmeiner

Abstract World War II brought with it a substantial increase in federal income tax rates, and introduced income tax withholding for wage income. Rates increased prior to withholding, so an examination of tax payments paid prior to and subsequent to withholding can offer some insight into the degree to which taxes were evaded prior to withholding. The data reveal a substantial increase in number of returns filed, taxable income reported, and income taxes paid due to the implementation of withholding, indicating that a substantial amount of tax evasion prior to withholding was reduced because of withholding. The additional income tax revenue that resulted from withholding undoubtedly had a substantial impact on the increase in the size of the federal government following World War II.

5.1 Income Tax Evasion Prior to Withholding

Federal government spending was less than 10% of GDP in 1940, just prior to World War II. By 1949 it was more than 14% of GDP, and had risen to 18% in 1954. By the 1980s it had moved to above 20% of GDP. The growth in federal government spending in the second half of the twentieth century was financed primarily by the personal income tax, and the increases in income tax revenue would not have been possible without the implementation of income tax withholding that occurred during World War II. One reason is that people's income tax liabilities are a large-enough share of their budgets that many taxpayers would lack the financial discipline to set aside enough money to pay their taxes on a quarterly basis, as was done prior to withholding. Another reason is that withholding makes it more difficult for

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J. Hall, B. Khoo (eds.), *Essays on Government Growth*, Studies in Public Choice 40, https://doi.org/10.1007/978-3-030-55081-3_5

taxpayers to evade their tax liabilities, because employers both collect their taxes as they are paid, and report how much they are paid and how much was withheld to the government.

World War II brought with it a substantial increase in federal income tax rates and introduced withholding for wage and salary income. The personal exemption was also substantially reduced, making many more working Americans liable for income tax payments. Through 1939 the personal exemption for a married couple was $2500, which was reduced to $2000 in 1940, $1500 in 1941, and $1200 in 1942 (Seltzer 1968, pp. 40–41). Tax rates increased substantially in the 1940s, and income tax withholding was implemented beginning in the second half of 1943, which was the beginning of FY 1944.[1] As Kleven et al. (2011) point out, citing experimental evidence, withholding provides a check on compliance because employers report income to the IRS and remit withheld estimated taxes to the IRS rather than relying on the self-reporting and self-payments of taxpayers.

By the time withholding was introduced in 1943, the personal exemption had already been lowered and rates had already been raised, so while there was some increase in rates when withholding was introduced, the biggest tax increases occurred prior to withholding. A comparison of income tax collections prior to and after the implementation of withholding can provide an estimate of the degree to which the implementation of withholding reduced income tax evasion.

Information on tax evasion is necessarily speculative, because tax evaders try to hide their activities, so government statistics will not directly provide a measure of the degree to which evasion takes place. As Sandmo (2005, p. 659) notes, "empirical knowledge [about tax evasion] is by necessity so uncertain." Still, a substantial number of empirical studies on tax evasion have been undertaken, and official statistics at the time withholding was implemented can reveal evidence of evasion prior to withholding. Smiley and Keehn (1995) make a good case that one reason tax rates were reduced in the 1920s was to reduce tax evasion in response to high rates. The highest income earners faced a marginal tax rate of 77% in 1918, which was reduced to 58% in 1922, 46% in 1924, and 24% in 1929. Higher tax rates in the early 1940s, in addition to subjecting many wage earners to income taxes who had never paid them before, provided an incentive for evasion, and withholding was an institutional change that could limit evasion.

Yaniv (1988) notes that even with withholding, employers might remit less to the IRS than they deduct from employees' paychecks, which is another possible source of tax evasion. While this is unlikely in the twenty-first century when computerized records can quickly match employee W-2s with employer remittances, it was a possibility in the 1940s before tax records were computerized.[2] This possibility presents one reason why the estimates that follow, though already large, may be

[1] Prior to 1976 the federal government's fiscal year ran from July 1 to June 30.

[2] Yaniv (1999) also looks at incentives to evade taxes from the standpoint of prospect theory. Yaniv (1998) notes that employees working for multiple employers might be able to evade by misinforming employers about other jobs, which is unlikely to be a factor in the 1940s.

underestimates of actual evasion. Kleven et al. (2016) note that in large firms with detailed accounting records, any attempt at collusion between employer and employees to evade taxes is likely to fail because it would take only one disgruntled whistle-blower to report the evasion to the authorities. Martinez-Vazquez et al. (1992) find some experimental evidence that if taxpayers are under-withheld, that would increase evasion. The estimates that follow do not take into account under-withholding. The effect is likely small, but to the extent it exists again would mean that the estimates that follow are underestimates.

Withholding only was applied to wage and salary income, so increased compliance would result in more wage and salary income reported but would have little if any effect on the reporting of other income. The estimates below are based on this characteristic of withholding. The introduction of withholding provides an interesting natural experiment, because tax rates had already gone up prior to withholding, so there should be a minimal impact from tax rate changes as withholding is introduced. Smiley (2000) notes that tax rates have a substantial effect on reported income, but the change in rates was small at the time withholding was introduced. Saez et al. (2012) review the literature and note that there is little evidence of behavioral responses to tax rate changes, such as changes in labor supply or saving behavior, but that avoidance and evasion does occur, supporting the methodology below which assumes that the introduction of withholding does not affect labor supply.

Changes in tax law during the early 1940s add several complications to making these estimates. One is that tax rates increased every year, but the largest changes came prior to withholding, so rates had already increased substantially before withholding came into effect, and increased by a smaller amount contemporaneous with withholding. Another complication is that prior to 1943 income taxes were paid in quarterly installments based on the previous year's income. For example, taxpayers would compute their taxes due on their 1940 income and then pay that amount in quarterly installments in 1941. The Current Tax Payments Act of 1943 which implemented withholding also altered the tax system so that taxes paid in any year were on the current year's income rather than the previous year's. The Act also provided for some tax forgiveness, because otherwise taxpayers in 1943 would have owed taxes on both their 1942 and 1943 incomes in that year. Taxpayers who owed less than $50 on their 1942 incomes only had to pay taxes on their 1943 incomes and those who owed more than $50 were required to pay their 1943 taxes plus 12.5% of their 1942 taxes.

These complications make estimates of tax compliance more complex and less precise, but there is sufficient data to make a reasonable estimate of the degree to which withholding increased compliance. The estimates do not provide any information on the aggregate amount of tax evasion, because tax evaders try to hide information on their incomes and the taxes they are evading. The estimates do provide insight on how much additional compliance occurred with the introduction of withholding.

Withholding was introduced decades ago during World War II, when patriotism might have pushed people toward more compliance than would be the case in

the twenty-first century. As Cebula (2004, p. 423) concludes after incorporating a dissatisfaction index in a regression model, "it appears that the greater the public's dissatisfaction with government, the greater the extent of income tax evasion." Patriotism ran high in the 1940s, which would have encouraged compliance, when compared with the higher dissatisfaction with government people express in the twenty-first century. Thus, the effect of withholding on compliance might be greater today than when it was introduced, because there is more dissatisfaction with government. The results show a substantial amount of evasion prior to withholding, suggesting that governments could not collect nearly the amount of income taxes they now do today they were only relying on self-reporting of income.

The theory of tax evasion is straightforward and uncontroversial. More evasion will occur when tax rates are higher, when the probability of being caught is lower, and when the penalty for evasion is lower. The introduction of withholding increases the probability of being caught underreporting wage and salary income. These commonsense conclusions are supported by Allingham and Sandmo (1972); Slemrod (1985); Pommerehne and Weck-Hannemann (1996); Cebula (2004); Sandmo (2005); Gorodnichenko et al. (2009), and the comprehensive review article by Slemrod (2007), among many other studies. Because the theory of tax evasion is so straightforward, the empirical literature focuses on estimating its magnitude, consistently finding results supporting the theory that evasion increases when the cost of paying taxes rises, and that evasion decreases when the expected cost of being detected rises.

While many empirical studies have been published on tax evasion, the only other study we are aware of that looked at the effect of the introduction of withholding on evasion is Dusek and Bagchi (2018), which looked at withholding at the state level, and reinforces the conclusions found here. Because of the nature of the data, the estimates that follow are surely imprecise. However, a straightforward estimation of the amount of evasion shows it was so large that even if these estimates are not precisely accurate, they are large enough to show that withholding considerably reduced the amount of evasion. This qualitative conclusion on the effect of implementing withholding, rather than any precise quantitative estimate, is the paper's main contribution.

5.2 Tax Rates During the 1940s

Appendix Table 5.5 shows the marginal and average tax brackets approved in the Revenue Act of 1941, which applied to income taxes in calendar year 1942. These taxes would have been paid in quarterly installments in 1943. The average rate is calculated from the marginal rates in the table for taxpayers at the very top of that bracket. Appendix Table 5.6 shows the marginal and average rates in the Revenue Act of 1942, which applied to 1943 income. The column at the far right of the table shows the percentage increase in the average rate for that bracket over the previous year's rate. The changes in the marginal rates were relatively uniform across the

brackets, at about 9% or slightly higher up through incomes below $60,000. Even at higher incomes the marginal rates did not increase by more than 14% until $200,000, at which point marginal rates went much higher, because the income at which the top marginal rate applied fell from $5 million to $200,000. However, average rates increased by a much greater percentage in the lower brackets than in higher brackets. The nine percentage point increase in the lowest marginal tax rate, from 10% to 19%, was a 90% increase, whereas the ten percentage point increase in the $22,000–$26,000 bracket from 48% to 58% increased the average rate by just over 30%.

Appendix Table 5.7 shows the average and marginal rates approved in the Revenue Act of 1943, which applied to 1944 income. The brackets are the same as in the previous year, and while rates did increase, the increases in the marginal rates were a relatively constant amount, at between 3% and 6%. Marginal rates had already increased by the time withholding was implemented, and while they did increase every year, the increase in marginal rates was roughly constant across brackets. Table 5.6 shows that the increase in average rates was much greater in the lower brackets, because while the increase in marginal tax rate was roughly constant across brackets, the previous year's average rate was much higher in the higher brackets.

Because 1943 was the year that taxpayers began paying taxes on their current year's income, tax payments would be slightly higher that year than the brackets indicate, because those who owed more than $50 on their 1942 incomes were also required to pay 12.5% of their 1942 liability. The estimates below do not take this into account, so overestimate 1943 tax payments because 1943 payments also include some payments for 1942 income. Because withholding started with the 1944 fiscal year, ignoring the 1942 liability overstates the amount of taxes paid on 1943 income, and so understates the difference between 1943 and 1944 taxes, which provides a conservative estimate of the amount of evasion in 1943, and understates the effect of withholding on tax evasion. Tax payments would have been lower in 1943 if not for the provisions associated with transitioning to paying on the current year's income.

5.3 Expected Tax Payments: No Evasion

If the total incomes in each of the brackets were unchanged from one year to the next, one would expect that the total income tax collected from each bracket would rise by the percentage increase in the average rate in the brackets. Looking at Table 5.7, the increase in taxes collected in 1943 would rise by about 21% in the lowest bracket, for example, and the total income tax collected in the $44,000–$50,000 bracket would rise by 7.9%. This provides a basis for estimating how income tax evasion was affected by withholding.

Income did change from year to year, but by a small amount compared to the estimates below. Table 5.8 shows that GNP grew by just under 10% from 1943 to 1944, but the civilian labor force remained roughly constant from 1942 through

1944 and military personnel increased substantially. Military personnel in combat zones were not liable for income taxes, however. Because fiscal years started midway through the calendar years, the data on fiscal years in the bottom section of Table 5.8 shows fiscal year data, calculated by averaging the calendar year data for the 2 years from the top section of the table. While there were measurable changes in incomes and the labor force over those years, those changes are not large enough to account for the major changes in tax returns filed, reported incomes, and taxes paid when withholding was implemented.

As a first pass at estimating the amount of additional revenue that higher rates in 1944 would have brought to the Treasury, look at the change in those rates from 1943 to 1944. Using the data in the appendix, Table 5.1 first calculates the percentage increase in the average tax rate in each bracket. The average across all brackets is 9.97%. The column on the right then calculates the percentage increase in each bracket divided by the average. By normalizing those increases by the average across all brackets, any effect from increases in aggregate income are eliminated, because the far-right column shows the expected increase in each bracket relative to all other brackets.

Assuming that the income earned in each bracket is constant as a share of total income, the number in the column on the right would give the ratio of the increase in total taxes collected in the bracket relative to a change in total income. For example, from 1943 to 1944, if the income share in each bracket did not change, or changed by the same percentage, tax revenue in the bottom bracket would be 2.11 times as large relative to total tax revenue in 1944 as in 1943. Similarly, for the $50,000–$60,000 bracket, tax revenues would shrink to 0.8 times their 1943 share.

Total tax returns, income, and income tax paid is reported in the Statistical Abstract of the United States, but the income categories do not correspond directly to the tax brackets. Appendix Table 5.9 shows the total number of income tax returns filed along with the increase in total returns in Appendix Table 5.10. At the low end, the 1944 data are not comparable to 1943 because returns for Form 1040A were not separately reported. That form could only be filed by taxpayers with less than $3000 in income, so for comparison purposes, all returns reporting less than $3000 in taxable income are combined to see the change in the number of returns, which is shown at the bottom of the table. Appendix Tables 5.10 and 5.11 show the same data for total income and total taxes paid. Data for returns filed, reported income, and income taxes paid are reported for income categories that do not exactly match the tax brackets.

Table 5.2 takes the average tax rate data from the far right column of Table 5.1 and adjusts it for the differences in the income versus tax brackets by averaging the rates across brackets to match the income categories. For example, the under $3000 income category encompasses the first two brackets in Table 5.1, which have the entries 2.11 and 1.71. Averaging them, $(2.11+1.71)/2 = 1.91$, which is the average rate shown for that category in Table 5.2. The remainder of the columns in Table 5.2 are calculated the same way as the percentage increase in the average tax rate. For example, the percentage increase in returns filed for each category from 1943 to 1944 is calculated, and the average of all the percentages is calculated. The entry

Table 5.1 Percentage increase in average tax rate from 1943 to 1944

Tax bracket bottom	Tax bracket top	Percentage increase	This bracket/Avg. bracket
$0	$2000	21.05	2.11
2000	4000	17.07	1.71
4000	6000	14.96	1.50
6000	8000	13.40	1.34
8000	10,000	12.21	1.23
10,000	12,000	11.22	1.13
12,000	14,000	10.92	1.09
14,000	16,000	10.49	1.05
16,000	18,000	10.12	1.01
18,000	20,000	9.78	0.98
20,000	22,000	9.43	0.95
22,000	26,000	8.90	0.89
26,000	32,000	8.29	0.83
32,000	38,000	7.86	0.79
38,000	44,000	7.78	0.78
44,000	50,000	7.93	0.80
50,000	60,000	8.02	0.80
60,000	70,000	8.00	0.80
70,000	80,000	7.96	0.80
80,000	90,000	7.87	0.79
90,000	100,000	7.95	0.80
100,000	150,000	8.07	0.81
150,000	200,000	7.73	0.78
200,000	Unlimited	2.27	0.23

Note: Average for all brackets = 9.97

in the table is the percentage increase in the average divided by the average of all categories. If the percentage increase in returns filed was the same for every income category, the entry in the Returns Filed column would be 1 for each income category. Numbers more than 1 indicate a category in which the increase in returns was greater than average; numbers less than 1 indicate less than average. Total reported income and total income taxes paid are calculated the same way.

The top section of Table 5.2 shows the changes from calendar year 1943 to 1944. Those data are collected by calendar year. Withholding began in July of 1943, at the beginning of fiscal year 1944, so some of the calendar year 1943 income was subject to withholding. The data in Table 5.2 show a much greater than expected increase in returns filed, income reported, and income taxes paid in the $3000–$10,000 income categories, and to a lesser degree in the $10,000–$25,000 category. One would expect the total tax column to be greater than 1 for income categories in which the average tax rate column also is greater than 1, and less than 1 in the other income categories, because of the greater percentage increase in the average tax rates, as calculated in Table 5.1. To adjust for this, the change in the total tax is

Table 5.2 Percentage increase from year 1943 to 1944

Income category	Avg. tax rate	Returns filed	Total income	Total tax
Calendar year				
<$3000	1.91	−0.17	−0.33	−1.75
3000–5000	1.61	3.10	3.43	8.51
5000–10,000	1.29	3.41	3.20	6.53
10,000–25,000	1.01	1.40	1.43	2.51
25,000–50,000	0.80	0.86	0.89	0.96
50,000–100,000	0.80	0.68	0.76	0.31
100,000–150,000	0.81	0.39	0.40	−0.95
150,000–300,000	0.78	0.48	0.52	−0.88
300,000–500,000	0.23	0.19	0.14	−2.36
500,000–1,000,000	0.23	−0.02	−0.04	−2.05
>1,000,000	0.23	0.66	0.59	0.17
Fiscal year				
<3000	1.91		0.10	1.03
3000–5000	1.61		3.05	3.32
5000–10,000	1.29		2.28	2.26
10,000–25,000	1.01		1.25	1.30
25,000–50,000	0.80		1.03	1.00
50,000–100,000	0.80		0.89	0.79
100,000–150,000	0.81		0.70	0.55
150,000–300,000	0.78		0.60	0.39
300,000–500,000	0.23		0.27	−0.02
500,000–1,000,000	0.23		0.26	−0.00
>1,000,000	0.23		0.55	0.78

Note: Percentage increase in each category divided by average percentage increase in all categories

divided by the change in the average tax rate for both the fiscal year and calendar year calculations, and is shown in Table 5.3. Table 5.3 shows that even adjusting for the tax rate increases, income taxes collected were higher than expected for incomes from $3000 to $50,000.

Tables 5.2 and 5.3 reveal convincing evidence of tax evasion prior to withholding. Withholding applied only to wage and salary income, which would have been the majority of income for those in the $3000–$10,000 brackets. Those in higher brackets would have been more likely to have earned the bulk of their income from sources other than wages and salaries. Compared to the averages across all brackets in returns filed, income reported, and taxes paid, the unexpectedly large increases appear in those brackets most likely to be subject to withholding. Table 5.2 shows that the number of returns filed in the $30,000–$10,000 brackets increased by more than three times more than expected and that two to three times more total income was reported by taxpayers in those brackets. Table 5.3 shows that after adjusting for the changes in average tax rates, two to three times more taxes were paid in those brackets than would have been expected from just extrapolating from the previous

Table 5.3 Tax collected adjusted for average tax rate change

Income category	Calendar year	Fiscal year
<$3000	−0.92	0.54
3000–5000	5.29	2.06
5000–10,000	5.06	3.20
10,000–25,000	2.49	1.75
25,000–50,000	1.20	1.29
50,000–100,000	0.39	0.99
100,000–150,000	−1.17	0.68
150,000–300,000	−1.13	0.50
300,000–500,000	−10.26	−0.09
500,000–1,000,000	−8.91	0.00
>1,000,000	0.74	0.55

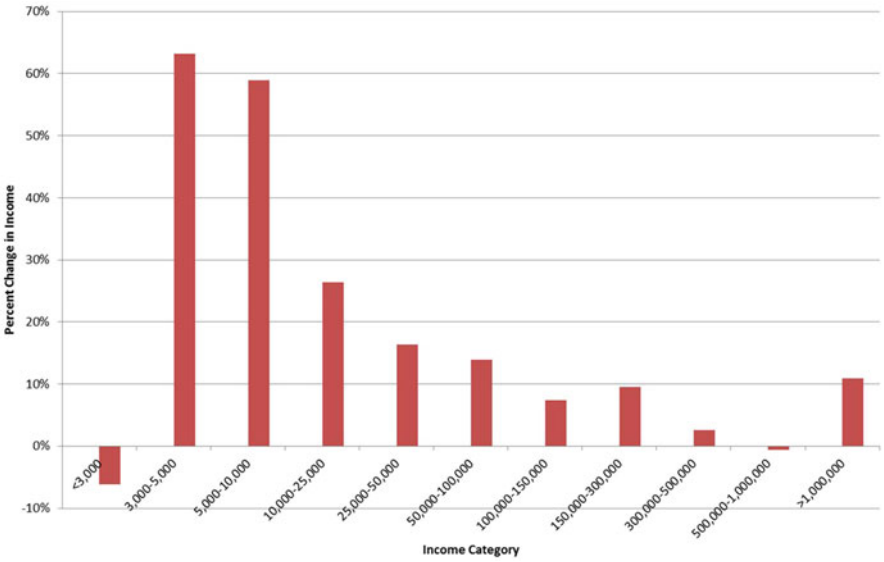

Fig. 5.1 Percentage Change in Income by Income Category: 1943 to 1944

year. Brackets over $50,000 paid a smaller share than would have been expected by extrapolating the previous year's data, but in those brackets, most income would not have been subject to withholding.

Figure 5.1 provides a graphical illustration of the unexpectedly large increase in reported income in the $3000–$10,000 brackets, Reported taxable income went up by about 60% from 1943 to 1944 in the $3000–$10,000 brackets, which consists of individuals whose main source of income is wage and salary income, therefore subject to withholding. Higher income levels, which would contain much more income from sources not subject to withholding, showed much smaller increases.

The Consumer Price Index did increase by 10.9% in 1942 and by 6.0% in 1943,[3] which may have pushed people into higher brackets, clearly cannot account for the huge increase in reported taxable incomes in the $3000–$10,000 brackets, and cannot explain why the brackets with the most income subject to withholding reported so much more income than the other brackets after withholding was implemented. Also, keep in mind that the expected changes are relative to the average change across all brackets, so those changes cannot be due to a general rise in incomes. The brackets that contained the largest percentages of income subject to withholding showed a much greater increase in reported taxable income than those in which less income was subject to withholding. This is evidence of tax evasion in wage and salary income prior to the introduction of withholding.

5.4 Further Analysis of the Data

The civilian labor force was relatively constant from 1941 through 1944 at around 55 million, as Table 5.8 shows. Military personnel increased substantially, but military personnel in war zones did not pay income taxes. To get a rough idea about the incomes of wage earners, Table 5.8 reports that GNP per capita was $1488 in 1943, and the civilian labor force was 55,535,000 out of a population of 136,739,353, so about 40.6% of the population was in the civilian labor force. Dividing GDP per capita by the percentage of the population in the civilian labor force attributes $3720 in GDP per civilian worker. With increased female labor force participation, many households would have had two earners, so looking at the income categories in Tables 5.2 and 5.3, one would expect that the bulk of wage and salary income would have been earned by people in the $3000–$10,000 income brackets, which are the brackets that show higher than expected tax returns filed, reported income, and income taxes paid. Tables 5.2 and 5.3 provide evidence that the introduction of withholding increased returns filed and reported income among taxpayers who earned wage and salary income subject to withholding.

These calculations are approximate, partly because of data limitations and partly because tax evaders hide their incomes so that it will not appear in official statistics. The data only show increased filings, with no indication of whether income taxes were owed but not paid in the previous year, so the evidence is circumstantial although persuasive. The big increases in filings and reported incomes are in precisely those categories in which people would have earned the wage and salary incomes that became subject to withholding.

The way the calculations are made in Tables 5.2 and 5.3 provide conservative estimates that likely understate the degree to which filings and reported incomes increased in those categories. Look at returns filed in Table 5.2. Those numbers

[3]Data on inflation taken from the Federal Reserve Bank of Minneapolis website, www.minneapolisfed.org.

show the increase in returns filed divided by the average increase in returns filed in all categories. The numbers for income categories above $25,000 are less than 1 because the average is inflated by the big increase in returns for those reporting less than $25,000 in income. Perhaps a more accurate measure would have been to look at the increase in returns for those below $25,000 relative to those above, with the thought that withholding would have a minimal impact on income reported above $25,000, because little of that income would have been wage and salary income subject to withholding. That would have made the numbers for categories below $25,000 even greater in all measures—returns filed, reported income, and taxes paid. The estimates in the tables are conservative estimates.

Comparing actual filings with what would be expected if changes across all categories were proportional, the numbers in the Returns Filed column of Table 5.2 say that after withholding, reported filings in the under $3,000 category fell, perhaps because some people were in that category in 1943 because they were not reporting all of their incomes. Withholding would have pushed those underreporters into higher income categories. Filings in the $3000–$5000 column were 3.1 times greater than if the change from 1943 to 1944 had been proportional to the average of all categories. Similarly, returns filed in the $5000–$10,000 income category were 3.41 times as large as would have been expected. Returns filed in all categories above $25,000 were less than would have been expected, but again because the denominator includes the much higher number of returns in the lower income categories.

Similarly, total income reported in the $3000–$10,000 categories was more than three times higher than would have been expected if income gains in that category would have been proportional to the overall increase in incomes in all categories. While it is possible that incomes really did rise that much in those categories, two factors weigh against that possibility. First, as already noted, the denominator is high because it includes incomes from those categories, which also makes it appear that incomes in the higher categories grew less than expected. That is the conservative nature of the way the estimates were made. Second, the increase in reported incomes is accompanied by a similar increase in number of returns filed, even while the civilian labor force is roughly constant across those years. The individual returns are not reporting higher incomes on average. There are more returns filed reporting income in those categories, but claiming about the same amount of income as returns from the previous year. Both returns filed and total income reported are about three times greater than expected based on extrapolating from the previous year's returns and income.

The total tax numbers in Table 5.2 show more taxes being collected, partly because of the increase in the average tax rate. Table 5.3 adjusts for the increase in the average tax rate, and taking the lower numbers associated with the fiscal years, shows that the amount of taxes collected were two to three times higher than would have been expected, again with the caveat that this is a conservative estimate because it includes those higher taxes in the denominator (which is why taxes are lower than expected in the higher income categories).

These are rough approximations of the amount of tax evasion prior to withholding, partly because of limitations in the existing data, and partly because actual data on evasion does not exist. The amount of evasion must be inferred from the reported data. The inferences seem reasonable, and the estimates of evasion seem conservative in the way they are calculated. There is good reason to think they are a lower bound and that actual evasion was greater than what is estimated here. The numerical estimates are so large that even if they are inaccurate by a considerable amount, they still indicate a substantial amount of evasion that was curbed by the implementation of withholding.

5.5 Estimating the Amount of Evasion

Table 5.3 shows that for income categories between $3000 and $50,000 the amount of taxes actually paid was larger than would have been expected based on the amount of the tax rate increase. The numbers in Table 5.3 compare the amount collected in each income category to the average across all categories, so numbers above 1 are larger than the average category and numbers below 1 lower. It appears that the larger-than-average increases in reported taxes collected corresponds with the introduction of withholding. Table 5.4 looks at the actual amount of taxes collected in those income categories in 1943, prior to withholding, and multiplies them by the under-reported percentage as estimated in Table 5.3. The first column shows the income categories in which larger-than-anticipated returns were filed, higher-than-anticipated income was reported, and higher-than expected tax payments were made in 1944. The second column shows the amount of taxes paid in 1943, and the third column shows how much larger than anticipated the 1944 tax payments were, adjusting for the higher rates in 1944. Multiplying columns 2 and 3 gives the amount of taxes that would have been paid in 1943 if the under-reported percentage in column 3 had been paid, so column 4 is the estimated taxes due in 1943, including the amount estimated to be under-reported. The column on the far right subtracts the

Table 5.4 Estimated income tax evasion eliminated by withholding, 1943

Income estimated category	Tax paid	Underreported percentage	Estimated tax due	Evasion
3000–5000	2,971,233,000	2.06	6,120,739,980	3,149,506,980
5000–10,000	1,490,256,000	3.20	4,768,819,200	3,278,563,200
10,000–25,000	1,786,543,000	1.75	3,126,450,250	1,339,907,250
25,000–50,000	1,345,052,000	1.29	1,735,117,080	280,065,080
		Underreported amount		8,158,042,510
		Total collected		14,589,324,000
		Collected + evaded		22,747,366,510
		Percent evaded		35.86

actual amount paid (column 2) from the estimated amount due (column 4) to give the estimated amount evaded in 1943, prior to withholding.

Comparing the Tax Paid column with the Estimated Evasion column, the estimates indicate that in the $3000–$10,000 income category, more tax was evaded than paid. Prior to World War II and the substantial reduction in the standard deduction, most working class families would not have owed or paid any income tax. While this amount of evasion seems large, it is not implausible that many people who never paid income tax before did not start to file and pay until withholding forced them to.

Adding up the under-reported amounts in the far-right column gives an estimate of more than $8 billion in under-reported taxes for 1943. The actual amount collected in 1943 was about $14.6 billion, so adding together the amount actually collected to the estimated amount evaded gives $22.7 billion that would have been collected had that evaded amount been paid. The unreported amount is 35.86% of the total estimate of the amount that would have been paid had withholding been in effect in 1943. That number seems large, but keep in mind that in 1943 more than half of all reported income was in the $3000–$50,000 category, and that most sources of income outside of those brackets would not be subject to withholding.

5.6 Conclusion

The introduction of income tax withholding in 1944 made income tax evasion for wage and salary income more difficult, because wage and salary income was reported to the IRS by employers, and income was withheld from employee pay. Because the estimated tax had already been withheld and paid to the government, it would be paid regardless of whether a return was filed, providing little financial incentive not to file, and a high probability of being caught for not filing because the income was reported directly to the IRS. If evasion was occurring prior to withholding, one would expect the evasion to significantly diminish for wage and salary income after withholding. Because other sources of income were not subject to withholding, withholding should have little effect on the reporting of other income.

An examination of reported income and income tax returns filed shows a substantial increase in the income categories within which most wage and salary income would have fallen, but not in other income categories. Figure 5.1 provides a graphical illustration of this. Based on the idea that the increases in returns filed and reported income in these income categories were due to withholding, the amount of evasion reduced due to withholding was estimated. These estimates are not estimates of the total amount of evasion, because they do not measure evasion in non-wage and salary income, and because there may be more evasion that went undetected. The estimates indicate only the amount of evasion that was deterred by withholding, not the total amount of evasion that occurred.

The estimates reported here indicate that the reduction in income tax evasion due to withholding was more than a third of total taxes due in 1943. While these numbers are rough estimates from aggregate data, they are based on a substantial increase in the number of returns filed among income categories dominated by wage and salary workers, a substantial increase in reported income in those income categories, and a substantial increase in taxes paid. These are all good indicators of the amount of evasion prior to withholding, especially when compared to higher-income categories where most income would not be subject to withholding where these increases did not occur. While these estimates seem large, Dusek and Bagchi (2018, Pg. 33), looking at data from state income tax withholding, "find that withholding led to an immediate and permanent increase in personal income tax collections by about 30 percent." Their estimates, also large, are roughly the same as ours.

Patriotism was high when withholding was introduced, as Americans supported the war effort that was behind the increase in rates and the introduction of withholding. In more normal times one would expect taxpayers to be even more tempted by opportunities to evade, lending credibility to the common idea that without withholding governments could not collect nearly the amount of income tax revenues that they do with withholding. Kau and Rubin (1981) and Winer and Hettich (1998) both note that when the marginal cost of collecting tax revenue falls, one would expect that revenues collected would rise simply because it is less costly to collect them. One plausible explanation for the large amount of estimated evasion prior to withholding is that until the early 1940s most working-class families would not have owed any income taxes or filed tax returns. These people might not have started filing returns until withholding forced them to do so.

The large increases in returns filed, taxable income reported, and income taxes paid concurrent with the introduction of withholding provide strong evidence that withholding was responsible for a substantial amount of income tax evasion. Without withholding, governments would not be able to collect the amount of revenue that they now collect. The introduction of income tax withholding undoubtedly had a major effect in facilitating the substantial growth of government in the last half of the twentieth century.

Acknowledgments The authors gratefully acknowledge helpful comments from Joshua Hall, Carl Kitchens, Phillip Magness, and Russell Sobel.

Appendix

See Tables 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13, 5.14.

Table 5.5 Tax rates of the revenue act of 1941

Tax bracket	Marginal rate	Average rate (at the top of bracket)
0–2000	10%	10.00%
2000–4000	13%	11.50%
4000–6000	17%	13.33%
6000–8000	21%	15.25%
8000–10,000	25%	17.20%
10,000–12,000	29%	19.17%
12,000–14,000	33%	21.14%
14,000–16,000	36%	23.00%
16,000–18,000	39%	24.78%
18,000–20,000	42%	26.50%
20,000–22,000	45%	28.18%
22,000–26,000	48%	31.23%
26,000–32,000	51%	34.94%
32,000–38,000	54%	37.95%
38,000–44,000	57%	40.55%
44,000–50,000	59%	42.76%
50,000–60,000	61%	45.80%
60,000–70,000	63%	48.26%
70,000–80,000	65%	50.35%
80,000–90,000	67%	52.20%
90,000–100,000	68%	53.78%
100,000–150,000	69%	58.85%
150,000–200,000	70%	61.64%
200,000–250,000	71%	63.51%
250,000–300,000	73%	65.09%
300,000–400,000	75%	67.57%
400,000–500,000	76%	69.26%
500,000–750,000	77%	71.84%
750,000–1,000,000	78%	73.38%
1,000,000–2,000,000	79%	76.19%
2,000,000–5,000,000	80%	78.48%
>5,000,000	81%	81% (asymptotic)

Table 5.6 Tax rates of the revenue act of 1942

Tax avg bracket	Marginal rate	Average rate (at the top of bracket)	Increase in rate from 1941
0–2000	19%	19.00%	90.00%
2000–4000	22%	20.50%	78.26%
4000–6000	26%	22.33%	67.52%
6000–8000	30%	24.25%	59.02%
8000–10,000	34%	26.20%	52.33%
10,000–12,000	38%	28.17%	46.95%
12,000–14,000	42%	30.14%	42.57%
14,000–16,000	46%	32.13%	39.70%
16,000–18,000	49%	34.00%	37.21%
18,000–20,000	52%	35.80%	35.09%
20,000–22,000	55%	37.55%	33.25%
22,000–26,000	58%	40.69%	30.29%
26,000–32,000	61%	44.50%	27.36%
32,000–38,000	64%	47.58%	25.38%
38,000–44,000	67%	50.23%	23.87%
44,000–50,000	69%	52.48%	22.73%
50,000–60,000	72%	55.73%	21.68%
60,000–70,000	75%	58.49%	21.20%
70,000–80,000	78%	60.93%	21.01%
80,000–90,000	81%	63.16%	21.00%
90,000–100,000	83%	65.14%	21.12%
100,000–150,000	85%	71.76%	21.94%
150,000–200,000	87%	75.57%	22.60%
>200,000	88%	88% (asymptotic)	38.56%

Table 5.7 Tax rates of the revenue act of 1943

Tax avg bracket	Marginal rate	Average rate (at the top of bracket)	Increase in rate from 1941
0–2000	23%	23.00%	21.05%
2000–4000	25%	24.00%	17.07
4000–6000	29%	25.67%	14.96%
6000–8000	33%	27.50%	13.40%
8000–10,000	37%	29.40%	12.21%
10,000–12,000	41%	31.33%	11.22%
12,000–14,000	46%	33.43%	10.92%
14,000–16,000	50%	35.50%	10.49%
16,000–18,000	53%	37.44%	10.12%
18,000–20,000	56%	39.30%	9.78%
20,000–22,000	59%	41.09%	9.43%

(continued)

Table 5.7 (continued)

Tax avg bracket	Marginal rate	Average rate (at the top of bracket)	Increase in rate from 1941
22,000–26,000	62%	44.31	8.90%
26,000–32,000	65%	48.19%	8.29%
32,000–38,000	68%	51.32%	7.86%
38,000–44,000	72%	54.14%	7.78%
44,000–50,000	75%	56.64%	7.93%
50,000–60,000	78%	60.20%	8.02%
60,000–70,000	81%	63.17%	8.00%
70,000–80,000	84%	65.78%	7.96%
80,000–90,000	87%	68.13%	7.87%
90,000–100,000	90%	70.32%	7.95%
100,000–150,000	92%	77.55%	8.07%
150,000–200,000	93%	81.41%	7.73%
>200,000	94%	90%	2.27%

Table 5.8 Relevant data from 1943 and 1944, calendar and fiscal years

	1942	1943	1944
Calendar year			
Population	134,859,553	136,739,353	138,397,345
GNP (total)	$176,288,864,833	$203,468,157,264	$223,554,359,468
GNP (per capita)	$1307	$1488	$1615
Unemployment	4.66%	1.89%	1.22%
Civilian labor force	56,410,000	55,535,000	54,630,000
Military personnel	3,915,507	9,195,912	11,623,463
Total employed	60,326,000	64,731,000	66,253,000

	Fiscal year	
	Fiscal year 1943	Fiscal year 1944
Population	135,799,453	137,568,349
GNP (total)	$176,288,864,833	$213,511,258,366
GNP (per capita)	$1367	$1552
Unemployment	3.74%	1.56%
Civilian labor force	56,119,000	55,083,000
Military personnel	5,673,882	10,409,688
Total employed	61,793,000	65,493.000

Table 5.9 Total tax returns filed

Net income class	1941	1942	1943	1944
Form 1040A	10,252,708	16,106,039	20,341,523	Not reported
<$1000	1,976,368	3,228,706	3,097,513	9,346,596
1000–2000	5,754,402	7,172,627	6,108,585	14,086,244
2000–3000	4,722,477	5,430,790	6,341,999	11,301,526
3000–5000	2,199,668	3,422,331	6,096,027	9,735,670
5000–10,000	636,901	785,785	1,107,412	1,834,433
10,000–25,000	243,081	300,161	390,203	495,481
25,000–50,000	49,521	65,137	86,203	100,467
50,000–100,000	14,850	19,793	25,362	28,693
100,000–150,000	2784	3585	4535	4873
150,000–300,000	1620	1985	2361	2581
300,000–500,000	367	415	456	473
500,000–1,000,000	169	199	222	221
>1,000,000	57	40	55	62
Total	25,854,973	36,537,593	43,602,456	46,919,590
<$3000	22,705,955	31,938,162	35,889,620	34,734,366

Table 5.10 Year-on-year increase

Net income class	1941–1942	1942–1943	1943–1944
Form 1040A	57.09%	26.30%	N/A
<$1000	63.37%	−4.06%	N/A
1000–2000	24.65%	−14.83%	N/A
2000–3000	15.00%	16.78%	N/A
3000–5000	55.58%	78.12%	59.71%
5000–10,000	23.38%	40.93%	65.65%
10,000–25,000	23.48%	30.00%	26.98%
25,000–50,000	31.53%	32.34%	16.55%
50,000–100,000	33.29%	28.14%	13.13%
100,000–150,000	28.77%	26.50%	7.45%
150,000–300,000	22.53%	18.94%	9.32%
300,000–500,000	13.08%	9.88%	3.73%
500,000–1,000,000	17.75%	11.56%	−0.45%
>1,000,000	−29.82%	37.50%	12.73%
Total	41.32%	19.34%	7.61%
<$3000	40.66%	12.37%	−3.22%

Table 5.11 Total income reported

Net income class	1941	1942	1943	1944
Form 1040A	$17,531,107,000	$25,715,974,000	$31,086,413,000	Not reported
<$1000	1,429,168,000	2,120,387,000	1,989,494,000	5,541,771,000
1000–2000	8,872,128,000	10,869,168,000	9,245,183,000	21,071,636,000
2000–3000	11,479,181,000	13,294,849,000	15,863,153,000	27,985,289,000
3000–5000	8,000,997,000	12,453,166,000	22,181,366,000	36,205,215,000
5000–10,000	4,286,515,000	5,254,452,000	7,383,871,000	11,735,064,000
10,000–25,000	3,583,574,000	4,452,963,000	5,801,890,000	7,330,445,000
25,000–50,000	1,673,403,000	2,201,992,000	2,912,219,000	3,388,703,000
50,000–100,000	994,006,000	1,324,652,000	1,690,758,000	1,926,020,000
100,000–150,000	333,998,000	431,323,000	544,220,000	584,702,000
150,000–300,000	322,432,000	394,634,000	465,726,000	510,236,000
300,000–500,000	139,765,000	156,857,000	172,485,000	177,026,000
500,000–1,000,000	115,661,000	132,358,000	149,986,000	149,017,000
>1,000,000	106,091,000	86,586,000	98,860,000	109,611,000
Total	58,868,025,000	78,889,362,000	99,585,627,000	16,714,736,000
<$3000	39,311,584,000	52,000,378,000	58,184,243,000	54,598,696,000

Table 5.12 Year-on-year increase in income

Net income class	1941–1942	1942–1943	1943–1944
Form 1040A	46.69%	20.88%	N/A
<$1000	48.37%	−6.17%	N/A
1000–2000	22.51%	−14.94%	N/A
2000–3000	15.82%	19.32%	N/A
3000–5000	55.65%	78.12%	63.22%
5000–10,000	22.58%	40.53%	58.93%
10,000–25,000	24.26%	30.29%	26.35%
25,000–50,000	31.59%	32.25%	16.36%
50,000–100,000	33.26%	27.64%	13.91%
100,000–150,000	29.14%	26.17%	7.44%
150,000–300,000	22.39%	18.01%	9.56%
300,000–500,000	12.23%	9.96%	2.63%
500,000–1,000,000	14.44%	13.32%	−0.65%
>1,000,000	−18.39%	14.18%	10.87%
Total	34.01%	26.23%	17.20%
<$3000	32.28%	11.89%	−6.16%

Table 5.13 Total tax reported

Net income class	1941	1942	1943	1944
Form 1040A	328,479,000	1,317,947,000	2,389,266,000	Not reported
<$1000	11,308,000	80,802,000	101,032,000	146,301,000
1000–2000	140,676,000	496,013,000	768,589,000	1,611,065,000
2000–3000	298,698,000	963,892,000	1,668,556,000	2,719,663,000
3000–5000	408,916,000	1,376,442,000	2,971,233,000	4,288,302,000
5000–10,000	406,498,000	904,148,000	1,490,256,000	1,997,510,000
10,000–25,000	683,247,000	1,231,202,000	1,786,543,000	2,019,914,000
25,000–50,000	574,217,000	948,162,000	1,345,052,000	1,412,266,000
50,000–100,000	462,842,000	742,361,000	1,005,645,000	1,021,998,000
100,000–150,000	181,958,000	286,405,000	379,290,000	360,446,000
150,000–300,000	187,259,000	287,693,000	353,706,000	337,501,000
300,000–500,000	83,779,000	122,470,000	138,515,000	121,513,000
500,000–1,000,000	71,991,000	103,829,000	116,233,000	103,804,000
>1,000,000	65,756,000	65,346,000	75,405,000	76,058,000
Total	3,905,625,000	8,926,712,000	14,589,324,000	16,216,401,000
<$3000	779,161,000	2,858,654,000	4,927,443,000	4,477,029,000

Table 5.14 Year-on-year increase in tax reported

Net income class	1941–1942	1942–1943	1943–1944
Form 1040A	301.23%	81.29%	N/A
<$1000	614.56%	25.04%	N/A
1000–2000	252.59%	54.95%	N/A
2000–3000	222.70%	73.11%	N/A
3000–5000	236.61%	115.86%	44.33%
5000–10,000	122.42%	64.82%	34.04%
10,000–25,000	80.20%	45.11%	13.06%
25,000–50,000	65.12%	41.86%	5.00%
50,000–100,000	60.39%	35.47%	1.63%
100,000–150,000	57.40%	32.43%	−4.97%
150,000–300,000	53.63%	22.95%	−4.58%
300,000–500,000	46.18%	13.10%	−12.27%
500,000–1,000,000	44.22%	11.95%	−10.69%
>1,000,000	−0.62%	15.39%	0.87%
Total	128.56%	63.43%	11.15%
<$3000	266.89%	72.37%	−9.14%

References

Allingham MG, Sandmo A (1972) Income tax evasion: a theoretical analysis. J Public Econ 1(3–4):323–338

Cebula RJ (2004) Income tax evasion revisited: the impact of interest rate yields on tax-free municipal bonds. South Econ J 71(2):418–424

Dusek L, Bagchi S (2018) Do More Efficient Taxes Lead to Bigger Government?: Evidence from the Introduction of Withholding for the State Personal Income Tax. Villanova University, Working Paper

Gorodnichenko Y, Martinez-Vazquez J, Sabirianova Peter K (2009) Myth and reality of flat tax reform: micro estimates of tax evasion response and welfare effects in Russia. J Polit Econ 117(3):504–554

Kau JB, Rubin PH (1981) The size of government. Public Choice 37(2):261–274

Kleven HJ, Knudsen MB, Kreiner CT, Pedersen S, Saez E (2011) Unwilling or unable to cheat? Evidence from a tax audit experiment in Denmark. Econometrica 79(3):651–692

Kleven HJ, Kreiner CT, Saez E (2016) Why can modern governments tax so much? An agency model of firms as fiscal intermediaries. Economica 83(330):219–246

Martinez-Vazquez J, Harwood GB, Larkins ER (1992) Withholding position and income tax compliance: some experimental evidence. Public Financ Q 20(2):152–174

Pommerehne WW, Weck-Hannemann H (1996) Tax rates, tax administration and income tax evasion in switzerland. Public Choice 88(1–2):161–170

Saez E, Slemrod J, Giertz SH (2012) The elasticity of taxable income with respect to marginal tax rates: a critical review. J Econ Lit 50(1):3–50

Sandmo A (2005) The theory of tax evasion: a retrospective view. Natl Tax J 58:643–663

Seltzer LH (1968) The personal exemptions in the income tax. Natl Bur Econ Res 12:1–16

Slemrod JB (1985) An empirical test for tax evasion. Rev Econ Stat 67(2):232–238

Slemrod J (2007) Cheating ourselves: the economics of tax evasion. J Econ Perspect 21(1):25–48

Smiley G (2000) A note on new estimates of the distribution of income in the 1920s. J Econ Hist 60(4):1120–1128

Smiley G, Keehn RH (1995) Federal personal income tax policy in the 1920s. J Econ Hist 55(2):285–303

Winer SL, Hettich W (1998) What is missed if we leave out collective choice in the analysis of taxation. Natl Tax J 1998:373–389

Yaniv G (1988) Withholding and non-withheld tax evasion. J Public Econ 35(2):183–204

Yaniv G (1998) Tax evasion by misinforming withholding agents. Public Finan Rev 26(4):362–375

Yaniv G (1999) Tax compliance and advance tax payments: a prospect theory analysis. Natl Tax J 1999:753–764

Chapter 6
The Size and Composition of Government Spending in Multi-Party Systems

Carlos G. Scartascini and W. Mark Crain

Abstract This paper explores the structure of party competition across democratic nations and its impact on the size and composition of government spending. The analytical framework expands on the norm of universalism, applies it to multi-party legislatures, and develops several propositions. We examine these propositions empirically using panel data for two samples, OECD countries and a large sample of world countries. The findings for both samples indicate that political fragmentation, usually measured by the number of effective political parties, has a positive relationship with the size of the government, and with subsidies and transfers. The findings also indicate that proportional representation (particularly closed lists proportional voting systems) and parliamentary countries favor higher public expenditures.

6.1 Introduction

Research in the field of political economics has probed the relationship between electoral institutions and the size and composition of government spending. Evidence continues to mount that institutions such as political regimes and electoral formulas that translate votes into seats shape economic and fiscal policy choices. This type of evidence is important as nations seek to adopt or reform political processes that accommodate citizen preferences, allow policy flexibility, and at the same time restrain fiscal excesses. This paper embraces and seeks to advance

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J. Hall, B. Khoo (eds.), *Essays on Government Growth*, Studies in Public Choice 40, https://doi.org/10.1007/978-3-030-55081-3_6

the established political economy framework by examining how the structure of political party competition in national legislatures influences fiscal performance.[1]

Our point of departure from the existing literature is straightforward: electoral institutions affect the structure of party competition and through this channel influence fiscal decisions. Whereas prior work such as the studies by Persson and Tabellini (1999) and Milesi-Ferretti et al. (2002) model the potential effects of electoral rules on "pre-election politics," we address the fiscal consequences of "post-election politics." To clarify this distinction, the "pre-election politics" perspective emphasizes that policy promises made during the electoral campaign have a binding impact on policymaking. In the "post-election politics" perspective electoral promises might not be binding, and the policymaking process depends in part on bargaining among the successful parties. In this paper, we focus on how the number and strength of parliamentary parties influence political party leaders' incentives to bargain both within party ranks and across party lines. Of course, the pre-election and the post-election effects of electoral rules are not mutually exclusive.[2] We simply seek to broaden the analysis of electoral rules by incorporating the structure of party competition, and how this important dimension of political organization influences budget decisions.

In most of the world's democracies the electoral rules and consequently the structure of party competition differ substantially from those associated with a US-style system. For example, in most democracies no single political party holds a parliamentary majority, and the median number of parties represented in the lower or unique chamber of the national legislature is five. As these two simple statistics suggest, interaction and bargaining among non-dominant political parties distinguishes fiscal policymaking in most countries in most budget cycles. We provide new evidence on the budgetary consequences of party competition based on two cross-country samples, one using OECD countries and the other using a large sample of free and partially free countries. The construction of these two samples is of significant value as they provide systematic data on political institutions for countries and periods that were not available before.[3]

To preview the findings, for each effective political party that gains parliamentary representation, central government expenditure as a share of GDP increases by roughly half a percentage point in both the OECD countries and the large sample of countries. We also find systematic differences in the composition of spending; an increase in the number of effective parties raises subsidies and transfers and reduces

[1] McKenzie (2001) presents an up-to-date and complete survey of the recent literature on the relationship between political institutions and fiscal outcomes.

[2] Persson and Tabellini (2000, pp. 11–14) present a good overview of the differences between pre-election and post-election models.

[3] Systematic data for some of the political variables used in this paper, mainly the absolute and effective number of parties, are not available for a large number of countries and years and had to be gathered from the individual election results. Other papers, like Persson and Tabellini (2001), have already benefited from these data. Recently, efforts that complement the availability of political data have been undertaken by Seddon et al. (2003) and Clarke et al. (2000).

expenditures on public goods. These considerable effects of party competition hold up even when we control for relevant institutional rules such as proportional representation closed lists, parliamentary government, and the existence of a party that holds the majority of the seats in the legislature. Importantly, we find empirical support for the hypothesis that proportional representation systems and parliamentary governments favor higher public expenditures. Finally, we find new empirical evidence that shows that using closed instead of open candidate lists has important consequences for fiscal policy in those countries with proportional representation.

The remainder of the paper is organized as follows. Section 6.2 discusses the notion of "universalism," a concept central to the hypothesis regarding the effect of party competition on fiscal outcomes. This concept has been applied for the most part to U.S. legislatures, which of course means to a system dominated by two political parties. We modify this concept to render it applicable to countries with multiple parties. Because some countries have a majority party in the legislature, we also analyze the impact of "constrained universalism" on fiscal outcomes. Section 6.3 examines the impact of party competition on the composition of expenditures. The main propositions are examined empirically in each section using panel data for two different samples, OECD countries and a large sample of world countries. Section 6.4 summarizes the major findings and offers some concluding remarks.

6.2 Universalism, the "Law of 1/n" and Legislative Majorities

Beginning with Riker (1962) early studies in legislative decision-making suggested that a minimum winning coalition would determine the decisions of a legislature making distributive policy. The smallest possible majority coalition would yield the largest *pro rata* benefits to coalition members and export the costs to non-coalition members. The empirical evidence, however, showed a contrary pattern: legislators often seek unanimity and display a reluctance to exclude minorities from the benefits of distributive legislation.[4]

Weingast (1979) and others subsequently developed an alternative conceptual framework to square with the evidence. The norm of "universalism" emphasizes a process of reciprocity and deference among legislators and applies this framework to

[4]Knight (2004) provides evidence contrary to the minimum winning coalition thesis using data for the U.S. Congress. See Matthews (1960), Ferejohn (1974), Fiorina (1974), and Mayhew (1974) for empirical evidence on congressional decision-making and universalistic outcomes. Collie (1988) offers evidence on the evolution of universalism in the U.S. Congress. Cox and Tutt (1984) present evidence on universalism for the Los Angeles County Board of Supervisors.

a decentralized legislature with weak political parties.[5] This literature, in particular the papers by Weingast (1979), Shepsle and Weingast (1981), and Niou and Ordeshook (1985), argues that in the absence of legally binding contracts among legislators, minimum winning coalitions (MWC) are not stable. For example, a small percent of the MWC members could form a new coalition with the representatives in the minority that offers larger benefits than those under the existing coalition. This creates considerable uncertainty regarding which of the many possible MWCs will be formed and how long they might last. The norm of universalism is a hedge against this type of uncertainty because each representative trying to maximize the expected benefits for his or her constituents might prefer a certain, stable coalition of the whole legislature to an uncertain, unstable MWC.[6] Under the norm of universalism, and assuming that public programs are financed by a general, uniform tax, each legislator favors a level of expenditure for his or her district such that the marginal benefit equals $1/n$ of its marginal costs (where n equals the number of legislators). In this calculus, legislators do not internalize the full cost of their project, but rather only the fraction of the cost that their constituents will have to pay. Because every legislator passes her own project, the budget approved by the legislature is larger than the budget expected from a minimum winning coalition.[7] The norm of universalism implies that expenditures grow as the number of legislators increases, the so-called law of $1/n$.[8]

The framework of universalism has been applied mostly to the U.S. Congress and American state legislatures dominated by a two-party structure. This paper expands the framework to a broad range of parliamentary systems characterized by multiple parties. This greatly expands its relevance; for example, among 106 countries in 1996, the median number of parties with representation in the lower house equals five.[9]

[5]Universalism is informally known as "pork-barrel politics." Weingast (1979, p. 249) defines universalism as "the tendency to seek unanimous passage of distributive programs through inclusion of a project for all legislators who want one." See also Niou and Ordeshook (1985) for a formal elaboration of the norm of universalism.

[6]Miller and Oppenheimer (1982) present experimental evidence on the prevalence of universalism in committee decision making.

[7]Again, because taxes are uniform across the polity, every citizen pays for the cost of every project whether or not he or she benefits from it. Consequently, every legislator has an incentive to include a project in the spending plan that benefits her constituency. The papers by Weingast (1979) and Shepsle and Weingast (1981) offer thorough explanations of the decision problem faced by the legislator and formal proofs of the stability of the equilibrium.

[8]Gilligan and Matsusaka (1995, 2001) examine the $1/n$ hypothesis empirically using data on American States in the pre-and post-World War II periods. In American State legislatures, where legislators are selected under a plurality rule from (mostly) single-member constituencies, they find a positive and significant correlation between the size of upper legislative chambers and state government expenditures. They also find that the size of state lower chambers has no systematic effect on spending, an interesting result in its own right.

[9]According to the data presented in Table 6.1, the median value among regions ranges from three to 9.5 parties. Important for panel data analysis, the number of parties within countries fluctuates

A large body of work in political science attributes the observed differences in party representation across democracies to specific electoral institutions, the most important being the distinction between a proportional representation system as opposed to a plurality ballot system. Proportional representation systems are characterized by the election of multiple representatives for each district (sometimes a unique district) and seats are allocated to each party according to the share of the votes they received in the election. Individual candidates gain access to those seats according to their position in the party list (closed lists) or according to a mixed system that includes the position in the list and the individual votes they obtained (open lists). Plurality voting elections (or first-pass-the-post) are simpler; candidates running in single-member districts have to outperform all other candidates in order to win a seat to the legislature.[10] Powell (1982), Ordeshook and Shvetsova (1994), Cox (1997), and Amorim Neto and Cox (1997) find that proportional representation systems tend to generate a larger number of parties than plurality, single-member district systems.[11]

The political science tradition on the determinants of the number of parties has been built around Duverger's Law. The idea behind Duverger's Law is that a plurality ballot system favors the two-party system, while a proportional representation system favors multiple parties. The theoretical explanations behind those statements are strategic voting (voters will only cast their vote for those with a positive chance of winning) and strategic contributions (campaign contributors who want to affect the electoral outcome will support those candidates with serious chances of winning).[12]

A multi-party legislature, in addition to reducing the probability that a single party holds the majority of the seats, creates an incentive structure that differs from that associated with the universalism model in a two-party system. When multiple parties are present, the agents in charge of fiscal policy negotiations are party officials instead of the individual legislator as is the case in the U.S.-style system. The link between parties and politicians is less evident in countries with single-member districts (and plurality or first-pass-the-post electoral rules) than in countries with party lists (proportional representation) because politicians seeking

over time. The typically large number of parties is not peculiar to the lower houses of parliaments. More than 50% of bicameral countries had at least six parties represented in the upper chamber.

[10]These are only a few of the basic differences that have been raised. A large number of books explain the differences among electoral systems in detail. See, for example, Shugart and Taagepera (1989), LeDuc et al. (1996), Katz (1980), Cox (1997), and Lijphart (1999).

[11]Lijphart (1999) presents a thorough summary on the determinants of the number of parties. Other relevant studies include Laakso and Taagepera (1979), Shugart and Taagepera (1989), Palfrey (1989), and Lijphart (1990).

[12]Duverger's work was later complemented by Leys's (1959) thesis that strategic voting occurs not for the two parties that are in the lead locally, but in favor of the two parties that have the largest number of seats in Parliament, regardless of their local strength. Subsequently, Sartori (1968) argued that a plurality rule would have no effect beyond the district until there are parties that have both nationwide organizations and ideological reputations that command a habitual following in the electorate.

reelection have an incentive to respond to the groups that will increase their chances of retaining office. These groups differ markedly under each electoral system. Under a regime of single-member districts and plurality rule, politicians respond to their local constituency to secure nomination and reelection. Under a regime of multi-member districts and proportional representation, politicians respond to the party leadership's platform to increase their chances of nomination. By following the party's platform, a candidate can obtain a spot on the party's list under multi-member districts.[13]

6.2.1 *Political Parties and the Norm of "Modified Universalism"*

The most important difference among democratic party systems is that between two-party and multi-party systems. In two-party systems, party discipline is usually low and the legislature is highly decentralized with each legislator trying to pass legislation with district-specific benefits. In multi-party legislatures where no party holds a majority of the seats, party discipline is usually high and the bargaining on bills and public projects relies on the party leadership and not on every legislator. This reduces the actual number of relevant bargaining agents to the number of parties. Each leader reflects an amount of power proportional to the number of seats his or her party holds in the legislature.[14] As a result, we use a measure of the number of parties that controls for the unequal sizes of parties as the basic unit of analysis.

Three different measures of party competition have been generally used in the literature. Rae (1967) proposed an index of party system fractionalization based on the number of parties and on their relative sizes:

$$F = 1 - \sum_i S_i^2 \tag{6.1}$$

where S represents the share of seats in the chamber held by each party. The theoretical rationale for F is that it represents the probability that two randomly chosen legislators belong to the same party. For example, in a pure one-party system,

[13]Most parties in multiple-party systems are highly undemocratic. Choice of candidates unrestricted to all party members is uncommon. The proportion is rarely more than a third of all members and sometimes is as small as 1% of the total number of members of the party. Representatives in the multiple-party system know that there is a big chance that they will not be able to face a next election if they defy the party line. As Gallagher et al. (1992, p. 134) describe, "In Western Europe, self interest requires politicians to put the party first, last, and always. Outside the party there is no salvation, or at least no career path prospect".

[14]For a thorough analysis regarding party discipline and the bargaining among party leaders, see de Dios (1999, p. 150).

all legislators would belong to a single party, and fractionalization would be zero; in the most extreme case of fractionalization, each legislator would have his or her own party, and fractionalization would reach the maximum value of 1. Laakso and Taagepera (1979) modified this index simply by transforming it into the "effective number of parties" (labeled ENPP). The effective number of political parties is the inverse of the Hirschhman-Herfindahl concentration index:

$$ENPP = \frac{1}{\sum_i S_i^2} \tag{6.2}$$

The ENPP measure carries the same information as Rae's index of party system fractionalization, and we use the ENPP instead of Rae's index in the subsequent analysis. The ENPP index incorporates the relative bargaining strength of each party in the legislature and measures the number of parties of similar size included in the legislature.[15] A third measure for the number of parties in the system has been proposed by Molinar (1991), labeled NP. This measure is an alternative to ENPP that weighs large parties more heavily than small parties:

$$NP = 1 + \frac{1}{\sum_{i=1}^{n} S_i^2} \frac{(\sum_{i=1}^{n} S_i^2) - S_1^2}{\sum_{i=1}^{n} S_i^2} \tag{6.3}$$

Molinar's index assigns a value of one to the largest party, and the other parties are weighted using a nested ENPP formula that is normalized with ENPP. The advantage of NP relative to ENPP is that NP behaves better in relation to the size of the largest party and to the gap between the two largest parties. Although we present empirical results using the different party structure measures, we generally follow Lijphart (1994) and concentrate on the ENPP.[16] ENPP, compared to the absolute number of parties, reduces the necessity of accounting for differences in the bargaining strength of the different parties in the legislature and proxies for the instability of the potential coalitions. Moreover, the evidence indicates that ENPP approximates the degree of proportionality of the system more closely than any other measure and has been the variable of choice for the most recent empirical studies such as Cox (1997), Amorim Neto and Cox (1997), and Lijphart

[15] For example, if there are four parties each with 25% of the seats, ENPP = 4. If one party has 85% of the seats and the other three parties have only 5% each, ENPP is approximately 1.

[16] Adopting the ENPP measure is not unique to our work. For example, Lijphart (1994, p. 70) offers the following assessment: "Because the effective number of parties is the purest measure of the number of parties, because it has become the most widely used measure, because the alternative measures are quite similar to it in most respects, and, last but not least, because it is computationally much simpler than the alternatives, it will be my number-of-parties measure in this study."

Table 6.1 Number of parties and weighted parties in the lower house in 1996

	Parties	ENPP	NP
All countries	6.1	3.17	2.30
Central America and Caribbean	3.6	2.19	1.68
North America	4.0	2.17	1.62
Latin America	5.0	2.97	2.22
Oceania	5.0	3.07	2.20
Africa	5.5	2.56	1.79
South America	6.2	3.68	2.72
South East Europe	6.7	3.69	2.55
OECD	7.0	3.61	2.69
North West Europe	7.3	3.96	2.98
Asia	7.6	3.06	2.15
Middle East	9.2	3.52	2.82

Note: OECD and Latin America share observations with other categories. For instance, the United States is included in OECD and North America

(1990). Additional evidence on the relationship between ENPP and the degree of proportionality follows from recent changes in electoral institutions.[17]

Following the modification of the electoral law in New Zealand for the election of representatives, from simple plurality to a mix of plurality and proportional elections, the ENPP increased from 1.76 in 1992 to 3.76 in 1996. Similarly, an opposite change in the electoral system for the election of senators in Italy produced a drop in ENPP from 6.46 to 2.55.[18] Table 6.1 presents summary statistics on the number of parties and two weighted parties indices, ENPP and NP, across regions in 1996.

To extend the framework in Weingast (1979) to the multi-party, no majority-party environment we introduce the concept of "modified universalism." In multi-party legislatures as the effective number of parties increases, coalitions become unstable. For example, in a five-party legislature, a minimum size majority of three parties could be overturned easily by a new coalition formed by one of those parties and the two remaining parties. In that environment, party leaders faced with the prospects of being in the losing minority would trade uncertain benefits for lower but certain returns, leading to a universalistic legislature in the sense of political party inclusiveness.

[17] In order to calculate the number of parties, we aggregated and considered coalitions to be one party if these coalitions announced an agreement before the election and the candidates ran under the name of the common coalition instead of the individual parties.

[18] New Zealand moved to a system where half of the seats are awarded by PR and half are chosen by plurality election in single-member districts. Italy shifted to a modified plurality system in which only 25% of the seats were awarded by PR and the rest by voters in single-member districts. For additional details on the institutional change in the 1990s, see Dahl (1996, p. 189).

We define the norm of modified universalism as the tendency to seek unanimous passage of expenditure programs through inclusion of a project for all the political parties that want one. In the traditional universalistic model each legislator proposes geographically-targeted spending to increase his or her chances of reelection. In the party-based framework, parties promote the platform of spending (public goods or transfers) that would bring them the higher voting advantage over the other parties by aiming the highest spending towards their supporters. If chosen to propose a budget, each party leader's first choice is to spend nothing on the projects that could benefit other parties and spend only on the projects that benefit their own supporters. However, absent a legislative majority that proposal is sure to lose in the legislature unless proponents can secure additional votes by including projects favored by other parties.

Proposition 6.1 *An increase in the number of effective parties in the legislature raises the overall size of the budget because the norm of modified universalism.*

The intuition behind this proposition is simply that the party leader, before choosing a strategy, has to evaluate the payoff from the universalistic coalition against the uncertain payoff from a minimum size coalition. Assuming that all the proposed projects have a benefit b greater than their cost c, and that these costs are the same for every project, then under a universalistic agreement the payoff would be $b - c$.[19] Each party receives the benefit of the project they sponsored minus the party voters' share of the total costs, or *one nth of n* projects that cost c, where n stands for the number of effective parties in the legislature.

Following the formulation by Weingast (1979), the probability of belonging to a minimum size majority is $\frac{n+1}{2n}$, which we label m. The expected payoff of a MWC is:

$$m(b - mc) + (1 - m)(-mc) = mb - m^2c - mc + m^2c = m(b - c) \tag{6.4}$$

Therefore, as long as the difference between the universalistic payoff and the expected payoff from a MWC is greater than zero, a political leader would always prefer a universalistic outcome instead of the lottery of MWC.[20] As the number of parties represented in the assembly increases, the number of projects proposed and approved would increase accordingly. Each party's expenditure proposal would be at the level of provision such that the marginal benefit of the project equals $1/n$ of its marginal cost. We reiterate that here, n, stands for the number of parties represented in the legislature.

[19] This assumption is only necessary for this simple model but it is not required for the results to be valid.

[20] Note that: $(b-c) - m(b-c) = (1-m)(b-c) > 0$ for $n > 1$. A more general proof, where b is not necessarily greater than c, can be found in Niou and Ordeshook (1985). In their set-up, either institutional constraints or repeated games yield the same universalistic outcome.

The fact that groups are able to export additional costs does not necessarily imply that a country's population has to grow. The number of effective parties can increase because the absolute number of parties that enters the legislature increases or because there is a shift in the share of seats for the existing parties. Note that the model captures both cases. First, an increase in the number of parties can occur because of changes in the electoral law or increases in the number of social cleavages in society. Both have similar consequences, reducing the cost of any project for each party leader as they can export it to additional groups or supporters of other parties. Second, when there is an increase in the degree of competition instead of the absolute number of parties, at least one of the parties increases its share of the seats in the legislature and consequently, the probability of being included in a potential coalition increases.[21] As a result, the probability of a universal coalition and the size of the transfer they could enact increase. Again, an increase in the number of effective parties increases the size of the government.[22]

6.2.2 Empirical Evidence

The empirical specification builds on the analysis of modified universalism that predicts that the size of the government increases as the number of effective political parties in the legislature increases. Additional parties raise the cost of attempting to form a MWC and reduce the internalized cost of any project. As a first look at the data, Table 6.2 splits the sample of countries by the median of the effective number of parties in the legislature. The first column reports the average size of the government for those countries with a below-median value of ENPP, and the second column reports the average size of the government for those countries with an above-median value of ENPP in 1996. The top panel of Table 6.2 indicates that OECD countries with a number of effective parties above the median have an average size of the government, measured by central government expenditures as a share of GDP, over 20% larger than those countries with a number of effective parties below the median. For the world sample, shown in the bottom panel of Table 6.2 the difference in expenditures is over 10%.

Using central government expenditure as a share of GDP (labeled CGE/GDP) as a proxy for the size of the government, we estimate several panel-data regressions to examine these differences more rigorously. Equation (6.5) specifies the model.

[21] For example, the number of effective parties increases by one as the share of the seats for four parties represented in the legislature changes from (40,39,11,10) to (25,25,25,25). ENPP equals 3 and 4 respectively.

[22] Kontopoulos and Perotti (1999) present a similar fiscal commons model to explain the size of the government by focusing on the number of ministers with spending authority.

Table 6.2 A first look at the norm of modified universalism

	Countries below the ENPP median	Countries above the ENPP median
OECD countries[a]		
Mean	33.6	40.5
Median	33.7	41.2
Standard deviation	9.2	7.5
World sample[b]		
Mean	27.7	31.5
Median	27.3	31.4
Standard deviation	10.1	10.0

Notes: Values in table correspond to central government expenditure as a share of GDP
[a]Median value of ENPP is 3.5
[b]Median value of ENPP: 2.8. The differences in means are statistically significant at the 1% level

$$(CGE/GDP)_{i,t} = \alpha + \beta_1 PC_{i,t} + \beta_2 PR_{i,t} + \beta_3 CL_{i,t} + \Phi P_{i,t} + \Psi X_{i,t} + \delta_R + \delta_t + \epsilon_{i,t} \tag{6.5}$$

In Eq. (6.5), the subscript i represents an observation for a particular country, and the subscript t represents an observation in a specific year. PC stands for a proxy for political competition, one of the three different measures of political competition discussed above: the absolute number of parties (Parties), the effective number of parties (ENPP) and the weighted number of parties (NP) according to Molinar (1991). PR is a dummy variable equal to one for those countries with proportional representation. For the purpose of this paper, we define PR very restrictively, considering only as PR countries those that elect every legislator from multi-member constituencies.[23] Including the PR variable helps to isolate the effects of political party fragmentation, as distinct from the "pre-election" effect of electoral systems on public expenditures.CL is a dummy variable equal to one for those countries with closed list proportional representation. In a proportional electoral system with closed lists, voters choose only the party they prefer, making no choice of individual candidates. Prior to the election the party submits a ranked list of candidates. The seats the party wins are distributed in order of ranking from the fixed list. If one party wins three seats, it elects the top three on its list. With open lists, voters select a party and then may, if desired, express a preference for a particular candidate or candidates within that list. Closed list systems increase party discipline; a candidate benefits from being included in the party list, and from being a high ranking on the party list. Given that citizens vote for parties and do not

[23]The alternative to PR systems are mixed systems, which elect some legislators from single-member constituencies and some from multi-member constituencies, and plurality or first-pass-the-post systems that elect every legislator from single-member constituencies. This restrictive rule is the closest to the theoretical models of pre-election politics and the most convenient to use in the empirical analysis.

have much say about the identity of the party representatives, politics in a closed list proportional system is less personality-centered than politics in a plurality system.[24] In both systems, the influence of the party leadership would surpass the case under single-member plurality voting system. Empirically, we would expect central public expenditures to be higher in proportional systems and even higher in those that use closed instead of open lists.

The vector *P* includes three political control variables. *Seats in the lower chamber* controls for the size of the legislature. Even though in multi-party legislatures each individual legislator does not have extensive bargaining power, legislature size affects the degree of fractionalization within a party and the potential demand for additional regional spending.[25] The two other political variables are *Federal Country* and *Presidential Country*. *Federal Country* is equal to 1 for federal countries and equal to zero for unitary countries. Given that the dependent variable is central government expenditure we would expect lower government size when sub-national governmental units have substantial expenditure powers. The importance of controlling for the type of regime (i.e., the *Presidential Country* variable) is twofold. First, presidential regimes tend to have lower expenditures because of competition among candidates, and presidents are held directly and separately accountable by the voters, as suggested by Persson and Tabellini (1999). Second, if the president can veto the budget, then any coalition that includes the party of the president will be more stable than any other coalition. This reduces uncertainty and therefore the tendency for universalistic outcomes that include programs for multiple parties.

The vector *X* includes a set of four economic and demographic control variables commonly found in empirical studies of spending across countries. First, the *log of GDP per capita* is a proxy for the development of the country and could influence voters' preferences for public goods as well as the size of the tax base. Second, the model includes a *Trade openness* variable, measured as the sum of exports plus imports as a percent of GDP, following the results in Cameron (1978), Rodrik (1998), and Alesina and Wacziarg (1998). Third, *log of population* controls for potential economies of scale in the provision of public services. Fourth, *Senior population*, measured as the percentage of the population aged 65 and over, controls for the demand for major government programs for the elderly such as social security, health insurance, and retirement benefits. In addition to these variables typically found in the literature, e.g. Persson and Tabellini (1999), other

[24] Kunicova and Rose-Ackerman (2005) make a similar argument to explain higher corruption in countries with closed list systems versus open list systems. In their model, in closed list proportional systems politicians are first accountable to the party and then to the voters; therefore elections are not as effective as in plurality systems to constrain individuals. Carey and Shugart (1995) show that under closed-lists formulas politicians' concern about personal reputation and the incentive to cultivate a personal vote are minimal.

[25] The size of the legislature has been shown to affect the size of government in a sample for the American States by Gilligan and Matsusaka (1995), US city governments by Baqir (2002), and in a world sample by Bradbury and Crain (2001). However, Pettersson-Lidbom (2012) finds evidence of a negative relationship between the size of the chamber and public expenditures.

specifications did not modify the coefficients or the degree of significance of our main variables of interest.[26]

Finally, δ_R and δ_t are vectors of fixed effects variables. δ_R controls for region specific effects with dummies for North West Europe, South East Europe, South America, North America, Central America and the Caribbean, Asia, Africa, Middle East, and Oceania. δ_t controls for year specific effects.

Table 6.3 presents the results of estimating Eq. (6.5) using panel data in a sample of OECD countries for 1971–1996. The header for each column of results indicates

Table 6.3 The norm of modified universalism in OECD countries, 1971–1996

Dependent variable: CGE/GDP	Parties	NP	ENPP	ENPP
Party competition	0.29	0.51	0.53	0.54
	(0.09)***	(0.22)**	(0.19)***	(0.19)***
Proportional representation	5.76	4.90	4.92	1.69
	(0.75)***	(0.78)***	(0.76)***	(0.91)*
Closed lists				4.07
				(0.56)***
Seats in the lower chamber	−0.003	−0.005	−0.004	−0.006
	(0.003)	(0.003)*	(0.003)	(0.003)**
Presidential	−6.56	−6.90	−6.73	−5.93
	(0.87)***	(0.89)***	(0.88)***	(0.87)***
Federal	−5.54	−5.83	−5.82	−7.38
	(0.59)***	(0.60)***	(0.59)***	(0.62)***
Log of GDP per capita	−4.40	−3.50	−3.76	−4.70
	(1.39)***	(1.34)***	(1.34)***	(1.40)***
Log of population	4.04	4.34	4.28	4.42
	(0.32)***	(0.29)***	(0.30)***	(0.30)***
Openness	0.14	0.14	0.14	0.15
	(0.01)***	(0.01)***	(0.01)***	(0.01)***
Senior population	0.40	0.38	0.36	0.34
	(0.15)***	(0.15)**	(0.15)**	(0.15)**
Year fixed effects	Yes	Yes	Yes	Yes
Region fixed effects[a]	Yes	Yes	Yes	Yes
Adjusted R^2	0.81	0.81	0.81	0.82
Observations	569	569	569	510

Notes: Standard errors in parentheses

***Indicates significance at the 1% level; **5% level, *10% level

[a]Regional dummies include North America, NW Europe, Oceania, and Asia

[26]Other variables we examined but do not report in the text include: land area, population density, urban population, GDP, Gini coefficient, education, bicameralism, ideology of government, governance indicators, and term limits. We also estimated models with the expenditure and openness variables in log form; again, these made no material difference to the results on our variables of interest.

the variable included as the measure of party competition in each regression. Each of the three indexes of political competition is positive and significant. The estimated coefficient on ENPP is 0.53, which indicates that the size of government increases approximately a half percentage point for each effective political party that gains representation to the lower house.[27] This increase in the number of effective parties could be caused either by the entry of new parties into the assembly or by a reduction in the standard deviation among parties in their shares of the seats in the legislature. The estimated impact for ENPP is almost identical to that estimated for NP variable. The coefficient on Parties indicates that each additional party increases the share of government expenditures by 0.29-percentage point. As discussed above, changes in the absolute number of parties and changes in the number of effective political parties are expected to have different effects on political bargaining in the legislature.

These estimated relationships between party competition and spending hold constant the impact of proportional representation. Those countries that use proportional representation have a size of the government approximately 5 percentage points larger than those countries that use plurality-voting elections. Consequently, according to the average values for ENPP in the sample, the average country that uses proportional representation is expected to have a government size almost 6% higher than the average country with plurality voting.[28] Differences are even starker for those countries that use closed instead of open lists to elect their representatives to the lower or unique chamber of the legislature. The average country that uses closed-lists proportional systems is expected to have a size of the government 4 percentage points larger than those which use open lists, and more than 6.5 percentage points larger than in those countries that elect their legislators using single-member plurality voting elections.

As expected from past studies, presidential and federal countries have lower expenditures than other countries. A country that is both federal and has a presidential executive would have a 12 percentage points lower government expenditure than a country that has a parliamentary and unitary government. The log of per capita income is negative and significant. Openness is statistically significant and positive as reported by Rodrik (1998). The size of the country in terms of population

[27] Stein et al. (1999) find a similar correlation between the number of effective parties and government expenditure in a sample of Latin American countries. In their model, an additional effective party increases government expenditure as a share of GDP by 2 percentage points. We note that in the Stein et al. (1999) study, the district magnitude (a variable described in the "pre-election politics" models) is not significantly correlated with the size of the government.

[28] The average ENPP for proportional representation countries is 3.9 while the average ENPP for the average majoritarian country is 2.4.

is positive and statistically significant.[29] We also find a positive correlation between spending and the percent of the population above 65 years old.

In Table 6.4 we present the results for the sample of world countries for 1980–1996. These results are not substantially different from the results presented in the previous table for the OECD countries. The estimated coefficients on the three political competition variables and proportional representation are again positive and highly significant. The average country with proportional representation presents a

Table 6.4 The norm of modified universalism in world countries, 1980–1996

Dependent variable: CGE/GDP	Parties	NP	ENPP	ENPP
Political competition	0.34	0.66	0.44	0.61
	(0.08)***	(0.24)***	(0.17)***	(0.19)***
Proportional representation	2.49	2.30	2.32	2.36
	(0.59)***	(0.60)***	(0.60)***	(0.88)***
Closed lists				2.00
				(0.80)**
Seats in the lower chamber	0.01	0.01	0.01	0.01
	(0.003)***	(0.003)***	(0.003)***	(0.003)***
Presidential	−3.37	−3.77	−3.69	−6.26
	(0.76)***	(0.75)***	(0.75)***	(0.79)***
Federal	−0.44	−0.64	−0.49	−0.27
	(0.64)	(0.65)	(0.65)	(0.65)
Log of GDP per capita	−2.07	−2.18	−2.22	−2.05
	(0.50)***	(0.50)***	(0.50)***	(0.52)***
Log of population	−0.38	−0.14	−0.22	0.09
	(0.39)	(0.38)	(0.38)	(0.40)
Openness	0.07	0.07	0.07	0.09
	(0.01)***	(0.01)***	(0.01)***	(0.01)***
Senior population	1.44	1.44	1.42	1.27
	(0.13)***	(0.13)***	(0.13)***	(0.14)***
Year fixed effects	Yes	Yes	Yes	Yes
Region fixed effects[a]	Yes	Yes	Yes	Yes
Adjusted R^2	0.56	0.55	0.55	0.61
Observations	1105	1105	1105	954

Notes: Standard errors in parentheses

***Indicates significance at the 1% level; **5% level

[a]Regional dummies include South America, North America, Central America and Caribbean, NW Europe, SE Europe, Oceania, Asia, Africa, and Middle East

[29]This result is consistent with the existence of economies of scale in the provision of public goods. In Sect. 6.4, we show that the coefficient for the log of population is negative with respect to public goods and positive with respect to transfers. A higher importance of transfers in the OECD countries explains the change of signs when compared with the world sample.

size of the government almost 3 percentage points higher than the average country with plurality-voting.[30] Given that the average size of the government is 30% of GDP, this value represents a difference of almost 10%. Similar to the findings for the OECD sample, public expenditures in countries that use closed-lists are on average higher than in those countries that use open-lists. This difference amounts to 2% of GDP. The difference between the former and the countries that use plurality voting amounts to roughly 5% of GDP in this specification. Government expenditures as a share of GDP are between 4.5 and 7 percentage points lower in federal countries with presidential executives compared to other unitary countries.[31]

Figure 6.1 illustrates the results from the estimation of the last column in Table 6.4, graphing the fitted values for government spending with respect to the effective number of parties. To derive the fitted values we use the mean values for the other variables. As Fig. 6.1 illustrates, expenditures in the typical country fluctuate between 31 and 35% of GDP depending on the effective number of parties in the legislature. This range is in harmony with the average values for the sample. The range of fluctuation for the size of governments differs, however, according to the

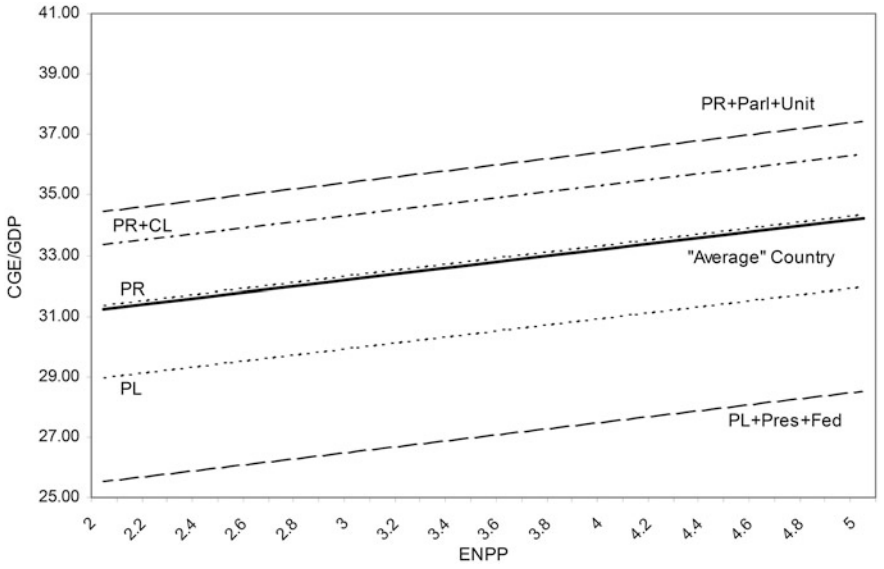

Fig. 6.1 ENPP and the size of government, world sample

[30]The average ENPP for proportional representation countries is 3.3 while the average ENPP for the average majoritarian country is 2.2.

[31]To check the validity of our results, we ran the same specifications using a variable that proxies our political competition variables from Clarke et al. (2000). This variable, government fragmentation (the probability that two random draws will produce legislators from different parties) and the other control variables remained consistent with the results reported in the text.

Table 6.5 Type of regime and size of government in 1996

	CGE/GDP	
OECD	*Presidential*	*Parliamentary*
Mean	24.0	38.0
Median	24.0	40.0
Std. deviation	2.9	8.2
World	*Presidential*	*Parliamentary*
Mean	26.0	35.0
Median	26.0	35.0
Std. deviation	9.2	9.4

Note: The differences in means are statistically significant at the 1% level

political institutions in place. Countries with plurality elections fluctuate between 29 and 31.5% of GDP and countries with proportional representation vary from 31 to 34.5. Spending is even higher for those countries that use closed-lists, ranging from 33 to 36.5% of GDP. When we take into consideration differences in political regimes and organization the differences increase. While the typical country that elects its legislators from single member-constituencies using plurality voting with a presidential executive and a federal organization has public expenditures that amount to 26% of GDP, the typical parliamentary and unitary country that uses proportional representation has public expenditures in excess of 35% of GDP.

In summary, the empirical evidence indicates broadly that electoral systems affect the size of the government, and more specifically, that the number of parties has a fundamental role in budgetary outcomes. Consistent with prior studies, we find that a separate executive branch dampens the size of government by more than 10%. This difference between presidential and parliamentary regimes is further illustrated in Table 6.5.

6.2.3 Constrained Universalism

The results for the norm of modified universalism—with or without closed lists—could be affected by the existence of a party that holds the majority in the legislative chamber. Even though the computation of ENPP takes into consideration the differences between those legislatures where large parties exist and those with a more equal distribution of power, controlling for the size of the majority is relevant. In our framework, the existence of a majority party predictably decreases the size of the government because it reduces the uncertainty of forming a minimum winning coalition. In turn, this decreases the probability of agreements that include several parties. In this alternative political game, however, agreements still have to be negotiated among the legislators within the majority party, rendering it important to control for the size of that majority. This is precisely the structural setting of constrained universalism analyzed by Inman and Fitts (1990) using time series

data for the U.S. Congress. Here we extend their analysis to the sample of world countries.

Under the norm of constrained universalism, expenditures follow a quadratic trend with respect to the size of the majority party, increasing from 0.5 and decreasing beyond some level of super-majority size. This follows from two opposing influences. First, an increase in the majority share means that more legislators seek programs for their respective constituencies and thereby increasing aggregate spending (the $1/n$ effect). However, as more legislators belong to the majority party, fewer legislators belong to the minority. This means that increases in the majority party's share increase the effective tax cost to party members. As the majority size becomes increasingly large, the majority party has incentive to internalize the $1/n$ effect, which exerts a restraining effect on spending.

Proposition 6.2 *Where one party holds a majority of legislative seats, the size of the government follows a quadratic relationship with respect to the share of seats held by the majority party.*

To estimate the validity of the norm of constrained universalism, we incorporate three additional variables. Majority is a dummy variable equal to one in those cases where a party holds more than 50% of the total number of seats. M/N reflects the percentage of seats held by the largest party in the chamber. Using the specification in Inman and Fitts (1990) we include two interaction terms, $M/N * Majority$ and $(M/N * Majority)^2$. These interaction variables investigate the non-linear effect on spending as the size of the majority party changes and the opposing forces come into play.

The results presented in Table 6.6 show that regardless of the specification and the sample used, the effective number of political parties, the electoral system, and the political regime remain significant determinants of government expenditures. The results are not conclusive, however, regarding the norm of constrained universalism. While the results are highly significant for the specification in the last column they are not for the other specifications.

The inconclusive results for the OECD sample might be explained by the relatively small number of cases in which one party holds a parliamentary majority. In addition, we note that the results are sensitive to the inclusion of the PR variable. The PR variable appears to be correlated with the existence of a majority party and the size of the majority. Accepting the results in the last column, the average country with a majority party would have a public expenditure share that ranges between 26.5 and 32%, reaching a maximum when the majority party holds 85% of the seats in the legislature. These values are consistent with the range of variation presented in Fig. 6.1.

Table 6.6 Testing the norm of constrained universalism

Dependent variable: CGE/GDP	OECD sample, 1971–1996		World sample, 1980–1996	
	(6.1)	(6.2)	(6.3)	(6.4)
ENPP	0.55	0.81	0.44	0.46
	(0.20)***	(0.20)***	(0.23)*	(0.24)*
Proportional representation	5.05		2.51	
	(0.77)***		(0.63)***	
Majority	−0.90	−5.40	−11.73	−30.14
	(32.18)	(33.43)	(11.35)	(10.90)***
M/N*Majority	−7.28	8.52	19.87	74.61
	(106.76)	(110.90)	(33.08)	(31.67)**
(M/N*Majority)^2	16.69	1.14	−4.23	−43.69
	(88.00)	(91.40)	(23.18)	(22.12)**
Seats in the lower chamber	−0.004	−0.012	0.01	0.01
	(0.003)	(0.003)***	(0.003)***	(0.003)***
Presidential	−6.84	−8.82	−3.79	−3.33
	(0.90)***	(0.88)***	(0.77)***	(0.77)***
Federal	−5.65	−7.16	−0.95	−1.43
	(0.61)***	(0.59)***	(0.67)	(0.66)**
Log of GDP per capita	−3.71	−4.36	−1.82	−1.36
	(1.37)***	(1.42)***	(0.52)***	(0.51)***
Log of population	4.27	4.32	0.13	0.23
	(0.30)***	(0.31)***	(0.39)	(0.39)
Openness	0.14	0.14	0.06	0.06
	(0.01)***	(0.01)***	(0.01)***	(0.01)***
Senior population	0.35	0.69	1.26	1.28
	(0.15)**	(0.15)***	(0.14)***	(0.14)***
Year fixed effects	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.81	0.79	0.58	0.55
Observations	569	569	1045	1083

Notes: Standard errors in parentheses
***Indicates significance at the 1% level; **5% level, *10% level

6.3 Public Goods, Subsidies and Transfers, and Political Competition

We next turn to examine the relationship between the structure of party competition and the composition of government spending. Motivating the analysis is the idea that electoral rules not only affect the number of political parties but also the organization of the groups that support the election of candidates. Candidates will consequently support the mix of expenditures that favors specific groups and thereby raise their chances of election.

Proposition 6.3 *The electoral system has a significant impact on the composition of government expenditures, increasing the reliance on subsidies and transfers as the system becomes more proportional.*

The groups that determine the election of candidates differ markedly under a single-member plurality system versus a multi-member proportional representation system. As is the case in the U.S., politicians respond to their local constituency to secure nomination under a regime of single-member districts and plurality rule. The sole representative of the district is ultimately responsible for providing public goods. In these districts, policies are hardly ideological and a successful politician responds to the preferences of the median voter in his or her geographic district. In this electoral system, politicians are usually reelected unless voters have evidence that a different candidate could provide a better bundle of goods given the tax cost. As a result, the programs advanced by the legislator are mostly geographically-targeted.

Politicians' strategies are different in regimes of multi-member districts and proportional representation. These systems are characterized by multiple parties and consequently, are more ideologically oriented than two-party systems.[32] Moreover, political parties' preferred policies usually deviate from that of the median voter.[33] In multiple-party systems, politicians have to respond to the party leadership's platform to increase their chances of nomination. Electoral competition is directed toward being selected for a party's list, and candidates need to be included in those lists in order to gain access to the legislature. Only by following the party's platform can a candidate obtain a spot in the party's list. This process means that the cost to a candidate for not serving the local constituency and following the party leadership is lower under a proportional representation system with multi-member districts than in a plurality, single-member district system.

In multi-member districts, the fate of the constituency depends on the joint effort of several representatives from different parties. As a result, problems of collective action arise where legislators find it profitable to serve broad-based interest groups because the benefits surpass those from helping the geographic constituency.[34] In proportional systems, a politician regards himself not as an ambassador of the district (as in single-member constituencies) but as an ambassador of a particular segment of the population that is thought to vote for the party of the representative.[35]

[32] Adams (1996) finds evidence that platforms and policies are more ideologically diverse even in those cases where the number of parties is fixed and cannot accommodate to the proportionality of the electoral system, as is the case with the Illinois General Assembly during the period 1870–1982.

[33] See Cox (1990a,b) for a more detailed analysis on multi-candidate spatial competition.

[34] As a further distinction, in a two-party system, constituents are able to hold their specific representative accountable. Under government coalitions, lines of responsibility are blurred and each party attempts to blame its partners for failures while taking credit itself for successes. Katz (1980) exposits this distinction.

[35] See Tullock (1994, p. 33).

This implies that under plurality systems legislators tend to favor geographically-targeted spending, and under proportional representation systems legislators tend to favor demographically based spending.[36] As a result, we should expect that legislators in plurality systems will try to pass higher expenditures on public goods and legislators in proportional representation countries will try to pass higher expenditures on subsidies and transfers.[37]

We extend the general implication by noting that regardless of having a proportional system, the degree of proportionality of the electoral system is influential. As evidenced in the political science literature such as in Cox (1997), the degree of proportionality is not constant, rather, it depends on the number of legislators elected by district. In a perfect proportional system, every legislator is elected from a single national constituency. On the other extreme, single-member constituencies and plurality voting represent the lowest level of proportionality. A higher level of proportionality increases the costs for not serving the party and the anonymity of the legislator in front of the geographic constituency.[38] Consequently, a higher proportionality increases the importance of demographically based groups, and the relevance of subsidies and transfers as a policy designed to gain voters' support, to the detriment of geographically based groups and public goods provision. Because a higher degree of proportionality is correlated with a larger number of parties, we should find that a large number of effective parties increases the amount of spending on transfers and reduces spending on public goods.

The theoretical underpinning is still the "modified universalism" framework. The only difference concerns the type of projects politicians prefer under alternative electoral systems.

[36]This result is also a consequence of a model where legislators have to choose the amount of time, effort, and political capital they invest in producing pork for their district. Bueno de Mesquita (2002) shows that legislators from multi-member districts invest less time and effort in work related to the specific interest of their district constituents than do legislators from single-member districts.

[37]Stratmann and Baur (2002) find empirical evidence of different behaviors across legislators for Germany, where half of the parliamentary seats are awarded from single-member constituencies and the other half through proportional voting. The legislators elected from single-member constituencies tend to choose legislative committees that deal with geographically based affairs while the legislators elected by party lists tend to prefer those committees that deal with broad based policies and transfers.

[38]For example, 70 legislators from different parties represent the constituents of Provincia de Buenos Aires, Argentina. In this case, the ignorance of voters is very high and the cost for each representative for not serving the constituency very low. On the other side, the cost of not serving the party is very high. Consequently, legislators form demographically based coalitions instead of geographically based.

6.3.1 Empirical Evidence

Equations (6.6) and (6.7) specify the models use to examine this implication using the major components of government expenditures.

$$(PG/GDP)_{i,t} = \alpha_1 + \alpha_2 PC_{i,t} + \alpha_3 PR_{i,t} + \Phi P_{i,t} + \Psi X_{i,t} + \delta_R + \delta_t + \epsilon_{i,t} \quad (6.6)$$

$$(ST/GDP)_{i,t} = \beta_1 + \beta_2 PC_{i,t} + \beta_3 PR_{i,t} + \Phi P_{i,t} + \Psi X_{i,t} + \delta_R + \delta_t + \epsilon_{i,t} \quad (6.7)$$

The dependent variables are public goods expenditures (PG/GDP) and subsidies and transfers (ST/GDP) as a share of GDP. Public goods expenditures is constructed as the sum of spending on goods and services (including wages and salaries) and capital spending. The control variables are the same ones used in Eq. (6.5).

Table 6.7 presents evidence on the impact of the number of effective parties and the electoral system on the components of government expenditures for the OECD and world samples. An increase in one effective party reduces public goods expenditures as a share of GDP by 0.35 percentage points and increases transfers by almost 0.3 percentage points in the OECD sample and 0.62 in the world sample. We find similar results, not reported, using NP and Parties as independent variables instead of ENPP. Considering the coefficients for proportional representation, the average country that uses proportional representation would have subsidies and transfers 1.5% of GDP higher than the average majoritarian country. In terms of total spending in subsidies and transfers, the difference amounts to 12.5%.

As expected, federal and presidential countries have lower expenditures on both public goods and transfers than unitary and parliamentary countries. We note that subsidies and transfers increase with the percent of the population above 65 years old, and with the degree of openness.[39] Finally, spending on public goods is negatively correlated with population, indicating the presence of scale economies in the provision of public goods.

Summarizing, the evidence indicates that the different groups that support the election of candidates have an impact on the composition of government expenditures. Because proportional (plurality) representation countries tend to favor demographically (geographically) based coalitions instead of geographically (demographically) based coalitions, as the degree of proportionality of the electoral system increases (decreases) there is a growing (diminishing) weight of subsidies and transfers and a decreasing (increasing) weight of public goods expenditure in the economy. Interestingly, Milesi-Ferretti et al. (2002) report a similar correlation between the degree of proportionality of the system and the size of the government. In a sample of 20 OECD countries they find strong cross-sectional and panel

[39] These results are consistent with the literature summarized in Persson and Tabellini (2000). In particular, Alesina and Wacziarg (1998) offer similar evidence on the positive relationship between openness and government transfers.

Table 6.7 Political competition and the composition of government expenditures

	OECD sample, 1971–1996		World sample, 1980–1996	
	Public goods	Subsidies and transfers	Public goods	Subsidies and transfers
ENPP	−0.35 (0.12)***	0.27 (0.15)*	−0.33 (0.11)***	0.61 (0.12)***
Proportional representation	0.06 (0.49)	2.12 (0.62)***	0.47 (0.34)	0.91 (0.38)**
Seats in the lower chamber	0.007 (0.002)***	−0.019 (0.002)***	0.012 (0.002)***	−0.002 (0.002)
Presidential countries	0.60 (0.57)	−7.46 (0.71)***	−0.75 (0.45)**	−0.68 (0.52)*
Federal countries	−0.35 (0.38)	−5.39 (0.48)***	−0.34 (0.37)	−0.78 (0.42)*
Log of GDP per capita	−6.02 (0.86)***	7.49 (1.08)***	−1.34 (0.30)***	−0.23 (0.34)
Log of population	−1.04 (0.19)***	5.36 (0.24)***	−1.97 (0.22)***	1.37 (0.26)***
Openness	0.014 (0.005)***	0.11 (0.01)***	0.019 (0.004)***	0.03 (0.004)***
Senior population	−0.06 (0.10)	0.21 (0.12)*	−0.17 (0.08)**	1.29 (0.08)***
Year fixed effects	Yes	Yes	Yes	Yes
Region fixed effects[a]	Yes	Yes	Yes	Yes
Adjusted R^2	0.51	0.79	0.50	0.72
Observations	569	569	1018	1018

Notes: Standard errors in parentheses
***Indicates significance at the 1% level; **5% level, *10% level
[a]Regional dummies include North America, NW Europe, Oceania, and Asia

evidence in support of the prediction of higher expenditure on transfers and total spending in more proportional electoral systems. This result is also supported by the theoretical model developed by Lizzeri and Persico (2005).

6.4 Concluding Comments

The cross-national empirical analysis reveals a clear systematic relationship between the structure of party competition and the size and composition of government spending. This relationship is consistent with a simple extension and modification of the norm of universalism. In multi-party settings, party leaders prefer to include projects favored by opposition parties rather than face the uncertainty of forming a minimum size winning coalition. Increases in the number

of parties raise the expected benefit of forming universal coalitions and reduce the cost for the party supporters of any pet project proposed by the party leader. The impact of a multiple party structure is also evident in the empirical models that examine spending on transfers and public goods. Increases in party competition tend to encourage subsidy and transfer programs and discourage spending on public goods.

This analysis differs from recent papers that tie electoral rules to fiscal policy through pre-election politics, a tradition well summarized in Persson and Tabellini (2000). In the pre-election politics framework, fiscal policy differs according to the optimal binding promises made by the candidates during the campaign. For example, in majoritarian systems (a U.S.-style electoral system characterized by small districts and plurality rules) spending tends to be larger and more narrowly targeted than under proportional representation systems (large districts with legislature seats allocated on the basis of total party votes). Candidates in majoritarian elections pay most attention to voters in marginal electoral districts, which induces more public goods expenditure. These models, however, do not consider the impact of the electoral system on the structure of political party competition and post-election legislative bargaining. As Persson and Tabellini (2000, p. 5) point out, this is a pitfall of the recent theoretical literature that has neglected the implications of the electoral rule on the party structure. Here we seek to advance the state of analysis by blending the new tradition that stresses "pre-election politics," with an older tradition that stresses legislator bargaining, which we label "post-election politics." In the post-election politics perspective, factors such as party leader bargaining and the potential for logrolling expand the size of the budget, for example the now-familiar fiscal commons effect.

The observed relationships between the number and sizes of parties and the size of the government strengthens and illuminates earlier work that stresses the importance of electoral institutions. Electoral rules influence the effective number of political parties; a plurality-voting system with single-member constituencies fosters two-party competition, while a proportional representation system with multi-member constituencies facilitates multiple parties. Papers like Persson and Tabellini (2001) and Rogowski and Kayser (2002) extend the evidence of the impact of electoral systems to the analysis of corruption and price levels. Together with these papers, the findings in this paper suggest that by looking at the consequences on party structure, constitutionalists may evaluate more precisely the benefits and costs of changing the electoral rules.

Acknowledgments We are grateful to Gordon Tullock, Richard E. Wagner, Tyler Cowen, Joe Reid, Thomas Stratmann, and participants at the Public Choice Society Meetings in Charleston, SC, and San Antonio, TX, and seminars at George Mason University, Loyola University, and the Inter-American Development Bank for constructive comments in previous drafts of the paper. Remaining errors are our responsibility. The views and interpretations expressed in this paper are those of the authors and should not be attributed to the Inter-American Development Bank, or to any individual acting on its behalf.

Appendix

See Tables 6.8, 6.9, and 6.10.

Table 6.8 Summary statistics

OECD sample 1971–1996	*Mean*	*Med*	*Std.*	*Obs*
Central government expenditure/GDP	34.36	34.57	10.05	579
Public goods expenditure/GDP	11.30	11.11	4.02	575
Subsidies and transfers/GDP	19.79	19.92	7.87	575
Effective number of parties	3.48	3.17	1.38	588
Legislative seats	285.46	212.00	176.89	588
Rae fractionalization index	0.67	0.68	0.11	588
Molinar's weighted number of parties	2.66	2.29	1.18	588
Absolute number of parties	6.89	6.00	3.32	586
GDP per capita	11, 952.81	11, 873.00	3415.61	598
Population (millions)	33, 353.87	9860.00	52312.10	598
Population density	128.05	91.44	125.78	598
Urban population	73.86	75.77	14.54	598
Trade openness	64.68	58.26	35.51	598
Senior population	12.53	12.83	2.31	598
Dependency ratio	0.35	0.35	0.03	598
Land area ('000 sq km)	1316.80	267.99	2872.74	598
World sample 1980–1996	*Mean*	*Med*	*Std.*	*Obs*
Central government expenditure/GDP	29.92	28.91	12.11	1329
Public goods expenditure/GDP	14.63	13.57	6.98	1208
Subsidies and transfers/GDP	12.16	9.18	9.66	1210
Effective number of parties	2.92	2.45	1.52	1324
Legislative seats	203.40	159.00	156.95	1541
Rae fractionalization index	0.52	0.58	0.25	1467
Molinar's weighted number of parties	2.04	1.76	1.16	1467
Absolute number of parties	5.35	5.00	3.41	1466
Average district size	0.48	0.28	0.40	1411
GDP per capita	6094.73	4218.23	5162.96	1630
Population (millions)	29.98	7.94	86.95	1785
Population density	152.54	53.68	459.64	1641
Urban population	56.14	56.13	22.44	1802
Trade openness	74.50	62.80	48.68	1630
Senior population	7.27	4.93	4.39	1751
Dependency ratio	0.41	0.40	0.08	1733
Land area ('000 sq km)	87, 381.49	17, 481.00	229, 828.20	1785

Table 6.9 Countries included in the empirical work

Albania[a]	Costa Rica[b,a]	Iceland[c,b,a]	Mauritius[b,a]	Slovenia[a]
Algeria[a]	Croatia[a]	India[b,a]	Mexico[b,a]	South Africa[b,a]
Andorra[a]	Cyprus[b,a]	Indonesia[b,a]	Mongolia[b,a]	Spain[c,b,a]
Argentina[b,a]	Czech Republic[b,a]	Ireland[c,b,a]	Morocco[b,a]	Sweden[c,b,a]
Armenia[a]	Denmark[c,b,a]	Israel[b,a]	Mozambique[a]	Switzerland[c,b,a]
Australia[c,b,a]	Dominica[a]	Italy[c,b,a]	Namibia[b,a]	Syria[b,a]
Austria[c,b,a]	Dominican Republic[b,a]	Jamaica[b,a]	Nepal[b,a]	Tanzania[a]
Bahamas[b,a]	Ecuador[b,a]	Japan[c,b,a]	Netherlands[c,b,a]	Thailand[b,a]
Bangladesh[b,a]	Egypt[b,a]	Jordan[b,a]	New Zealand[c,b,a]	Trinidad and Tobago[b,a]
Barbados[b,a]	El Salvador[a]	Kenya[b,a]	Nicaragua[b,a]	Tunisia[b,a]
Belgium[c,b,a]	Estonia[b,a]	Kiribati[a]	Norway[c,b,a]	Turkey[b,a]
Belize[b,a]	Fiji[b,a]	Korea, Rep.[b,a]	Pakistan[b,a]	United Kingdom[c,b,a]
Benin[a]	Finland[c,b,a]	Latvia[b,a]	Panama[b,a]	United States[c,b,a]
Bolivia[b,a]	France[c,b,a]	Liechtenstein[a]	Paraguay[b,a]	Uruguay[b,a]
Botswana[b,a]	Germany[c,b,a]	Lithuania[b,a]	Peru[b,a]	Venezuela[b,a]
Brazil[b,a]	Ghana[b,a]	Luxembourg[c,b,a]	Poland[b,a]	Yemen[b,a]
Bulgaria[b,a]	Greece[c,b,a]	Madagascar[b,a]	Portugal[c,b,a]	Zambia[b,a]
Cameroon[b,a]	Grenada[b,a]	Malawi[b,a]	Romania[b,a]	Zimbabwe[b,a]
Canada[c,b,a]	Guatemala[b,a]	Malaysia[b,a]	Russia[b,a]	
Cape Verde[a]	Guyana[b,a]	Mali[b,a]	Samoa[a]	
Chile[b,a]	Honduras[a]	Malta[b,a]	Singapore[b,a]	
Colombia[b,a]	Hungary[b,a]	Mauritania[a]	Slovak Republic[a]	

Notes: Countries included in the empirical work according to data availability
[a]Included in the preliminary statistics for Tables 6.1, 6.2, and 6.5
[b]Included in the world regressions for Tables 6.4, 6.6, and 6.7
[c]Included in the OECD regression for Tables 6.3, 6.6, and 6.7

Table 6.10 Variables and sources of data

Variables	Period	Sample	Source
Effective number of parties	1971/1990	OECD	SC [IAEH]
	1990/1996	OECD	SC [CPE]
	1980/1996	WORLD	SC [CPE]
Molinar's NP	1971/1990	OECD	SC [IAEH]
	1990/1996	OECD	SC [CPE]
	1980/1996	WORLD	SC [CPE]
Rae fractionalization index	1971/1990	OECD	SC [IAEH]
	1990/1996	OECD	SC [CPE]
	1980/1996	WORLD	SC [CPE]
Absolute number of Political	1971/1990	OECD	SC [IAEH]
Parties	1990/1996	OECD	SC [CPE]
	1980/1996	WORLD	SC [CPE]
Majority size	1971/1990	OECD	SC [IAEH]
	1990/1996	OECD	SC [CPE]
	1980/1996	WORLD	SC [CPE]
Average district size	1980/1996	WORLD	SC [CPE]
Single-member constituencies	1980/1996	WORLD	SC [CPE]
Multi-member constituencies	1980/1996	WORLD	SC [CPE]
Legislative seats	1971/1996	OECD/WORLD	SC [CPE, CW, PH]
Proportional representation	1971/1996	OECD/WORLD	SC [CPE, DPI, PSW, PT]
Presidential governments	1971/1996	OECD/WORLD	SC [CPE, PT, PSW]
Federalism	1971/1996	OECD/WORLD	SC [T, PC, PSW]
Bicameralism	1971/1996	OECD/WORLD	SC [CPE, PC]
Political party ideology	1975/1996	OECD/WORLD	DPI
Closed lists	1975/1996	OECD/WORLD	SC [CPE], DPI
Freedom index	1971/1996	OECD/WORLD	FH
Free countries	1971/1996	OECD/WORLD	FH
Free and partially free countries	1971/1996	OECD/WORLD	FH
Central government expenditure	1971/1996	OECD/WORLD	WDI
Public goods expenditure	1971/1996	OECD/WORLD	WDI
Subsidies and transfers	1971/1996	OECD/WORLD	WDI

(continued)

Table 6.10 (continued)

Variables	Period	Sample	Source
Government capital expenditure	1971/1996	OECD/WORLD	WDI
Government expenditure on goods and services	1971/1996	OECD/WORLD	WDI
Government wages and salaries	1971/1996	OECD/WORLD	WDI
GDP	1970/1979	OECD	PWT
	1980/1996	OECD/WORLD	WDI
GDP per capita	1970/1979	OECD	PWT
	1980/1996	OECD/WORLD	WDI
GDP growth	1971/1996	OECD/WORLD	WDI
Population (millions)	1971/1996	OECD/WORLD	WDI
Population density	1971/1996	OECD/WORLD	WDI
Urban population	1971/1996	OECD/WORLD	WDI
Trade openness	1971/1996	OECD/WORLD	WDI
Open countries	1971/1996	OECD/WORLD	SW
Trade openness index	1971/1996	OECD/WORLD	G
Senior population	1971/1996	OECD/WORLD	WDI
Dependency ratio	1971/1996	OECD/WORLD	WDI
Land area ('000 sq km)	1971/1996	OECD/WORLD	WDI
Gini coefficient	1971/1996	OECD/WORLD	DS, DK

Sources: C: Cox (1997). CPE: Inter-Parliamentary Union (Various). CW: Maddex (2007). DK: Dollar and Kraay (2002). DPI: Clarke et al. (2000). DS: Deininger and Squire (1996). E: Easterly (1999). FH: Freedom House (Various). G: Gwartney et al. (2001). IAEH: Mackie (1991). PC: Henisz (2000). PH: Banks et al. (2000). PT: Persson and Tabellini (1999). PSW: Derbyshire and Derbyshire (1996). PWT: Heston and Summers (1995). SC: Scartascini and Crain. Computations by the authors from the electoral sources indicated in parentheses. SW: Sachs and Wartner (2010). WDI: World Bank (1999). T: Treisman (2000)

References

Adams GD (1996) Legislative effects of single-member vs. multi-member districts. Am J Polit Sci 40(1):129–144

Alesina A, Wacziarg R (1998) Openness, country size and government. J Public Econ 69(3):305–321

Amorim Neto O, Cox GW (1997) Electoral institutions, cleavage structures, and the number of parties. Am J Polit Sci 41(1):149–174

Banks AS, Muller TC, Overstreet PSM William, Smith H (2000) Political Handbook of the World 1999. CQ Press, Washington, DC

Baqir R (2002) Districting and government overspending. J Polit Econ 110(6):1318–1354

Bradbury JC, Crain WM (2001) Legislative organization and government spending: cross-country evidence. J Public Econ 82(3):309–325

Bueno de Mesquita E (2002) Less than the sum of its parts: monitoring legislative teamwork in multi-member districts. Harvard University Department of Government, Working Paper

Cameron DR (1978) The expansion of the public economy: a comparative analysis. Am Polit Sci Rev 72(4):1243–1261
Carey JM, Shugart MS (1995) Incentives to cultivate a personal vote: a rank ordering of electoral formulas. Elect Stud 14(4):417–439
Clarke G, Beck T, Keefer P, Groff A, Walsh P (2000) New tools and New Tests in Comparative Political Economy: The Database of Political Institutions. World Bank, Policy Research Working Paper 2283
Collie MP (1988) Universalism and the parties in the US House of Representatives, 1921–1980. Am J Polit Sci 32(4):865–883
Cox GW (1990a) Centripetal and centrifugal incentives in electoral systems. Am J Polit Sci 34(4):903–935
Cox GW (1990b) Multicandidate spatial competition. In: Enelow J, Hinich M (eds) Advances in the spatial theory of voting. Cambridge University Press, Cambridge, pp 179–198
Cox GW (1997) Making votes count: strategic coordination in the World's electoral systems. Cambridge University Press, Cambridge
Cox GW, Tutt TN (1984) Universalism and allocative decision making in the Los Angeles County Board of Supervisors. J Polit 46(2):546–555
Dahl RA (1996) Thinking about democratic constitutions: Conclusions from democratic experience. Nomos 38(1):175–206
de Dios MS (1999) Parliamentary party discipline in spain. In: Bowler S, Farrell D, Katz R (eds) Party discipline in parliamentary governments. Ohio State University Press, Columbus, pp 141–161
Deininger K, Squire L (1996) A new data set measuring income inequality. World Bank Econ Rev 10(3):565–591
Derbyshire J, Derbyshire I (1996) Political Systems of the World. St Martins Press, New York
Dollar D, Kraay A (2002) Growth is good for the poor. J Econ Growth 7(3):195–225
Easterly W (1999) Life during growth. J Econ Growth 4(3):239–276
Ferejohn JA (1974) Pork barrel politics: rivers and harbors legislation, 1947–1968. Stanford University Press, Palo Alto
Fiorina MP (1974) Congress, keystone of the Washington establishment. Yale University Press, New Haven
Freedom House (Various) Freedom in the World. Freedom House, Washington, DC
Gallagher M, Laver M, Mair P (1992) Representative government in Western Europe. McGraw-Hill, New York
Gilligan TW, Matsusaka JG (1995) Deviations from constituent interests: the role of legislative structure and political parties in the states. Econ Inq 33(3):383–401
Gilligan TW, Matsusaka JG (2001) Fiscal policy, legislature size, and political parties: evidence from state and local governments in the first half of the 20th century. Natl Tax J 54(1):57–82
Gwartney J, Skipton C, Lawson R (2001) Trade openness, income levels, and economic growth, 1980–1998. In: Gwartney J, Lawson R (eds) Economic freedom of the World: 2001 annual report. Fraser Institute, Vancouver, pp 71–98
Henisz W (2000) The Political Constraint Index (POLCON) Dataset. University of Pennsylvania, https://mgmt.wharton.upenn.edu/faculty/heniszpolcon/polcondataset/
Heston A, Summers R (1995) The Penn World Tables. Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, Philadelphia
Inman RP, Fitts MA (1990) Political institutions and fiscal policy: evidence from the US historical record. J Law Econ Organ 6:79–132
Inter-Parliamentary Union (Various) Chronicle of Parliamentary Elections. International Centre for Parliamentary Documentation, Geneva
Katz RS (1980) A theory of parties and electoral systems. JHU Press, Baltimore, MD
Knight B (2004) Bargaining in legislatures: an empirical investigation. National Bureau of Economic Research, Working Paper 10530

Kontopoulos Y, Perotti R (1999) Government fragmentation and fiscal policy outcomes: evidence from OECD countries. In: Poterba J, von Hagen J (eds) Fiscal institutions and fiscal performance. University of Chicago Press, Chicago, pp 81–102
Kunicova J, Rose-Ackerman S (2005) Electoral rules and constitutional structures as constraints on corruption. Br J Polit Sci 35(4):573–606
Laakso M, Taagepera R (1979) 'Effective' number of parties: a measure with application to west Europe. Comp Polit Stud 12(1):3–27
LeDuc L, Niemi RG, Norris P (1996) Comparing democracies: elections and voting in global perspective. Sage Publications, Thousand Oaks
Leys C (1959) Models, theories, and the theory of political parties. Polit Stud 7(2):127–146
Lijphart A (1990) The political consequences of political laws. Am Polit Sci Rev 84(2):481–496
Lijphart A (1994) Electoral systems and party systems: a study of twenty-seven democracies, 1945–1990. Oxford University Press, Oxford
Lijphart A (1999) Patterns of democracy: government forms and performance in thirty-six countries. Yale University Press, New Haven
Lizzeri A, Persico N (2005) A drawback of electoral competition. J Eur Econ Assoc 3(6):1318–1348
Mackie T (1991) The international Almanac of electoral history. Macmillan, London
Maddex R (2007) Constitutions of the World. CQ Press, Washington, DC
Matthews D (1960) US senators and their World. University of North Carolina Press, Chapel Hill
Mayhew DR (1974) Congress: the electoral connection. Yale University Press, New Haven
McKenzie K (2001) A tragedy of the house of commons: political institutions and fiscal policy outcomes from a Canadian perspective. CD Howe Institute, Toronto
Milesi-Ferretti GM, Perotti R, Rostagno M (2002) Electoral systems and public spending. Q J Econ 117(2):609–657
Miller GJ, Oppenheimer JA (1982) Universalism in experimental committees. Am Polit Sci Rev 76(3):561–574
Molinar J (1991) Counting the number of parties: an alternative index. Am Polit Sci Rev 85(4):1383–1391
Niou E, Ordeshook P (1985) Universalism in congress. Am J Polit Sci 29(2):246–258
Ordeshook PC, Shvetsova OV (1994) Ethnic heterogeneity, district magnitude, and the number of parties. Am J Polit Sci 38(1):100–123
Palfrey T (1989) A mathematical proof of Duverger's Law. In: Ordeshook P (ed) Models of strategic choice in politics. University of Michigan Press, Ann Arbor, pp 69–91
Persson T, Tabellini G (1999) The size and scope of government: comparative politics with rational politicians. Eur Econ Rev 43(4–6):699–735
Persson T, Tabellini GE (2000) Political economy: explaining economic policy. MIT Press, Cambridge
Persson T, Tabellini G (2001) Political institutions and policy outcomes: what are the stylized facts? Centre for Economic Policy Research, Discussion Paper 2872
Pettersson-Lidbom P (2012) Does the size of the legislature affect the size of government? Evidence from two natural experiments. J Public Econ 96(3–4):269–278
Powell GB (1982) Contemporary democracies: participation, stability, and violence. Harvard University Press, Cambridge
Rae DW (1967) The political consequences of electoral laws. Yale University Press, New Haven
Riker WH (1962) The theory of political coalitions. Yale University Press, New Haven
Rodrik D (1998) Why do more open economies have bigger governments? J Polit Econ 106(5):997–1032
Rogowski R, Kayser MA (2002) Majoritarian electoral systems and consumer power: price-level evidence from the OECD countries. Am J Polit Sci 46(3):526–539
Sachs J, Wartner A (2010) Trade openness indicators, 1950–1992. Harvard Dataverse. https://doi.org/10.7910/DVN/PIZQEZ
Sartori G (1968) Political development and political engineering. In: Montgomery J, Hirschman A (eds) Public policy. Cambridge University Press, Cambridge

Seddon J, Gaviria A, Panizza U, Stein E (2003) Political particularism around the world. World Bank Econ Rev 17(1):133–143

Shepsle KA, Weingast BR (1981) Political preferences for the pork barrel: a generalization. Am J Polit Sci 25(1):96–111

Shugart MS, Taagepera R (1989) Seats and votes. Yale University Press, New Haven

Stein E, Talvi E, Grisanti A (1999) Institutional arrangements and fiscal performance: the Latin American experience. In: Poterba J, von Hagen J (eds) Fiscal institutions and Fiscal performance. University of Chicago Press, Chicago, pp 103–133

Stratmann T, Baur M (2002) Plurality rule, proportional representation, and the German Bundestag: How incentives to pork-barrel differ across electoral systems. Am J Polit Sci 46(3):506–514

Treisman D (2000) The causes of corruption: a cross-national study. J Public Econ 76(3):399–457

Tullock G (1994) Thoughts about representative government. Eur J Polit Econ 10(1):27–39

Weingast BR (1979) A rational choice perspective on congressional norms. Am J Polit Sci 23(2):245–262

World Bank (1999) World development indicators. World Bank, Washington, DC

Chapter 7
A Congressional Theory of the Size of Government

Robi Ragan and Sachin Khurana

Abstract In this paper, we examine the implications of the party cartel model of congressional policy making on the level of redistributional social welfare spending in the United States. The party cartel model predicts an inverse relationship between the level of spending on social welfare programs and median family income of the district that the median member of the majority party represents. Specifically, the higher the median district income of the median member of the majority party, the smaller the amount of social welfare spending Congress will allocate. To test this hypothesis, we estimate a random coefficients model using time series cross sectional data on congressional Budget Authorization for redistributional social welfare spending. We find that for each $1000 increase in median district income for the median member of the majority party, each redistributional Budget Authority sub-function decreases by an average of $489 million (for a total decrease of $3.91 billion overall). Therefore, the party cartel model appears to be a significant predictor of the level of income redistribution in the U.S.

7.1 Introduction

For this project, we combine the party cartel theory of congressional policy making Cox and McCubbins (2005) with Meltzer and Richard's (1981) theory of income redistribution. We use a congressional district's median income as a proxy for a member of Congress' ideal point with respect to income redistribution, and we use redistributional categories of Federal Budget Authority as a measure of income redistribution. We find that for every $1000 increase in median district family income for the median member of the majority party, the level of income redistribution falls by $489 million.

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J. Hall, B. Khoo (eds.), *Essays on Government Growth*, Studies in Public Choice 40, https://doi.org/10.1007/978-3-030-55081-3_7

This is the first research to directly examine the effect of the institutional rules of Congress on income redistribution. The traditional Meltzer and Richard model assumes a direct democracy median voter model of policy making. In creating such a parsimonious model, Meltzer and Richard may be making two errors. The first error is in their assumption of direct democracy. Voters do not vote directly on policy in the U.S. Instead, they vote for a representative who then votes on policy. Even if it is assumed that the representative from each congressional district represents the median voter from that district, and the median member of the legislature sets policy, there is no reason to believe that the policy that would be chosen by the median voter in the population will correspond to the policy enacted by the median member of the legislature. It is not always the case that the median of the median will be the median. In a related work, one of us finds that the degree to which congressional districts are gerrymandered with respect to income can cause the policy preferred by the median voter and the policy preferred by the median member of Congress to diverge (Ragan 2013).

The second area of concern with the Meltzer and Richard model is that most modern models of the U.S. congressional system do not simply assume the median member of Congress sees their ideal point become policy. Once one takes into account the institutional structure of Congress, the level of redistribution can depend crucially on intra-chamber and intra-branch dynamics. In order to incorporate these institutional features, we extend the Meltzer and Richard approach to modeling the "size of government." In place of the direct democracy median voter as the policy maker, we substitute the party cartel model of congressional policy making.

The results may give us some insight into two puzzles in the political economy literature. The first is, "What accounts for the growth in the size of government in the United States?" Social welfare spending has risen from 4% of gross domestic product (GDP) in 1929 to 21% in 2002.[1] Researchers who have empirically tested Meltzer and Richard's model have found mixed results. In Meltzer and Richard's (1983) own test of their theory, they find that a 1% change in the ratio of mean to median income changes total redistribution by 1.5 billion dollars.[2] Gouveia and Masia (1998) tested an extended version of the Meltzer and Richard model using panel data from the 50 states, and they find that there is little evidence to support the predictions of the Meltzer and Richard model.[3] The second puzzle is,"Why do we see different patterns of redistribution in the United States versus other Western Democracies?" At a more practical level, this research may help us determine whether a common modeling simplification in political economy is really an oversimplification.

[1] "Social Security Bulletin, Annual Statistical Supplement" (Security Administration 1981, 2002) "Represents program and administrative expenditures from federal, state and local public revenues and trust funds under public law. Includes workers compensation and temporary disability insurance payments made through private carriers and self-insurers. Includes capital outlay and some expenditures abroad".

[2] Note that redistribution is Meltzer and Richard's measure of the size of government.

[3] See Benabou (1996) for a review of articles which test the Meltzer and Richard model.

7.2 Literature Review

We draw upon two distinct literatures for this paper. The first is the political economy literature dealing with the "size of government." The second is the congressional politics literature examining the influence of political parties on policy outcomes.

7.2.1 Rational Size of Government

The "size of government" literature is primarily concerned with explaining the growth in the size of federal spending. Researchers in this area typically investigate the growth of social welfare programs that redistribute income. These models contain a "Robin Hood" story of the poor using the ballot to take resources from the rich. The Meltzer and Richard (1981) "Rational Size" model uses a stylized model of policy formation in order to generate the level of redistribution in their theory. Their model uses a direct democracy framework in which voters express their preferences for redistribution directly by voting rather than through their vote for a representative. Voters' preferences for redistribution are determined by their location in the income distribution. Voters who find themselves below the mean income prefer higher taxes and transfers to their end of the distribution. Conversely, voters who are above the mean income prefer lower taxes and transfers from their end of the distribution.[4] Income distributions are skewed to the right, and accordingly the median voter's income is below the mean income. Meltzer and Richard use a straightforward application of Black's median voter theorem 1948 and claim that we should expect to see relatively high levels of redistribution. This incentive to "soak the rich" is only tempered by the realization of the median voter that upper distribution voters will work less if taxes become too high, thereby reducing transfers. The prediction of the Meltzer and Richard model is that *the greater the distance between the median and mean income, the greater the amount of redistribution.* Acemoglu and Robinson (2005) find that greater inequality will usually lead to higher tax revenues. Bartels (2018) similarly finds that greater economic inequality results in more redistribution.

Some researchers have questioned the connection between income redistribution and inequality altogether. Roemer (2009) questions the positive relationship between income distribution and the tax rate. He finds that an increasing median income can actually lead to a decrease in the tax rate as elites use their political power to lower their tax rates. Kelly and Enns (2010) find results consistent with Benabou (1996), concluding that income inequality increases are self-reinforcing

[4]Meltzer and Richard (1981, p. 915) assume that "Any voting rule that concentrates votes below the mean provides an incentive for redistribution of income financed by (net) taxes on incomes that are (relatively) high".

due to a conservative response from many voters resulting in less redistribution than would be expected in the Meltzer and Richard world. Pickering and Rockey (2011) find that Meltzer and Richard (1981, 1983) fail to account for the complexity of government. In a similar spirit to this chapter they modify the model to create a more institutionally informed model of public good preferences where it is the public's ideology that determines the size of government. Noting that Meltzer and Richard's (1981) model does not account for the large variance in redistribution across democratic governments, Iversen and Soskice (2006) transform redistributive policies into a multidimensional game that includes the electoral system. The electoral system in turn determines the number and strategies employed by political parties and governing coalitions. The resulting party structure is what directly affects the level of redistribution. McCarty et al. (2016) conclude that during the Great Recession in 2008–2009, the rise of income inequality in the U.S. did not increase the median income voter's preference for redistribution.

The Meltzer and Richard model is still used in many models of income redistribution. For a survey of more current work on redistribution that uses similar policy models, see Persson and Tabellini (2000, ch. 6). There is a missing piece in this "size of government" puzzle, and it is that the process by which the preferences of voters become law is subject to highly partisan influences. The recent $819 billion "American Recovery and Reinvestment Act of 2009" passed the House without a single Republican voting in favor. The appropriations and budgeting process has become increasingly partisan, with many bills passing on party line votes (Schick and LoStracco 2000). The "size of government" literature black boxes the political process; however, in this paper, we seek to substitute a model of congressional politics for this black box.

7.2.2 Congressional Models and Policy Outcomes

Most researchers examining the implications of congressional policy models are primarily interested in comparing the predictive power of the several competing models of congressional politics. Aldrich (1995), Aldrich and Rohde (1998), Krehbiel (1998), Groseclose et al. (1999), Binder (1999), Brady and Volden (2005) and Cox and McCubbins (2005) all use various tests of some of the more indirect implications of models of congressional politics. There are, as of yet, only two papers that directly test the implications of models of congressional politics on actual policy outcomes. Aldrich et al. (2005) examine the predicted effect of each of the major models of congressional policy making on the appropriations process. They find (using the conditional party government model of Aldrich and Rohde (2001)) that the location of the median member of the majority party has a substantial impact on federal appropriations and that party influence alone accounts for $1.3 trillion in federal appropriations from 1969 to 1994. Anderson (2008) examines the effect of congressional politics on federal budget categories. She finds that none of the models of congressional politics can empirically demonstrate a link between members' ideal points and policy outcomes.

7.3 Theory

In this paper, we replace the median voter of the population as the de facto policy setter in the Meltzer and Richard model with the median member of the majority party in Congress, based on the party cartel model of congressional policy making (Cox and McCubbins 1993, 2005). This theory includes the importance of agenda setting in congressional policy making. For a bill to reach the floor of the House, a majority of the majority party must allow it on the agenda. This means that the median member of the majority must consent, if a bill is to be considered by the entire House. The median member is able to exert "negative agenda control." That is, he or she blocks any legislation from consideration by the floor that would make the majority party worse off if passed.

The party cartel model is single dimensional, and assumes that each policy is considered one issue at a time (Cox and McCubbins 2005, p. 38). The theory assumes that all bills that the median member of the majority party allows to reach the floor of the House will be considered under an open rule.[5] As such, all bills that reach the floor are amended to the ideal point of the median member of the house (F) and subsequently pass. Given this, the majority party must decide whether they prefer the status quo or the ideal point of the median member (F). In the party cartel model, the preference of the majority party is represented by the location of the median member of the majority party (M). There is a region of the policy space called the "blockout zone." If the status quo policy for a particular issue falls within this region, then the majority party will block all legislation on that issue. The blockout zone consists of all alternatives falling between M and 2M-F.[6] The top portion (a) of Fig. 7.1 illustrates the blockout zone when M is to the right of F and the bottom portion (b) illustrates the blockout zone when M is to the left of F.

Cartel theory predicts that, (1) no issue on which the status quo is preferred to the floor median by the median of the majority party will be scheduled for

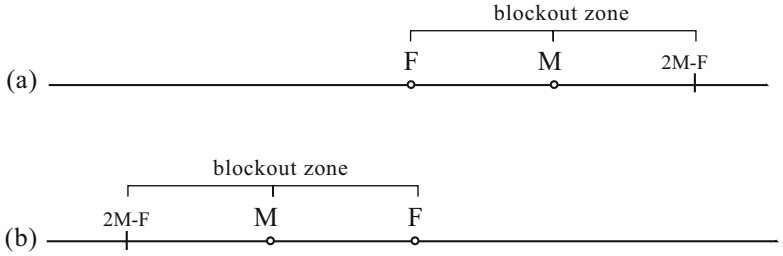

Fig. 7.1 Examples of party cartel blockout zones

[5] Under an open rule, the bill can be amended.

[6] The notation here follows Cox and McCubbins (2005). Since the extremes of the policy space are not defined, a more precise expression of the blockout zone would be $M \pm |M - F|$.

a vote, and (2) no bill opposed by a majority of the majority party's members ever passes. Hence, the median of the majority party must vote "yea" for a bill to pass.[7] Clearly, the location of the median member of the majority party (M) is an important determinant of policy outcomes. We will retain the assumption from Meltzer and Richard's (1981) model that individuals vote based on their position in the income distribution. Further, We will assume that members of Congress reflect the preferences of the median voter in their district. These two assumptions are not all that far fetched. As it turns out, the income of the median voter in a district is a strong predictor of how a member votes on roll call votes (McCarty et al. 2006).

Given these assumptions, what does the party cartel theory predict regarding income redistribution? Unfortunately, as of yet there is no reliable way to map status quos and legislator ideal points into the same policy space.[8] Given this limitation, the location of the median member of the majority party is used as a proxy for the location of policy outcomes (Aldrich et al. 2005; Anderson 2008). Given this proxy, we put forth the following hypothesis: *The higher the median district income of the median member of the majority party, the lower the level of income redistribution in the U.S.*

7.4 Empirical Tests

The data set consists of yearly data from 1953 to 1998 (t) for eight Budget Authority categories (i). Picking an empirical specification for this sort of time-series cross-sectional data requires careful consideration. With longitudinal data where i is much larger than t, researchers typically use one of several well understood estimators like fixed effects, random effects or Arellano-Bond 1991. All of these techniques get their asymptotic properties (consistency) from their large cross section. Here, however, the cross sections are short ($i = 8$) and the time series are longer but not very long ($t = 45$). The cross-sections are far too short for any probability limits to be met, so these estimators could produce inconsistent estimates for this data set. Traditionally, researchers using the feasible generalized least squares model known as the Swamy-Hsiao method (Swamy 1968; Hsiao 2003). (Beck and Katz 2011, 2007; Beck 2008) find that the Swamy-Hsiao method has poor small sample properties, and they recommend the use of a random coefficient model (RCM) (Western 1998; Pinheiro and Bates 2000; Hsiao 2003) for time-series-cross-sectional data where the time dimension (t) is significantly larger than the cross sectional dimension (i).

The random coefficient model works well for situations in which each category of the cross-section is not identical, yet is not entirely unique. Using an estimator like

[7] For proofs of these two predictions, see Cox and McCubbins (2005, p. 42).

[8] Peress (2013) includes a summary of why this problem is so technically difficult, as well as a proposed solution.

ordinary least squares (OLS) individually on each category would likely lead to a consistent but inefficient estimate. Conversely, a fully pooled ordinary least squares regression would not be consistent but would be efficient.[9] The random coefficient model blends these two estimators using a weighted average. The technique shrinks back the estimates that would be found in a category by category OLS estimation toward the estimates that would be found in a fully pooled OLS estimation. The degree of the shrinkage is based on the amount of uncertainty in the estimates the random coefficient model makes. The more uncertain the estimates are, the more the random coefficient model shrinks the category-by-category (consistent, but inefficient) estimates back to the pooled (inconsistent but more efficient) estimates. This shrinking allows the RCM to find the best linear unbiased predictor for the data. Thus, in the class of $E(\beta_i) = \beta$ predictors, it has the lowest error loss. If the partial effects of the variables are different for each category of budget authority but not completely unrelated, then RCM will be an improvement (it will have lower RMSE) over category-by-category estimation or fully pooled models (Beck and Katz 2007). RCM will not find unit heterogeneity across the Budget Authority categories if it does not exist, and there is no danger in accidentally using it if heterogeneity is not present. The random coefficient model allows the data to tell us how heterogeneous the budget authority categories are rather than assuming it ex-ante. This heterogeneity is estimated as Γ in Eq. (7.1) and is a variance-covariance matrix between the βs from a category-by-category OLS estimation. It is estimated from the set of all positive definite matrices. RCM can also be thought of as a linear model like OLS, but with a complicated error term (Beck and Katz 2007).

Using a time series (1953–1998) of several categories of redistributional Budget Authority data and median district income as a proxy for members' preference for redistribution, the following random coefficient model was estimated:

$$\begin{aligned}\text{Budget}_{i,t} &= \beta_{0,i} + \beta_{1,i}\text{MedianofMajority}_{i,t} + \beta_{2,i}\text{Population}_{i,t} + \beta_{3,i}\text{Poverty}_{i,t} \\ &\quad + \beta_{4,i}\text{Mandatory}_{i,t} + \beta_{5,i}\text{GDP}_{i,t} + \beta_{6,i}\text{Budget}_{i,t-1} + \epsilon_{i,t} \\ &\quad \text{Where : } \boldsymbol{\beta}_i \sim N(\boldsymbol{\beta}, \Gamma) \\ &\quad i = 1, \ldots, 8 \text{ and } t = 1, \ldots, 45 \end{aligned} \tag{7.1}$$

The dependent variable is the *level of income redistribution*. This is measured using federal Budget Authority data for eight Office of Budget and Management sub-functions. Budget Authority is the legal authority for Federal Agencies to make obligations that result in outlays. Three of the sub-functions—Unemployment

[9]The "fixed-effects" estimator is simply pooled ordinary least squares with a dummy variable for each cross-sectional category.

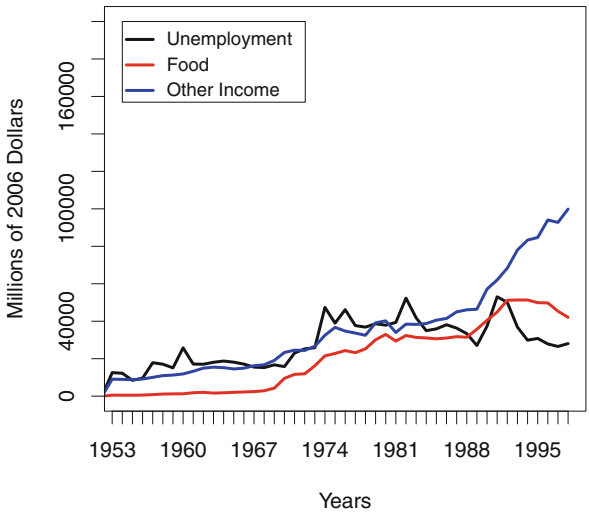

Fig. 7.2 Budget authority for mandatory income redistribution sub-functions

Compensation[10], Food and Nutrition Assistance[11], and Other Income Security[12]—are mandatory spending categories. The level of spending for these sub-functions is governed by program law rather than the annual appropriations process. Changes in these programs generally redirect the slope of the trajectory of spending. The remaining five categories—Community Development[13], Regional Development[14], Training and Employment[15], Social Services[16] and Housing Assistance[17]—are all discretionary sub-functions. The level of spending in these categories is governed by the annual congressional appropriations process. Spending across these eight categories in a given year serves as the cross-sectional dimension of observation.[18] Figures 7.2 and 7.3 display the levels of spending for each of the Budget Authority Categories.

The main independent variable is the *median district income of the median member of the majority party*. This variable for each member of Congress is

[10]Federal unemployment insurance.

[11]Food Stamps, WIC, and milk programs.

[12]Cash assistance, Social Security Insurance, Aid to Families with Dependent Children/Temporary Assistance to Needy Families and Earned Income Tax Credit.

[13]Housing and Urban Development, slum clearance, and urban redevelopment.

[14]Farmers Home Administration, Rural and depressed area development.

[15]Job training and employment and dislocated worker training grants.

[16]Block grants for social services and rehabilitation services.

[17]Subsidized housing, public housing and rental assistance.

[18]All Budget Authority Data compiled by True (2007) from Office of Budget and Management Data.

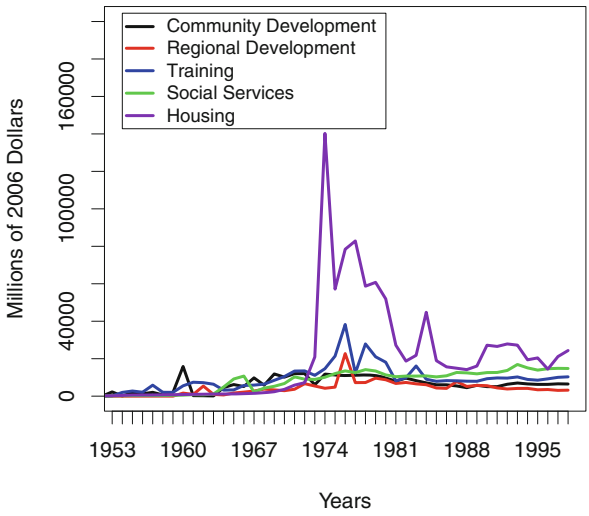

Fig. 7.3 Budget authority for discretionary income redistribution sub-functions

measured using the median family income of the member's Congressional district.[19] In the Meltzer and Richard framework, the poorer voters are, the more redistribution they want. Our proxy takes this assumption and adds that members of Congress vote on redistribution policy in line with their district's preference. McCarty et al. (2006) find that in terms of 1st dimension DW-NOMINATE scores,[20] "An increase in family income of two standard deviations is associated with a .225 shift to the right, larger than the shift associated with reducing the percentage of African Americans by the same two standard deviations." A district's median family income is strongly correlated with the way in which a member votes. It follows that members' votes for redistribution would likely be highly correlated with district median family income. For years in which the Democrats held a majority in Congress, the median member of the majority party is the median Democrat in the chamber, and vice versa for years in which the Republicans held a majority in the House. In Fig. 7.4, the median family income for the median republican district is plotted with a red dotted line, and the median democrat district family income is plotted with a blue line. The solid black line indicates the median family income of the median district of the majority party. For all years in the data set, the median Republican district is consistently richer than the median Democratic district. The average difference between the median of

[19]Income data comes from Census data compiled by Adler (2003), and directly from the Census Bureau.

[20]DW-NOMINATE is an ideal point estimation technique that assigns members of Congress a two-dimensional ideal point based on their voting record. The first dimension score ranges from -1 to $+1$ and is largely thought to represent liberal (-1) to conservative $(+1)$ preferences on economic matters (Poole and Rosenthal 1997). For more information on NOMINATE see www.voteview.com.

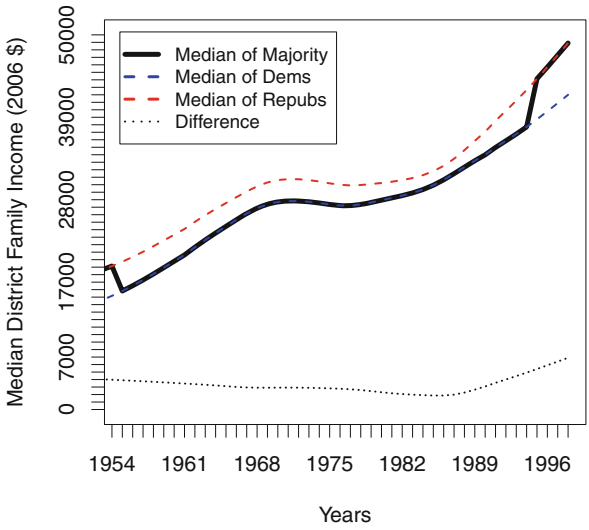

Fig. 7.4 Location of the median member of the majority party with respect to median district family income

the Republicans and the median of the Democrats ranges from $1157 to $3601, and the mean is $2198.

The first control variable is the *population of the United States.* As the population grows, the number of dollars allocated to income redistribution will rise. Second, the *poverty rate of the United States* is included.[21] As the poverty rate rises, the amount of income redistribution in mandatory redistribution will rise.[22] There may also be heightened pressure to increase Budget Authority for discretionary redistribution. A dummy variable is included for the *mandatory Budget Authority* categories. As mentioned before, the levels of Budget Authority in these categories are not directly set; rather, Congress sets the formula to determine who is eligible for the program. The *Gross Domestic Product* of the U.S. is included to control for the overall size of the economy. Finally, a lag of the dependent variable is included to control for serial correlation in Budget Authority across years.

7.4.1 Results

Recall that our main hypothesis is: *The higher the median district income of the median member of the majority party, the lower the level of income redistribution in the U.S.* This hypothesis was tested using the random coefficient model estimation

[21] The poverty rate comes from the Census Bureau.

[22] Results using the unemployment rate rather than the poverty rate are similar but smaller in magnitude. These results are available upon request.

Table 7.1 Random coefficient model estimation of the effect of the location of the median member of the majority party on the level of redistributional budget authority

	Coefficent	Standard error	p-value
(Intercept)	−14, 716.896	18, 342.396	0.422
Median of majority	−0.489	0.240	0.042
Lag DV	0.725	0.037	0.000
Population	0.000	0.000	0.514
Poverty	537.829	546.451	0.325
Mandatory	1986.830	1530.099	0.241
GDP	1.371	1.761	0.436

$\sigma_{\beta 1} = 0.1946107$, $\sigma_{intercept} = 3738.878$, $\sigma_{\epsilon} = 8997.538$

from Eq. (7.1), and results are presented in Table 7.1.[23] We find that for each $1000 increase in the median district income of the median member of the majority party, the level of income redistribution falls by an average of $489 million for each Budget Authority category. This translates into a $3.91 billion overall decrease in total redistributional Budget Authority. A hypothetical switch in party control from the Republicans to the Democrats would result in a $1.07 billion decrease, on average, for each redistributional Budget Authority sub-function. The switch from the Democrats to the Republicans as the majority party in the House in 1994 resulted in a $4047.47 increase in the median district income of the median member of the majority party. The results here would predict a $1.95 billion decrease for each category, ceteris paribus.

7.4.2 Testing Meltzer and Richard

In order to examine the predictive power of the party cartel model with the traditional Meltzer and Richard theory, we estimate the same random coefficient model seen in Eq. (7.1), but replace the median family income of the median member of the majority party's district with the distance between mean and median family income of the entire nation. Recall that Meltzer and Richard (1981) use Black's (1948) median voter theorem as their policy making apparatus. Their prediction is: *the greater the distance between the median and mean income, the greater the amount of redistribution.* Figure 7.5 displays the difference between mean and median income for the years in the data set.

To test Meltzer and Richard's (1981) prediction, we estimate the following random coefficient model (Eq. (7.2)), with the:

$$\begin{aligned}\text{Budget}_{i,t} = {} & \beta_0 + \beta_1 \text{DifferenceMeanandMedian}_{i,t} + \beta_2 \text{Population}_{i,t} + \beta_3 \text{Poverty}_{i,t} \\ & + \beta_4 \text{Mandatory}_{i,t} + \beta_5 \text{GDP}_{i,t} + \beta_6 \text{Budget}_{i,t-1} + \epsilon_{i,t} \\ & \text{Where} : \boldsymbol{\beta}_i \sim N(\boldsymbol{\beta}, \Gamma) \\ & i = 1, \ldots, 8 \text{ and } t = 1, \ldots, 45 \end{aligned} \tag{7.2}$$

[23] The Appendix has OLS results sub-function by sub-function.

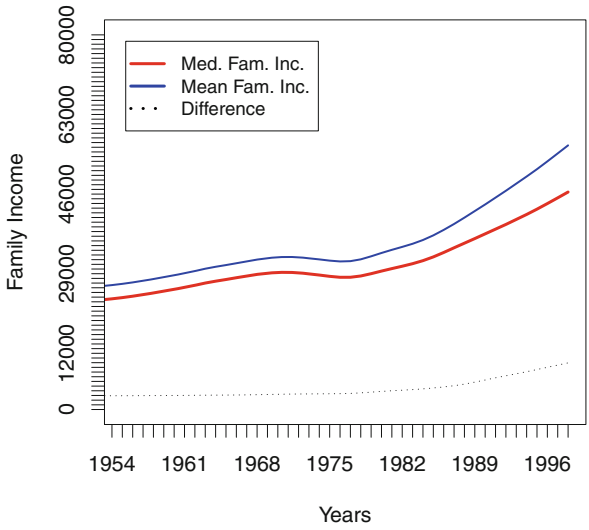

Fig. 7.5 Difference between mean family income and median family income

Table 7.2 RCM with difference between mean family income and median family income on redistributional sub-functions

	Coefficent	Standard error	*p*-value
(Intercept)	20, 123.660	20, 130.842	0.318
Mean income − median income	−2.740	0.699	0.001
Lag DV	0.711	0.037	0.000
Population	0.000	0.000	0.152
Poverty	311.292	540.608	0.565
Mandatory	1789.265	1521.991	0.284
GDP	.982	2.503	0.001

The results are presented In Table 7.2, and we find that the difference between mean and median income is statistically significant, but the partial effect is the opposite of that predicted by Meltzer and Richard. For every $1000 that median and mean family income deviate, the level of redistribution falls by an average of −2.74 billion dollars. This comports with the findings of Gouveia and Masia (1998), who find no evidence for the deviation of mean and median income affecting income redistribution at the state level.

7.5 Implications

In light of the failure of the traditional Meltzer and Richard (1981) model of income redistribution to stand up to empirical tests (Benabou 1996), we use this paper to explore the effects of Congressional politics on income redistribution. This is done by combining the party cartel theory of congressional policy making (Cox and McCubbins 2005) with the spirit of Meltzer and Richard's model. Where

Meltzer and Richard assume a direct democracy median voter model of policy making, we substitute the median member of the majority party in the U.S. House of Representatives. The location of the median member of the majority party appears to be more effective at accounting for the growth in the size of government in the United States than does the location of the median member of the population. Without a comparative data set, it would be premature to address the different patterns of redistribution seen in the U.S. versus other western democracies. The results do suggest, however, that the intricacies of a legislative system can have a real impact on policies such as income redistribution. The inclusion of Congress as the policy making procedure adds an important piece of the puzzle to the "size of government" literature. Researchers in political economy should strongly consider including such institutional details in their models and empirical tests.

Acknowledgments We would like to thank Robert Grafstein, David B. Mustard, Keith Dougherty, and Jamie Carson for their many comments and insights. Greg Robinson's thoughts were especially helpful early in the project. Thanks to seminar participants at EITM V: Ann Arbor, Binghamton University, and Stony Brook University.

Appendix

A sub-function by sub-function OLS was estimated for the same data as the RCM in the body of the paper. The results are displayed in Table 7.3. The standard errors are wrong because they are not taking advantage of the full structure of the data as in the case of the RCM.

Table 7.3 Equation by equation results for main specification

Coefficient (p-value)	Intercept	Median of majority	Lag DV	Pop.	Pov.	GDP
Unemployment	−130,300	−1.517	0.2731	0.0010	1181	−6.302
	(0.003)	(0.008)	(0.095)	(0.004)	(0.233)	(0.072)
Food	−22,350	−0.422	0.844	0.001	−165.3	−0.063
	(0.101)	(0.021)	(0.000)	(0.067)	(0.688)	(0.966)
Other income	−0.001	−0.694	0.763	0.001	−600.2	0.002
support	(0.034)	(0.003)	(0.000)	(0.016)	(0.245)	(0.999)
Com. dev.	−5015	0.158	0.203	0.001	208.7	−4.486
	(0.047)	(0.565)	(0.228)	(0.054)	(0.765)	(0.058)
Reg. dev.	−42,930	−0.470	0.1405	0.001	218.9 3	−2.275
	(0.014)	(0.023)	(0.404)	(0.011)	(0.624)	(0.129)
Job training	−42,090	−0.498	0.189	0.001	102.7	−2.234
	(0.0182)	(0.0190)	(0.259)	(0.012)	(0.820)	(0.141)
Soc. serv.	−2547	−2.080	0.5447	0.0000	1965	9.065
	(0.980)	(0.140)	(0.001)	(0.998)	(0.523)	(0.360)
Housing	−36,260	−1.464	0.531	0.0000	3666	5.846
	(0.701)	(0.242)	(0.001)	(0.911)	(0.188)	(0.503)

Looking across the sub-function categories, the estimated partial effect of the location of the median member of the majority party has a similar magnitude and sign as the effect found in the random coefficient model for the sub-functions relating to food, income support, regional development, and job training.

For unemployment, social services, and housing, the effect is of the same sign (negative), but the effect is much larger than the estimate from the random coefficient model. The effect on community development is actually of the opposite sign than the random coefficient model estimate. However, the result is not remotely statistically significant.

References

Acemoglu D, Robinson J (2005) Economic origins of dictatorship and democracy. Cambridge University Press, Cambridge

Adler S (2003) Congressional district data file [83rd to 105th Congress]. University of Colorado at Boulder

Aldrich J (1995) Why parties? University of Chicago Press, Chicago

Aldrich J, Rohde D (1998) Measuring conditional party government. Mimeo, New York

Aldrich J, Rohde D (2001) The logic of conditional party government: revisiting the electoral connection. In Dodd L, Oppenheimer B (eds) Congress reconsidered. CQ Press, Washington

Aldrich J, Gomez B, Merolla J (2005) Follow the money: models of Congressional governance and the appropriations process. Mimeo, New York

Anderson S (2008) Pivots and bills: testing models of appropriations. Mimeo, New York

Arellano M, Bond S (1991) Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Rev Econ Stud 58(2):277–297

Bartels LM (2018) Unequal democracy: the political economy of the new gilded age. Princeton University Press, Princeton

Beck N (2008) Time-series cross-section methods. In: Box-Steffensmeir J, et al (eds) The Oxford handbook of political methodology. Oxford University Press, Oxford, pp 475–493

Beck N, Katz J (2007) Random coefficient models for time-series-cross-section data: Monte Carlo experiments. Polit Anal 15(2):182

Beck N, Katz J (2011) Modeling dynamics in time-series cross-section political economy data. Ann Rev Polit Sci 14(1):331–352

Benabou R (1996) Inequality and growth. NBER Macroecon Ann 11(1):11–74

Binder SA (1999) The dynamics of legislative gridlock, 1947–1996. Am Polit Sci Rev 93(3):519–533

Black D (1948) On the rationale of group decision-making. J Polit Econ 56(1):23–34

Brady D, Volden C (2005) Revolving gridlock: politics and policy from Jimmy Carter to George W. Bush. Westview Press, Boulder

Cox G, McCubbins M (1993) Legislative leviathan: party government in the house. University of California Press, Berkeley

Cox G, McCubbins M (2005) Setting the agenda: responsible party government in the U.S. House of Representatives. Cambridge University Press, Cambridge

Gouveia M, Masia N (1998) Does the median voter model explain the size of government? Evidence from the states. Public Choice 97(1–2):159–177

Groseclose T, Levitt S, Snyder J Jr (1999) Comparing interest group scores across time and chambers: Adjusted ADA scores for the US Congress. Am Polit Sci Rev 93(1): 33–50

Hsiao C (2003) Analysis of panel data. Cambridge University Press, Cambridge

Iversen T, Soskice D (2006) Electoral institutions and the politics of coalitions: Why some democracies redistribute more than others. Am Polit Sci Rev 100(2):165–181
Kelly N, Enns P (2010) Inequality and the dynamics of public opinion: the self-reinforcing link between economic inequality and mass preferences. Am J Polit Sci 54(4):855–870
Krehbiel K (1998) Pivotal politics. University of Chicago Press, Chicago
McCarty N, Poole K, Rosenthal H (2006) Polarized America: the dance of ideology and unequal riches. Cambridge University Press, Cambridge
McCarty N, Poole K, Rosenthal H (2016) Polarized America: The dance of ideology and unequal riches, 2nd edn. MIT Press, Cambridge
Meltzer AH, Richard SF (1981) A rational theory of the size of government. J Polit Econ 89(5):914–927
Meltzer AH, Richard SF (1983) Tests of a rational theory of the size of government. Public Choice 41(3):403–418
Peress M (2013) Estimating proposal and status quo locations using voting and cosponsorship data. J Polit 75(3):613–6311
Persson T, Tabellini G (2000) Political economics. MIT Press, Cambridge
Pickering A, Rockey J (2011) Ideology and the growth of government. Rev Econ Stat 93(3):907–919
Pinheiro J, Bates D (2000) Mixed-effects models in S and S-PLUS. Springer, New York
Poole KT, Rosenthal H (1997) Congress: a political-economic history of roll call voting. Oxford University Press, Oxford
Ragan R (2013) Institutional sources of policy bias: a computational investigation. J Theor Polit 25(4):467–491
Roemer JE (2009) Political competition: theory and applications. Harvard University Press, Cambridge
Schick A, LoStracco F (2000) The federal budget: politics, policy, process. Brookings Institution Press, Washington
Security Administration U (1981) Social security bulletin. Annual statistical supplement. Social Security Administration, Washington
Security Administration U (2002) Social security bulletin. Annual statistical supplement. Social Security Administration, Washington
Swamy P (1968) Statistical inference in random coefficient regression models. University of Wisconsin, Madison
True JL (2007) Historical budget records converted to the present functional categorization with actual results for fy 1947–2006. Lamar University and The Policy Agenda's Project
Western B (1998) Causal heterogeneity in comparative research: a Bayesian hierarchical modelling approach. Am J Polit Sci 42:1233–1259

Chapter 8
Trade and the Size of Government Revisited

Olga Haislip

Abstract I revisit the relationship between trade and government expenditures in an attempt to extend the work of Rodrik (J Polit Econ 106(5):997–1032, 1998). Several different tests are conducted. The first is a simple replication of Rodrik's benchmark model on an extended dataset. The results here are not conclusive but suggest that the causation may run from government spending to trade. I then use bilateral trade in observations and the augmented form of the classic gravity equation used by trade economists. This analysis uses time series changes in government spending and trade. Test for Granger style causality are performed. Again little evidence is found for Rodrik's hypothesis that trade causes government spending. And some weak evidence exists for the alternative hypothesis. I then extend the analysis to trade tax revenues and I find little evidence over short run periods but over the long run there does seem to be an association between high trade tax revenues in one period and high government expenditures in the next period. Finally I look at a direct test of Rodrik's hypothesis that trade creates volatility in income which then induces government to provide social insurance. I calculate a measure of trade volatility by looking at bilateral trading partners and find that trade volatility is associated with income volatility. The results of this test are ambiguous because changes in government expenditures are negative related to income volatility but at the same time positively related to trade volatility.

8.1 Introduction

There is evidence of the relationship between the size of government and the size of international trade the cause of which may be of particular interest to both policy makers and trade experts. Prior work by Rodrik (1998) argues that expansion of

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J. Hall, B. Khoo (eds.), *Essays on Government Growth*, Studies in Public Choice 40, https://doi.org/10.1007/978-3-030-55081-3_8

trade causes government to grow in order to provide social insurance against the external economic fluctuation.

However, as even Rodrik points out, the causality could go the other way. For many reasons the size of government and the size of trade in an economy could be positively related and, indeed, growth in the size of government could precede expansion of trade.

I examine the causal relation between trade and government size in several ways. First, I replicate Rodrik's analysis using an extended data set. I also collect data on tariff rates and on trade tax revenues and explore the time series patterns in these. In addition, I use disaggregated data on trade by examining bilateral trading patterns across country pairs. These disaggregated data are exploited in two ways. One uses an augmented form of the classic gravity equation by including government spending as a gravity factor like income. The other uses bilateral trading patterns to define trade volatility as an attempt at a direct test of Rodrik's social insurance hypothesis, that is, does trade volatility create income volatility, and does government then step in.

8.2 Literature Review

A large body of economic literature concerns the economic determinants of government size, the determinants of international trade and the relationship linking these two variables.

One of the most influential papers in the theory of government and trade is famous paper by Rodrik (1998). He explores the relationship between increase in government and increase in trade. He finds a positive correlation between economy's exposure to foreign trade and size of its government. Rodrik believes that the explanation for this relationship is that government expenditures are used to provide social insurance against external risk. He also finds the share of trade in GDP in early 1960s is a statistically significant predictor of the expansion of the government consumption over the subsequent three decades. The author assumes that the causality should run from exposure to external risk to government spending.

Recent studies of the economics of government and trade, by Adsera and Boix (2002), Alesina and Wacziarg (1998) and Alesina et al. (2005) offer different hypothesis to explain the link between government size and trade openness.

Adsera and Boix (2002) perform the study of the correlation between country's openness to trade and size of government. They attempt to include politics as a possible explanation for this relationship. Alesina et al. (2005) explore another aspect of the development in international trade. They claim size of countries is crucial for understanding of increase in international trade. They review the impact of market size on growth and endogenous determinant of country size. They show that size of countries influence country's preferences for international trade.

Alesina and Wacziarg (1998) argue that the size of government correlates negatively with country size and positively with trade openness. They show that smaller

countries have a larger share of public consumption in GDP, and are also more open to trade. They claim that these empirical observations may account for the observed positive empirical relationship between trade openness and government size. Their research is done in two steps. The authors first show that government consumption, as a share of GDP, is smaller in larger countries. In the next step they confirm the observation that small countries tend to be more open to international trade. They claim that these two facts, taken together, may account for the observation that open countries have larger governments. They suggest a different link between trade openness and government size than suggested by Rodrik (1998). Their research implies a different but not mutually exclusive explanation for the positive empirical relationship between openness and government size. Specifically, they argue that positive link between the two is mediated by country size. In this way they put some doubts on the direct link between openness and the share of government consumption. At the same time they find evidence of a direct relationship between openness to trade and the size of government transfers, which is in the spirit of Rodrik (1998).

My research is also aimed to explore the link between size of government and international trade. My research investigates the issue of reverse causality which concerned Rodrik (1998) as well. I consider the body of literature which points toward a negative relationship between international trade and taxes.

Kenny and Winer (2006) perform a study on the structure of taxation. They suggest that no government would choose a point on the backward bending part of any rate-revenue Laffer curve, since it would lead to a marginal cost that is higher than those implied by the lower tax rate that raises the same revenue. They also claim that since the total marginal costs associated with any level of total revenue decline as tax base expands, the equilibrium size of government increases. They show an importance of trade as a tax base and find that countries with large international trade sector rely more on taxes on exports and imports. The claim is that share of trade to GDP has a highly significant positive impact on the share of revenue that comes from trade taxes. Although they say that the effect of the expansion of trade on the trade tax is not straightforward. They believe that with the large potential trade tax base, the same trade revenue can be raised with a lower tax rate or with more extensive loopholes. But the larger tax base makes trade taxation more attractive. Despite the theoretical uncertainty on the direction of the two effects their empirical findings suggest that the trade base has a negative but insignificant effect on the trade tax rate. They also find that countries in which international trade is important rely more on trade taxes.

Fisher (2006) raises the question about anxiety of developing countries that lowering trade tariffs will reduce government revenues. He demonstrates that dependence on tariff revenue is diminishing and trade liberalization need not result in lower total tax revenues or even lower customs revenues. Moreover he claims that much depends on a country's current tariff and trade regime, its tax structure and that at some point, a country needs to broaden its tax base.

A Fiscal Affairs Department, International Monetary Fund (2005, pp. 7–8) report on links between trade liberalization and tax revenue states that:

> As is now widely recognized, trade liberalization does not necessarily reduce revenue from trade taxes. This is most likely to be the case when liberalization involves. . . cutting tariffs that are initially set, for protective reasons, at such high levels that a reduction will cause trade volumes to increase by more than enough to offset the direct revenue loss from lower rates. . . . (Lower tax rate) leads to an expansion of trade and trade tax revenue will increase.

This research is based on the hypothesis that points toward a relationship between size of government and the degree of international trade. My research takes as a starting point a paper by Rodrik (1998) who argues that open countries are more subject to external shocks, and therefore need a larger public sector to provide a stabilizing role. However, I consider reverse causality, i.e. that it is increases in government that leads to the increase in trade. My reasoning is based on Kenny and Winer (2006). I claim that government needs additional recourse as it grows and in order to provide that recourse it lowers the taxes on international trade. The later pulls the trigger and leads to an increase in international trade.

8.3 Theoretical Model

As noted in the introduction, I will test the Rodrik hypothesis several different ways. The main idea is to examine the causal relation between trade and government size in a time series context. Does the growth of government follow or precede the expansion of trade?

The conventional approach is to explore the relationship between the share of government expenditures in GDP to "openness," or the share of trade (measured as exports plus imports) in GDP. I undertake this analysis as well using an expanded dataset of international trade.

In addition, I apply the classic trade theory gravity equation augmented in a way to further investigation of this relationship. In the past, the gravity equation has been used to make conclusions about trade between countries by looking at their relative distances and GDPs. I add government expenditures of trading pairs to the classic model. Just as the size of an economy acts as a force on trade, I postulate that government expenditure exerts a similar force. Tweaking the classic gravity equation in this way allows us to evaluate the empirical robustness of the theory employed by Rodrik.

The classic gravity equation is a cross-sectional specification relating the nominal bilateral trade flow from exporter i to importer j in any year (X_{ij}) to the exporting and importing countries' nominal gross domestic products (Y_i and Y_j, respectively).

$$X_{ij} = Y_i^{\alpha} Y_j^{\beta} Z_{ij} \tag{8.1}$$

where Z_{ij} stands for all of the additional elements usually included in the gravity model, such as, distance, adjacency, language, and colonial effects.

In this paper, I augment the gravity equation by including the size of government expenditures in the model. I use a standard structure of gravity equation and add

government size (as measured by government expenditures) as a component to the equation in the same way other researches have included adjacency, language and colonialism to the gravity equation. The basic idea of the gravity model is that trade between two countries responds to the weight of their combined incomes. We postulate a similar force will exist in response to the weight of their government sizes.

Inclusion of government expenditures is not substantively different than inclusion of colony, language, adjacency or other variables. I include total government expenditures, not the shares of expenditures to GDP in keeping with the classic formulation of the gravity equation, which uses absolute GDP rather than a normalized variable. Including total government expenditures of both exporter and importer is baked into my assumption that it is the combined size of expenditures that drives the trade effect.

I also employ disaggregated data on trade by using observations on pairs of countries. This comes from the simple gravity equation trade model. Trade between a pair of countries is driven by many factors. By combining and using the data in this way follows the gravity equation methodology—a methodology which has proven its usefulness for empirically evaluating other aspects of trade.[1] So my new gravity model can be written as:

$$X_{ij} = Y_i^{\alpha} Y_j^{\beta} Z_{ij} G_i^{\lambda} G_j^{\mu} \tag{8.2}$$

My interest is in exploring the causal relation between trade and government spending. I do this using a Granger-style time series analysis in which we look at the first difference of the logs, and time shifts of these variables going in both directions. my motivation is to see how changes in government spending are correlated to changes in trade.

My study is concerned with the presence of causality between government size and the size of international trade and we define two models to estimate this causation. The first model deals with the possibility that government expands first, and that this is followed by the expansion of trade. If so, there should be a time lag between the increase in government and increase in trade.

To simplify the notation, I express the difference in the logs of trade through time as:

$$\dot{X}_{ijt} = \ln X_{ijt} - \ln X_{ijt-1} \tag{8.3}$$

and use similar notation for the other variables. My gravity equation now becomes:

[1]The possible counter-argument against using the trade observations on the pairs of countries may be that since government size is the same for the same country's trade observations it may deflate the standard errors. While this may be true, it is essentially the same as including other dummies in the model, and the literature has not raised/addressed that question.

$$\dot{X}_{ijt} = A + \alpha \dot{Y}_{it} + \beta \dot{Y}_{jt} + \lambda \dot{G}_{it} + \mu \dot{G}_{jt} \tag{8.4}$$

First differencing the log form of the gravity model eliminates all the variables included in Z_{ij}, i.e., distance, adjacency, language and colony, since those variables do not vary with time.

The Granger causality approach includes leads and lags of the right-hand side variable on the hypothesis that if government is causing trade but not the reverse, future values of the change government spending should be correlated with current values of trade. If the increase in government size causes increase in trade, I will have positive coefficients on the lagged values of government spending. If the opposite holds true, the coefficients will be negative.

I flip Eq. (8.4) to look for causation going in the other direction and to test the idea that increases in trade lead to expansion in the size of a country's government: Rodrik's theory. In this flip test I must make an assumption about the values of λ and μ. For simplicity, I assume that they are both the same. Thus, I have

$$G_i G_j = \left(X_{ij} Y_i^{-\alpha} Y_j^{-\beta} Z_{ij}^{-1} \right)^{\Gamma} \tag{8.5}$$

Then let:

$$\dot{g}_{ijt} = \ln \left(G_{it} G_{jt} \right) - \ln \left(G_{it-1} G_{jt-1} \right) \tag{8.6}$$

so that I capture this inverse gravity effect in terms of percentage changes. Again I include leads and lags of the right-hand side variables. If an increase in trade causes an increase in government, I will have positive coefficients on the lagged RHS values of trade.

In the event that I find that the causality runs opposite to the way that Rodrik asserts, it is interesting to consider what might be going on. It might be possible that government is financing increased government spending by increased trade tax revenues. So I collect data on these and examine the time series patterns with government spending. Also, I collect data on tariff rates and rank countries as high, middle, and low. I then examine the sensitivity of the relations between trade and government size for these groups.

There are some factors not accounted for in this empirical analysis. Tariffs and non-tariff barriers reduce trade. Because of this, trade volume may be a measure of how "open" a country is, regardless of country's specific tariff rates. An alternative way of investigating a country's "openness" to trade is to observe country's level of trade in the years after a country joins the GATT or other tariff and non-tariff barrier reducing body.[2]

[2]The reason why chose the GATT is that until 1995 (the year when WTO was created) it was the world's major agreement on reduced tariff barriers. I consider GATT and not WTO because my data set is covering the years 1962–2000, and the GATT was signed in 1948 and continued until

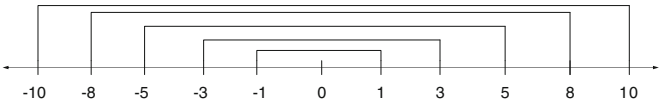

Fig. 8.1 The GATT entrance time span. Note: The 0 in the center of the scale represents the year a country enters the GATT

I look at the entry to the GATT as a point of reference of countries willingness to accept trade. I explore the growth rate of a country's trade and government expenditures before and after the country joins the GATT. I consider the simplest possible specification and regress the average yearly growth of country's trade N years after entering the GATT on the average yearly growth of this country N years before entering the GATT. Figure 8.1 shows graphically the intervals of time that I choose for the analysis, with $N = 1, 3, 5, 8$ and 10 years before and after entering the GATT.

8.4 Data Description

The trade data for this project come from four sources: National Bureau of Economic Research (NBER), Center for International Comparisons at the University of Pennsylvania, UNCTAD—TRAINS (Trade Analysis and Information System) and WTO4. Feenstra et al. (2005) constructed this unique data set from United Nations under a grant from the National Science Foundation to the NBER. Feenstra et al. (2005) revised some of the UN country codes to aggregate small countries and adjust for countries that no longer exist. The researchers combined Belgium and Luxemburg into a single coded-entity for example. They also recoded some countries that were former Soviet Republics but no longer exist.

Both importers and exporters report the data. Importers report CIF (cost, insurance, freight) and exporters report FOB (free on board). Import data are usually more reliable than export data since they constitute a tax base, as pointed by Felbermayr and Kohler (2006). Constructing data from importers alone gives more accurate reporting and reflects a larger number of country pairs with positive trade. Feenstra et al. (2005) also give primacy to the importers' reports whenever they are available, but use exporter data when they are not available.

The number of trade observations changes in the middle of the dataset as UN changed the way that data were collected. Before 1984, it included all the trade data, no matter how small. But starting in 1984, the UN only recorded data that exceeded USD$100,000 for each bilateral flow. Feenstra et al. (2005) revised the data by adding smaller-valued trade to the UN dataset, but only for certain countries.

the end of 1994. WTO was signed in 1995 and continues until today. So I chose GATT because it covers more of the period of time that I have the data available for.

There are 203 countries and or territories listed in the dataset for the period 1962–1983 but there are only 72 countries listed during 1984–2000. Those 72 countries accounted for 98% of the world's exports in the last five years. I confine my analysis largely to the period 1984–2000 because of the issues of the dataset composition over the entire period.

The World Trade Flows dataset includes data on country $i's$ imports from country j, X_{ijt}, where t stands for the year. The data are reported in nominal thousands of US dollars and each observation is unique, reported only once in the database. I transform the trade data into real terms with the base year equaling 2000.

GDP and Government expenditures data come from the Center for International Comparisons at the University of Pennsylvania and are called the "Penn World Tables." They provide data on GDP per capita and population for 188 countries for some, or all, of the years 1950–2004. I use the real GDP per capita in constant prices (Chain) with the base year = 2000 and multiply that by population to receive the country i GDP in millions of US dollars. Penn World Tables offer data on Government Share of GDP. In order to generate Government expenditures I multiply the Government Share on GDP. Government expenditures are in constant prices in millions of US dollars.

The data on tariffs come from the UNCTAD—TRAINS database which ranges from 1988–2000. The dataset includes most favored nation rates and effectively applied rates for 120 countries. For earlier years 1988–1992 the data are available for very few countries. More data are available in the later years. For my research I use the most favored nation rates. The mean tariff rate is 14% with the standard deviation equal to 10%. I calculate the average of the tariff rates over the period 1993–2000 and divide the sample into high, low and medium tariff rates countries. I use half a standard deviation from the mean as the rule to divide the countries into different groups. Thus the low tariff group consists of 46 countries that have tariffs less than 9%. The high tariff rates group has 26 countries with the tariffs higher than 19%. And the rest of the 48 countries fall into medium tariff rate group with the tariff rates ranging between 9 and 19%.

The summary statistics for all of the variables described above are represented in Table 8.1.

There are high standard deviations in trade, both in the bilateral trade dataset and the aggregate trade dataset. There is a high variation from the mean of trade from countries which I observe in both datasets. On average, country urbanization rate is equal to 53% and ranges from 5% to 100%. The mean of the dependency ratio is 41% but it ranges from 10 to 55, which means that 55% of the population is not of working age. I also see that approximately 21% of the countries have high tariff rates and 38% of the countries in my sample have low tariff rates. OECD countries constitute 19% of the sample and only 5% of the countries are former Soviet. Sub-Saharan and East Asian countries account for almost 40% of the sample.

Table 8.1 Summary statistics

Variable	Mean	Std. dev.	Min	Max
Bilateral trade variables				
Year	1992	3	1988	1996
Volume of trade	5248	33,477	0	160,000
GDP exporter	541	1160	0	8260
GDP importer	489	1160	0	8260
Gov. expenditures exporter	9.77	188	0	98,000
Gov. expenditures importer	8.51	177	0	98,000
Aggregate trade variables				
Year	1992	5	1984	2000
Trade	7420	25,400	0	425,000
Government	422	126	0	151,000
GDP	225	751	0	9850
Dependency	41	7	10	55
Urbanization	53	24	5	100
Dummy variables				
High tariff	0.21			
Low tariff	0.38			
Soviet	0.05			
Sub-Saharan Africa	0.26			
East Asia	0.14			
Latin America	0.18			
OECD	0.19			

Notes: Number of bilateral observations = 53,502 and number of aggregate observations = 2419. Data on tariffs have 1791 observations. Trade is in millions of US dollars, GDP is in billions of US dollars, Government expenditures is in millions of US dollars. Dependency and Urbanization are measured as a ratio of total population

8.5 Analysis

My first effort is to examine the general trends in the level of government and the level of trade relative to GDP across time for the countries in my sample. The average over countries is shown in Fig. 8.2 over the period 1962–2000.

Table 8.2 shows the average of the trade and government as share of GDP over time and countries. The average for Government share is 21% with the standard deviation of 0.02 and minimum and maximum 18% to 23%, so that Government share is fairly tightly bound. On the other hand trade varies rather markedly with the mean of 30% and varies between 6% and 58. I can also see from the graph that trade in my data has been growing substantively.

From the graph it is hard to see the relationship between the two variables. However it does not seem that the trends in growth of government and growth of trade coincide for the same period of time.

Fig. 8.2 Yearly averages of trade share and government share during 1962–2000

Table 8.2 Averages of trade share and government share over 1962–2000

Variable	Mean	Std. dev.	Min	Max
Trade	0.30	0.16	0.06	0.58
Government	0.21	0.02	0.18	0.23

Notes: Number of observations = 6516. Trade is measured as share of GDP and Government is government expenditures as a share of GDP

8.6 Rodrik Replication

My first step is to replicate Rodrik's specification as closely as possible with the dataset that I have at my disposal. Rodrik's benchmark regression includes as dependent variable the log of the share of government expenditures in GDP average for years 1990–1992. His independent variables include: log of per capita GDP, log of urbanization in year 1990, log of dependency ratio 8 in year 1990, log of openness (calculated as exports plus imports divided by GDP, also called as a trade share) averaged over years 1980–1989, and a set of dummy variables, such as socialist countries, OECD, Latin America, East Asia and Sub-Saharan Africa.[3]

Table 8.3 presents results of Rodrik's specification of the model for the relationship between trade and government with some small modifications. I use the data for years 1984–2000 which extends the period of observation beyond that examined by Rodrik.

[3]It is not clear which year if log of GDP Rodrik uses in his benchmark regression. I assume it is 1990, the same year that he uses for dependency and urbanization. Rodrik is also not clear in his definition of the dependency ratio in population. I calculate the dependency ratio as the ratio of population which is aged <15 and over 64 divided by total population.

Table 8.3 Rodrik's specification versus alternative

	Rodrick			Alternative		
Model	(1)	(2)	(3)	(1)	(2)	(3)
Log of GDP per capita		−0.19	−0.16		0.30	0.46
		(−3.15)	(−1.65)		(1.60)	(3.66)
Log of GDP per capita, 1993	−0.18			0.26*		
	(−3.25)			(1.35)		
Log dependency		−0.10*	−0.04*		−0.05*	0.23*
		(−0.31)	(−0.08)		(−0.08)	(0.31)
Log dependency, 1993	0.02*			0.08*		
	(0.08)			(0.13)		
Log urbanization		−0.08	−0.11*		0.78	0.58
		(−0.89)	(−0.93)		(3.04)	(3.50)
Log urbanization, 1993	−0.08*			0.80		
	(−0.96)			(2.98)		
Soviet	0.58	0.57	0.63	−0.81	−0.80	−0.66
	(4.67)	(4.89)	(3.47)	(−2.20)	(−2.60)	(−1.95)
OECD	−0.04*	−0.06*	0.02*	0.29*	0.25*	−0.00*
	(−0.48)	(−0.61)	(0.18)	(1.54)	(1.38)	(−0.01)
Latin America	−0.12*	−0.13*	−0.10*	0.08*	0.11*	0.01*
	(−1.39)	(−1.51)	(−0.86)	(0.36)	(0.50)	(0.04)
East Asia	−0.24	−0.25	−0.21	0.51	0.60	0.53
	(−2.55)	(−2.55)	(−2.01)	(2.65)	(2.96)	(1.95)
Sub-Sahara	−0.48	−0.46	−0.42	0.66	0.74	0.58
	(−3.62)	(−3.47)	(−2.74)	(3.24)	(3.78)	(2.63)
Log Trade share average 1984–1992	0.07*	0.08	0.08*			
	(1.57)	(1.95)	(1.44)			
Log Gov't share average 1984–92				0.20*	0.27	0.22*
				(1.36)	(1.91)	(1.28)
High tariff dummy			−0.09*			0.10*
			(−0.72)			(0.55)
Low tariff dummy			−0.11*			0.22*
			(−1.13)			(1.16)
R-squared	0.24	0.23	0.22	0.44	0.44	0.56
# of observations	142	144	107	143	146	108

Notes: t-statistics in parentheses. All coefficients, except * are significant at the 5% level. All regressions have robust standard errors. Regression (1) and (4) are for year 1993 only. All regressions except (1) and (4) have all independent variables as the averages of the corresponding variables over years 1993–2000. The dependent variable in Columns 1–3 is the Log of Gov't share average 1993–2000. The dependent variable in Columns 4–6 is the Log of Trade share average 1993–2000

Also Rodrik included socialist dummy and found that the coefficient on it was insignificant. I instead include soviet dummy, i.e. former Soviet Union and countries which were formed after USSR collapsed, since my data range covers period when

those countries became independent and entered the world markets as separate entities.

As a dependent variable I consider the log of the share of government expenditures average for years 1993–2000, and as independent variable I include log of openness (exports plus imports divided by income) averaged over years 1984–1992, log of GDP in 1993, log of dependency in year 1993 and log of urbanization in year 1993 as well as all the dummies included in Rodrik's original regression. Regression 1 is the direct replication of Rodrik's results (but for the different time period and including soviet dummy instead of socialist).

Rodrik's benchmark regression had negative insignificant coefficients on all dummies except dummy on socialist which was positive. my replication of the model shows the same signs of the coefficients but more of them are significant. For instance, coefficient for East Asia and for Sub Saharan Africa which are statistically significant at 5% level, and are equal to -0.24 and -0.48 accordingly. Also the coefficient on Soviet is positive and highly significant at 5% level equal to 0.58.

Rodrik reports coefficient on openness that is significant and positive with the coefficient value of 0.223. However, my replication shows that coefficient on openness is equal to 0.07 and is not significant. Also I find that though coefficients on GDP, dependency, and urbanization have the same sign in my replication as in Rodrik's the results are the opposite in significance: Rodrik reports insignificant coefficient on the first and significant on the others, while I find the significant coefficient on GDP and insignificant on dependency and urbanization.

Regression 2 uses modified version of Rodrik's model and includes all the independent variables except openness calculated as averages over period 1993–2000. I find in this case that coefficient on openness significant at 5% level but the value of it does not change compared to regression 1. All other coefficients in Regression 2 are almost identical to the coefficients in regression 1 both in statistical significance and in magnitude.

Since I am interested in the question of the causality between openness and government expenditures I perform regression 4 which is in the sprit of Rodrik but is simply the reverse causality regressions in which dependent variable now becomes log of openness averaged over years 1993–2000. Log of the share of government expenditures average for years 1984–92 is now included as an independent variable along with all other variables.

I find that the coefficient on government expenditures is positive equal to 0.20 but is not statistically significant. I also find that GDP per capita has a positive but insignificant coefficient, which is reverse of the finding in Rodrik's specification, since it was negative and significant in regression 1. Also I report that coefficient on urbanization is positive and significant equal to 0.80, which is again reverse to the Rodrik's specification where it was insignificant and negative. As for the dummy variables all of them have an opposite signs but have not changed their statistical significance compared to regression 1.

In regressions 5 I use identical specification as in regressions 4 but I are using the averages for all of the independent variables calculated as averages over years 1993–2000. The coefficient on government expenditures becomes statistically

significant at 10% level now and is equal to 0.27, values of all other coefficients and their statistical significance in this regression are have not changed compared to regression 4. Thus regression 5 is superior to regression 4, since the coefficients are more significant while their magnitudes do not change. In the reverse causality there is significance from government share in period 1984–1992 in trade over period 1993–2000. So my question of the reverse causality deserves farther investigation.

I extend the analysis to see if the level tariffs have a predictive effect either on government spending or trade. Two specifications are re-estimated including dummy variables for high and low tariff countries; tariff levels in the middle range are the omitted class. The results are present in regressions 3 and 6. The coefficient estimates on the tariff dummies are not statistically significant. However, the point estimate for the alternative specifications shows that low tariff countries have a higher level of trade, which is seems reasonable. Also inclusion of the tariff dummies causes the significance level of the effect of government spending on trade to fall.

8.7 Gravity Equation

My next specification exploits the disaggregated, bilateral trade patterns using the gravity model. As discussed in the theory section I will explore the gravity model in the time series fashion by looking at leads and lags of the 1st differences of the logs of the variables. First I explore the Rodrik's hypothesis that trade causes government, in the gravity formulation I would look at the product of the size of the government for the trading countries. This regression is shown in Tables 8.4 and 8.5. Table 8.4 contains the coefficients of interest while Table 8.5 reports coefficient on income variables.

I find evidence of correlation between trade and government spending within the narrow time frame within three years is not strong the only statistically significant coefficient is the percentage change in trade three periods in the future effecting government spending today.

Note that the coefficients on income are less then one, which is expected because government spending is a component of income. They are significant between the current government spending and income.

Turning to the reverse causality hypothesis I regress the percentage change in the bilateral trade on leads and lags of government spending. In this specification I can separate government spending into the data for the importer and for the exporter. While these results are not overwhelming two things stand out. One is that future values of government spending are not correlated with the current level of trade. Second, there is some correlation between the current level of trade and past levels of government spending for importers. The effect for exporters nets out over three lags. Since these results suggest that there may be some causal relationship from government spending to trade I explore the relation between trade tax revenues and government spending.

Table 8.4 Bilateral trade and gravity equation (coefficients of interest)

	% Δ in government	% Δ in trade
	(1)	(2)
% Δ in trade at time $t + 3$	0.001 (1.65)	
% Δ in trade at time $t + 2$	0.000* (0.37)	
% Δ in trade at time $t + 1$	−0.000* (−0.09)	
% Δ in trade at time t	0.001* (0.70)	
% Δ in trade at time $t - 1$	0.001* (1.46)	
% Δ in trade at time $t - 2$	0.000* (0.38)	
% Δ in trade at time $t - 3$	0.001* (0.27)	
% Δ in Importer's Gov't at time $t + 3$		−0.024* (−0.67)
% Δ in Importer's Gov't at time $t + 2$		0.009* (0.25)
% Δ in Importer's Gov't at time $t + 1$		0.025* (0.69)
% Δ in Importer's Gov't at time t		0.078 (1.86)
% Δ in Importer's Gov't at time $t - 1$		0.132 (3.20)
% Δ in Importer's Gov't at time $t - 2$		−0.128* (−0.30)
% Δ in Importer's Gov't at time $t - 3$		−0.045* (−1.08)
% Δ in Exporter's Gov't at time $t + 3$		−0.007* (−0.16)
% Δ in Exporter's Gov't at time $t + 2$		−0.001* (−0.03)

8.8 Tax Revenues and Government

Next I investigate the relationship between total tax revenues from trade and government expenditures. The graph of the relationship is depicted in Fig. 8.3. Visually, there appears to be a positive relation between trade tax revenues and the size of government. Even so, this relation is almost surely strongly affected by heteroskedasticity.

Table 8.4 (continued)

	% Δ in government	% Δ in trade
	(1)	(2)
% Δ in Exporter's Gov't at time $t+1$		0.047*
		(1.04)
% Δ in Exporter's Gov't at time t		−0.072*
		(−1.36)
% Δ in Exporter's Gov't at time $t-1$		−0.173
		(−2.86)
% Δ in Exporter's Gov't at time $t-2$		0.088*
		(1.57)
% Δ in Exporter's Gov't at time $t-3$		0.092
		(1.79)
R-squared	0.195	0.019
# of observations	53,502	53,502

Notes: t-statistics in parentheses. All coefficients, except * are significant at the 10% level. Both regressions included the percentage change of income for exporter and importer, which are reported in Table 8.5

I undertook a time series analysis of government expenditures and trade tax revenues for short lags. I regressed the percentage change in each on leads and lags of the other for up to three periods. I also estimated these regressions separately for high, medium, and low tariff countries. There was no causal inference to be drawn. The only significant effect was that the current percentage change in government spending is negatively correlated with the current percent change in trade tax revenues.

I next perform an analysis of the long term relationship for causality between government and revenues from trade. In order to do that I calculate the logs of average of government expenditures as a percent of income over years 1993–2000 and the logs of averages of the tax revenues from trade as a percent of income over years 1984–1992. I then regress the average of government on the average of trade. The result is reported in Table 8.6.

Regression 1 investigates if trade revenues in 1984–1992 had any significant influence on government share between 1993 and 2000. I find the coefficient is positive but not significant. The second regression in the table checks for the reverse causality in this relationship. I witness that government expenditures from 1984–1992 are a good predictor of tax revenues from trades for the time between 1993 and 2000. I see the coefficient on government expenditures is statistically significant at the 5% level and is equal to 3.42.

Based on all the results reported in Table 8.6 I can conclude that while the short term relation between government expenditures and tax revenues from trade does not seem to be strong there is some evidence of the longer term relation between the two. Based on my results it seems that the causality is running from government to trade but not the other way around.

Table 8.5 Bilateral trade and gravity equation (income coefficients)

	% Δ in government	% Δ in trade
	(1)	(2)
% Δ in Importer's income at time $t+3$	0.134	0.057*
	(1.08)	(0.83)
% Δ in Importer's income at time $t+2$	−0.001*	−0.131
	(−0.22)	(−2.14)
% Δ in Importer's income at time $t+1$	0.019	−0.004*
	(5.96)	(−0.06)
% Δ in Importer's income at time t	0.490	1.190
	(29.70)	(14.30)
% Δ in Importer's income at time $t-1$	0.123	−0.193
	(4.55)	(−2.99)
% Δ in Importer's income at time $t-2$	0.045*	−0.138
	(0.65)	(−2.15)
% Δ in Importer's income at time $t-3$	0.130	−0.077*
	(13.39)	(−1.15)
% Δ in Exporter's income at time $t+3$	0.056	0.050*
	(4.40)	(0.65)
% Δ in Exporter's income at time $t+2$	−0.009	−0.026*
	(−1.78)	(−0.35)
% Δ in Exporter's income at time $t+1$	0.034	0.140
	(3.28)	(1.65)
% Δ in Exporter's income at time t	0.484	1.12
	(25.65)	(9.93)
% Δ in Exporter's income at time $t-1$	0.113*	0.240
	(1.20)	(2.18)
% Δ in Exporter's income at time $t-2$	0.061*	−0.224
	(0.47)	(−2.26)
% Δ in Exporter's income at time $t-3$	0.141	−0.055
	(13.88)	(−0.66)
Constant	−0.004	0.022
	(−4.01)	(2.84)
R-squared	0.195	0.019
# of observations	53,502	53,502

Notes: t-statistics in parentheses. All coefficients, except * are significant at the 10% level. This table reports income coefficients on constant from regression in Table 8.4

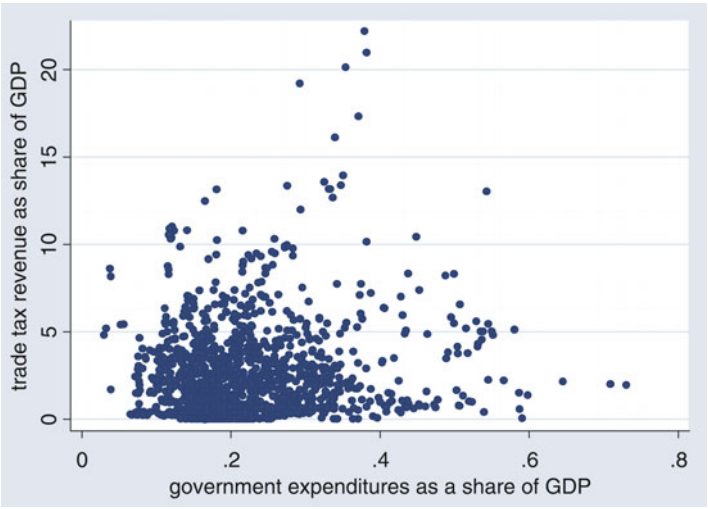

Fig. 8.3 Relationship between government and tax revenues

Table 8.6 Tax revenue from trade and government in the long run

	Government share 1993–2000	Trade Revenue share 1993–2000
Variable	(1)	(2)
Trade Revenue share 1984–1992	0.007* (0.34)	
Government share 1984–1992		3.421 (2.35)
Constant	−1.630 (−30.00)	−0.503* (−1.30)
R-squared	0.002	0.029
# of observations	90	90

Notes: Revenue from Trade share and Government Expenditures shares are calculated as average over the corresponding period of time. t-statistics in parentheses. All coefficients except * are significant at the 5% level. All regressions have robust standard errors

8.9 Volatility

In the last part of my analysis I undertake a more detailed investigation of Rodrik's idea that government acts as a social insurance in the world of uncertainty in trade. To do this I exploit the disaggregation of the bilateral trade data. I create a measure for the volatility of trade from the pair-wise combinations of trading partners. For import volatility I calculate the average of the sum of the squares of the difference in the level of imports for country i and each of its trading partners from 1 year to the next. The same calculation is performed for exports. Then import and export

volatilities are added together. my idea is that even if the overall level of trade doesn't change from year to year, variation in trading partners is a measure of disruption.

The Rodrik argument is that trade volatility should cause income volatility, so I regress fluctuations in income year to year on my measure of trade volatility. Current and lag values are included. Then I regress the change in government expenditures on these measures of trade and income volatility. Some summary statistics are shown in Table 8.7 and the regressions in Table 8.8.

The volatility of income is measured as a square of the percentage change in income. I can see from Table 8.7. Trade volatility has the mean equal to 1.51, with a minimum of 0.02 and maximum of 40.11. At the same time the standard deviation is only 1.33. As for the income volatility the mean here is equal to 0.01 but the

Table 8.7 Volatility of trade and income

Variable	Mean	Std. dev.	Min	Max
Trade volatility	1.51	1.33	0.02	40.11
Income volatility	0.01	0.04	0.00	1.08

Notes: Number of observations = 2767 for Trade Volatility and 2402 for Income Volatility

Table 8.8 Volatility

	% Δ in GDP	Volatility of income	% Δ in government
Model	(1)	(2)	(3)
Volatility of trade	−2.24	1.98	0.84
	(−5.30)	(3.95)	(2.43)
Volatility of trade at time $t-1$	0.86	−0.09*	−0.94
	(2.98)	(−0.53)	(−2.26)
Volatility of trade at time $t-2$	0.80	0.11*	0.60
	(3.47)	(0.70)	(1.88)
% Δ in GDP			85.48
			(12.44)
% Δ in GDP at time $t-1$			2.37*
			(0.46)
Volatility of income			−21.23*
			(−1.40)
Volatility of income t time $t-1$			−19.05*
			(−1.45)
Constant	3.82	−2.09	−0.92*
	(5.88)	(−4.25)	(−1.33)
R-squared	0.09	0.31	0.29
# of observations	2093	2093	2086

Notes: t-statistics in parentheses. All coefficients except * are significant at the 10% level. All regressions have robust standard errors. GDP and government variables are in logs. All the coefficients are scaled by 100

standard deviation is four times higher than the mean and is equal to 0.04. Income volatility ranges between the values of 0.00 and 1.08.

Regression 1 in Table 8.8 shows that volatility in trade has a direct negative influence on changes in income. Regression 2 performs a test on the relationship between volatility of trade and volatility of income. I find the two are positively correlated, with the coefficient on the volatility of trade significant at the 5% level and equal to 1.98. Finally, Regression 3 looks at changes in GDP, volatility of trade and volatility of income, as well as their lags, as explanatory variables for changes in government expenditures. I consider three variables, and their time shifts, that may affect government expenditure levels: the volatility of trade, the volatility of income and the percentage change in GDP. I find that volatility of trade is statistically significant at the 5% level while the volatility of income is not significant.

8.10 Entry into GATT

Analysis presented in Table 8.9 accounts for some other factors not included in the models I present in my analyses. my approach in Table 8.9 is to approximate the "openness" of a country by observing the change in trade in the years after a country joins GATT. I consider different intervals of time before and after the entry into this trade agreement. I regress the average yearly growth rates after a country joins the GATT on the average yearly growth rates before joining.

Table 8.9 Regressions of growth of GATT countries

	$N = 1$	$N = 3$	$N = 5$	$N = 8$	$N = 10$
Models	(1)	(2)	(3)	(4)	(5)
Trade total	−0.233	−0.175	0.018	0.088	0.163
	(−11.28)	(−18.54)	(1.26)	(4.87)	(16.49)
Trade/GDP	−0.137	−0.142	0.005	0.075	0.136
	(−10.15)	(−26.82)	(0.32)	(4.13)	(15.33)
Gov expenditures total	−0.183	−0.026	0.175	0.195	0.166
	(−9.71)	(−1.76)	(9.29)	(21.69)	(20.28)
Gov expenditures/GDP	−0.110	−0.057	0.037	0.152	0.151
	(−5.53)	(−3.16)	(1.61)	(16.38)	(14.73)
Growth of government/GDP before GATT[a]	−0.495	−0.679	−0.321	−0.198	0.221
	(−12.02)	(−28.16)	(−10.33)	(−4.34)	(7.08)
Growth of trade before GATT[b]	0.011	−0.047	0.008	0.053	0.060
	(1.86)	(−7.77)	(1.44)	(50.79)	50.24

Notes: Dependent variables: Growth of corresponding variables after entering GATT; independent variables are growth of corresponding variables before entering GATT. t-statistics in parentheses. N is number of years before/after entering GATT

[a]Regressions have a growth of trade share after GATT as dependent variable and 1762 observations

[b]Regressions have a growth of gov't share after GATT as dependent variables and 1752 observations

In the analysis, I consider models for the growth of total trade, trade as a share of GDP, government expenditures and government expenditures as a share of GDP. I find highly statistically significant negative coefficients for all the specifications for 1 and 3-year time period spanning before and after entering into GATT. However at the 8 and 10-year time period spanning all of the specifications considered exhibit positive, highly statistically significant coefficients. In other words, in the short run after entering GATT I witness the negative effect on growth of trade and government expenditures and in the long run the effect becomes positive. Trade and government expenditures are growing together in the long run window after entering GATT.

The last two regressions in Table 8.9 explore growth of trade share, N years after a country entered GATT, on the growth of government share before a country's entrance into GATT and the reverse of this relationship. I find that up to $N = 8$ years, the growth of government before entrance has a highly significant negative effect on growth of trade after the entrance. At the same time, I see the reverse tendency when growth of trade before joining GATT had a positive effect on post-GATT entrance growth of government (with the exception of $N = 3$ years).

8.11 Conclusion

I performed and investigation of the causal relationship between trade and government expenditures, in the attempt to extend the work of Rodrik (1998). Several different tests were conducted. The first is the simple replication of Rodrik's benchmark model on the extended dataset. The results here are not conclusive but suggest that the causation may run from government spending to trade.

Next I use bilateral trade in observations and the augmented form of the classic gravity equation used by trade economists. This analysis uses time series changes in government spending and in trade. Test for Granger style causality are performed. Again little evidence is found for Rodrik's hypothesis that trade causes government spending. And some weak evidence exists for the alternative hypothesis.

Next I extend the analysis to Trade tax revenues under searching for the possible link between government spending and revenues gained from tariffs. Little evidence is found over short run periods but over the long run there does seem to be an association between the high Trade tax revenues in one period and high government expenditures in the next period.

Finally I look at a more direct test of the Rodrik's hypothesis. Rodrik's story is that trade creates volatility in income which then induces government to provide social insurance in the form of government expenditures. I calculate a measure of trade volatility by looking at bilateral trading partners. And find that trade volatility is associated with income volatility. The results of this test are ambiguous because changes in government expenditures are negative related to income volatility but at the same time positively related to trade volatility.

Thus at this point the results of the inquiry are not conclusive but certainly suggestive that the Rodrik's hypothesis requires further investigation.

References

Adsera A, Boix C (2002) Trade, democracy, and the size of the public sector: the political underpinnings of openness. Int Organ 56(2):229–262

Alesina A, Wacziarg R (1998) Openness, country size and government. J Public Econ 69(3):305–321

Alesina A, Spolaore E, Wacziarg R (2005) Trade, growth and the size of countries. In: Aghion P, Durlauf S (eds) Handbook of economic growth, vol 1. Elsevier, New York, pp 1499–1542

Feenstra RC, Lipsey RE, Deng H, Ma AC, Mo H (2005) World trade flows: 1962–2000. National Bureau of Economic Research Working Paper No. 11040, Cambridge, MA

Felbermayr GJ, Kohler W (2006) Exploring the intensive and extensive margins of world trade. Rev World Econ 142(4):642–674

Fiscal Affairs Department, International Monetary Fund (2005) Dealing with the revenue consequences of trade reform. International Monetary Fund, Washington, DC

Fisher B (2006) Preference erosion, government revenues and non-tariff trade barriers. World Econ 29(10):1377–1393

Kenny LW, Winer SL (2006) Tax systems in the world: an empirical investigation into the importance of tax bases, administration costs, scale and political regime. Int Tax Public Financ 13(2–3):181–215

Rodrik D (1998) Why do more open economies have bigger governments? J Polit Econ 106(5):997–1032