I. Debt and Taxes

Paying for services directly produced by Governments normally involves a combination of taxes, borrowing, and other revenue sources such as fines and fees. Taxes are normally the largest source of revenues, followed by debt, and then fees for services of various kinds. This lecture analyzes the politics and effects of debt finance. Government borrowing is accomplished by selling bonds which are essentially promises to pay interest and eventually to repay the amount borrowed. Because of this, some would argue that borrowing is simply another form of taxation, with the tax revenues coming in the future rather than in the present.[1]

However, there are many differences. For example, the government debt is rarely fully paid off, which implies that some debt-financed services are, in effect, free for taxpayers. The taxes that are paid are paid by future tax payers. These taxpayers are often not directly involved in the selling of bonds and do not always benefit from the services produced. Debt-finance often involves intergenerational shifts of tax burdens, although there are some caveats to that claim that will be taken up in this lecture. Also, occasionally, a government will default on its debt. They may do so explicitly, by canceling payments to bondholders. Or, they may do so implicitly, through policies that increase inflation and thereby the value of the currency used to repay the debt. Such defaults can have major effects on a nation's economy, on international bond markets, and through associated effects on the world economy.

For the most of this lecture, however, we will assume that the debt is to be repaid--that is to say that there are no "free lunches." This also allows us to ignore crises of confidence that undermine confidence in country, state, or city's ability to repay their debts, although these do occur and can be serious problems. Indeed, they are the principle reason that excessive debts are worried about. Debt purchasers take this into account, but the spillover effects of defaults on non-debt holders are only indirectly taken into account through electoral pressures. The problems associated

---

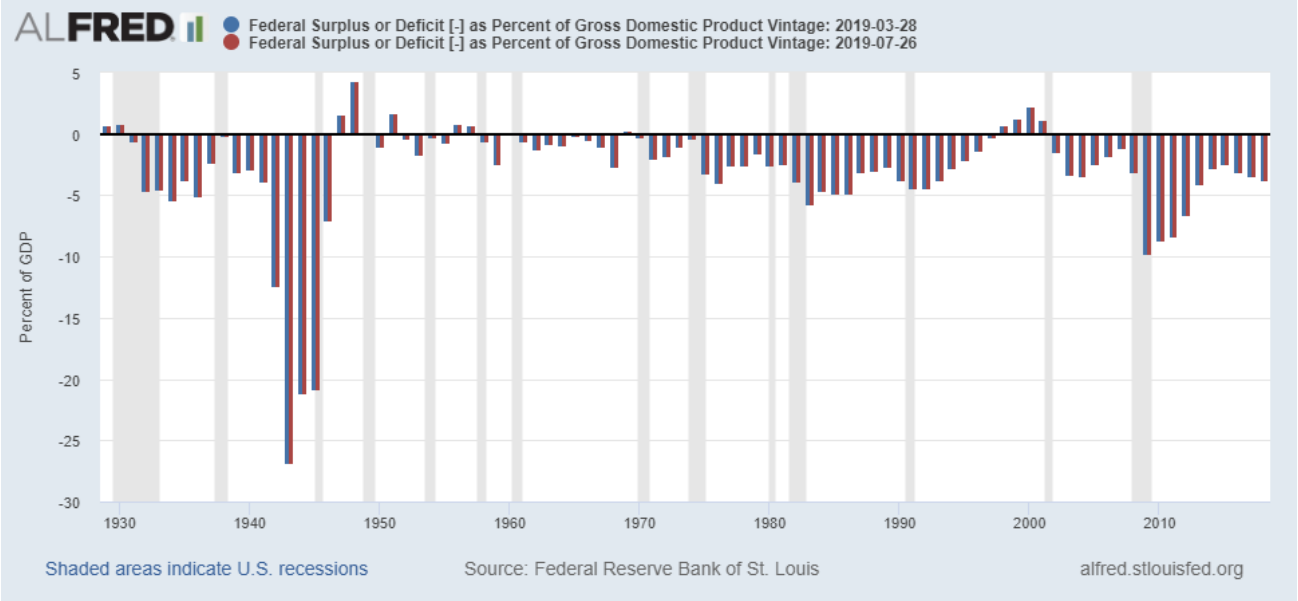
[1] Governments can also use regulations and mandates to indirectly "produce" services by encouraging (or requiring) private organizations and individuals to provide services of interests. Many such regulations violate the so-called takings clause of the U.S. Constitution but not all of them. Such non-financed services are ignored in this chapter, but taken up in the second half of the course.

with defaults are taken up near the end of the lecture.

A Short Fiscal History of U.S. Deficits and Debt Accumulation

We begin with a short overview of the fiscal history of the United States in the form of two graphs, one on deficits as a fraction of GDP and one on national debt as a fraction of GNP.

Figure 1: 90 Years of Deficit Spending in the U.S.



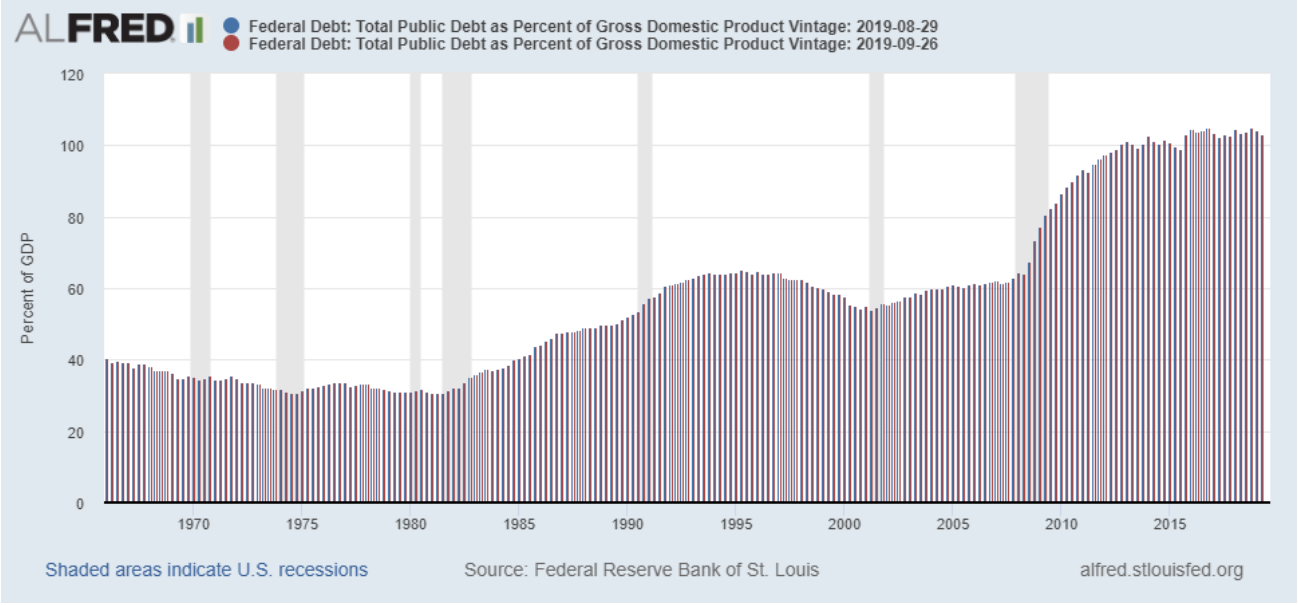
Note that deficits as a fraction of GNP are generally less than 5% of GDP, except during World War II and following the financial crisis of 2008. Although there was two other severe recession in this period (during the 1930s and early 1980s) only after the 2008 recession were extraordinary deficits run. Also noteworthy is the fact that years in which surpluses were run are quite rare. Only 11 of the 90 year period plotted were associated with deficits. Deficit finance is the norm rather than the exception, although there are exceptionally large deficits in two periods.

Notice that deficits are not generally run in the manner that Keynesian theory suggests with larger deficits during recessions and smaller ones or surpluses during the period between recessions. There are far more years of growth than of recession, but far fewer years with surpluses than deficits. Towards the end of recessions after 1970 there are often higher deficits as a fraction of GDP, but otherwise no clear pattern. The most Keynesian looking series seems to be that following the 1992 recession. It is, however, clear that the relative size of deficits have increased during the past 75

years, with relatively low deficits in the 1950-75 period, far larger ones from 1975-95, and somewhat larger ones after 2008.

The second figure tracks total government debt (all federal bonds issued except those held by Social Security) as a fraction of GDP. As in the previous case, this avoids issues with respect to price indices and also puts into economic perspective. The risks and future tax burdens associated with national deficits and national debt can be more easily judged when presented as a fraction of GNP than in nominal or inflation adjusted dollars, because GDP is the upper bound on the tax base of the United States.[2]

Figure 2: 55 Years of National Debt (Including that Held by the Federal Reserve)



Notice that although deficits were run in most of the period covered (all but 5 years), total publicly held debt has shrunk as a fraction of GDP in several periods, because the nominal economy grew faster than nominal debt was being accumulated. The decline during the 1970s reflected relatively high inflation rates (what U.S. economists term the great inflation). The 1990s was a case in which real economic growth exceeded the accumulation of debt, partly because half of that period is associated with surpluses. The great expansion of debt after the 2008 financial crisis reflected unusu-

[2] Note that some assets can be taxed, as with land and wealth taxes, but these assets decline in value as they are taxed, because their value is associated with future income that can be generated from them. The latter is part of GDP. Without that future income, most assets would have little val-

ally large deficits during the Obama administration and relatively slow growth. Although deficits remain historically high in nominal terms during the Trump administration, higher growth rates have "kept up with" those deficits and thus national debt as a fraction of GDP has been relatively stable in spite of relatively large nominal deficits. (Of course, deficits for the past 20 years have been lower than they might otherwise have been because of relatively low interest rates in the post-2000 period.)

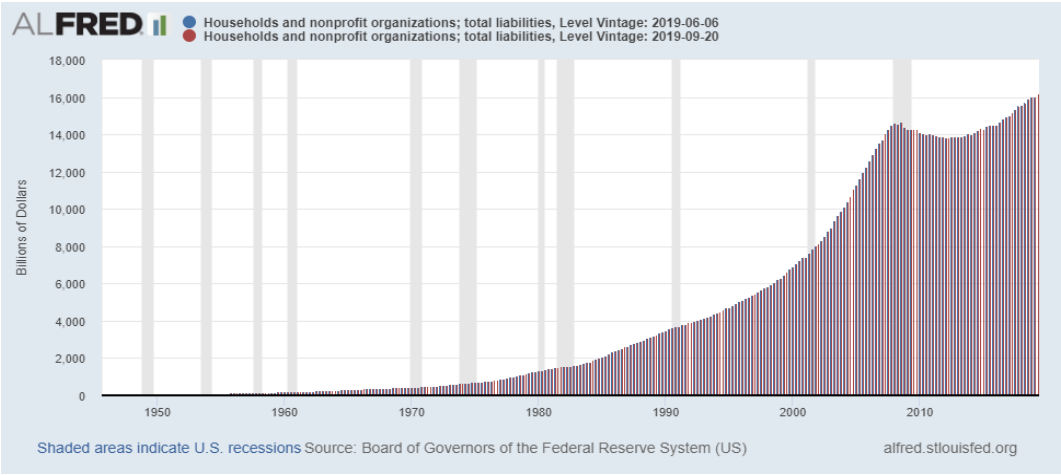
Ricardian Equivalence and Balanced Budgets in the Long Run

If all government debts are eventually repaid, then debt and taxes are very similar instruments. Borrowing affects the timing of taxes rather than the total collected in present value terms. Indeed, Ricardo (1820) suggests that taxes and debt are literally equivalent instruments in that the persons who expect to repay the bonds will adjust their savings plans based to take account of higher taxes in the future. A similar conclusion was reached by Barro (JPE 1974), who was chided by Buchanan (JPE 1976) for neglecting Ricardo. However, this equivalence is by no means accepted by all economists.

Macroeconomic and microeconomic equivalence are also different matters as far as voting is concerned. That most of the U.S. debt is held "internally" by the federal reserve, banks, investment houses, and private investors does not mean that "we owe it to ourselves" at the level of individual voters. Relatively few individuals hold debt or undertake debt repayment planning. (I personally have never met or heard of anyone doing so.) Thus, the incentives to borrow confronted by voters is different than those they confront as consumers. Unlike personal debt, today's voters may or may not have to pay it back, rather it may be paid by others including their children. (Personal debt, nonetheless, has also grown significantly in nominal terms over the past 50 years).[3]

---

ue.



3

The focus of this lecture is on the electoral determinants of government finance, when debt is taken to be a routine method of finance, rather than one used only in emergencies. Given this, under what circumstances will a median voter prefer partial debt finance to tax finance? Under what circumstances will a voter borrow in more or less the same way they do in private life and under which might voters prefer more or less government debt than they would in private life?

We begin with the case of a well-functioning democracy with a well-informed median voter and examine the case in which a voter that fully expects to pay higher future taxes when he or she induces the government to borrow. Just as a private debtor may borrow to improve the timing of consumption based on anticipated income flows, so might a rational voter.

This set of lecture notes includes a long Appendix that reviews some of the early literature on deficit finance, most of it from an early political economy perspective. The appendix is based loosely on a survey and synthesis of the literature that I wrote several years ago for a lecture at the University of Rome that was subsequently published in an Italian journal (which unfortunately is not available on the Web). That old survey includes a variety of factors that may predispose voters to over-use debt from the perspective of economic growth and social welfare. However, it is the next section on the simple electoral politics of debt, section II, that is most important for the purposes of the first part of this course.

II. Well-Informed Median Voters, Lifetime Balanced Budgets, and Debt Finance

Political Support for debt finance is not always the result of biased expectations about future taxes or about opportunities to shift tax burdens to the next generation of taxpayers. There are several arguments that suggest that debt finance can increase the median voter's welfare, social welfare, and generate Pareto superior moves. We take up this first case first and then look at more problematic possibilities.

From the perspective of a voter that is forward looking and expects to pay back any debts accumulated during his or her lifetime, the problem of debt finance is similar to that associated with borrowing to pay for private consumption during his or her lifetime. They will, for example, be inclined to favor more debt finance when they are young and their income is relatively low and pay it back when they are older and have greater income—over some range, income rises with age because of accumulated knowledge and skills that increase their marginal revenue product and because of sorting that takes place in real time through which relatively high skill and high talent individuals are identified and rewarded.

As a point of departure, suppose that voters have an exponential intertemporal utility function defined over present and future consumption and present and future government services:

$$U = C_1^u C_2^x G_1^y G_2^z .$$

Suppose also that their lifetime income (present (period 1) and future income (period 2) is known to be Y_1 and Y_2, and that the long-term interest rate is r. This allows their life-time budget constraint—wealth—to be written as $W = Y_1 + Y_2/(1+r)$. The voter's choice is how to allocate that income among present and future private consumption and present and future government services. Let P_1 and P_2 represent the price of consumption in the present and future and let D_1 and D_2 represent the price of present and future government services. Their lifetime budget constraint can be written as

$$Y_1 + Y_2/(1+r) = P_1C_1 + P_2C_2/(1+r) + D_1G_1 + D_2G_2/(1+r)$$

A standard result of maximizing utility functions of this functional form subject to a constraint of this form is that individuals will spend a constant fraction of their wealth on each good. (See any derivation of a demand curve from a Cobb-Douglas utility function for an illustration of how that can be done here.) The fraction of wealth spent on current consumption will be u/(u+x+y+z), that on future consumption will be x/(u+x+y+z), that on current government services will be y/(u+x+y+z) and that on future government services will be z/(u+x+y+z). (This is one of the few results that is easier to derive from the Lagrangian method than the substitution method, although it can be found in either way.) The demands for each good—because of the functional form assumed for the utility function—are completely independent of each other and have unitary price elasticity with:

$$C_1^* = W(u/(u+x+y+z)/P_1$$
$$C_2^* = W(x/(u+x+y+z)/(P_2/(1+r))$$
$$G_1^* = W(y/(u+x+y+z)/D_1$$
$$G_2^* = W(z/(u+x+y+z)/(D_2/(1+r))$$

Note that each of these demand curves is "linear in logs," and so it is this type of utility function that implicitly lies behind log-based estimation strategies for demands for private goods and public services.

Hidden within the math to this point is the extent to which any borrowing takes place. Overall borrowing takes place when ever expenditures in the first period are larger than the first period's income, which is to say whenever (i) $Y_1 < W(u/(u+x+y+z) + W(y/(u+x+y+z)$. Saving would take place in the opposite case, when (ii) $Y_1 > W(u/(u+x+y+z) + W(y/(u+x+y+z)$. Only in the rather odd case (iii) in which current and future expenditures exactly equal income in those periods

would no borrowing be undertaken. This might happen by chance or because of the absence of markets for loans (sometimes referred to as capital markets), but is not likely in the normal course of affairs when capital markets are easy to use and knowledge about the future is reasonably good. The data presented above for deficits suggests that case (i) is far more common than the others for the median voter of U.S. electorates.

In the highly simplified model, in which voters are perfectly informed and public policies extremely responsive to electoral pressures, the median voter's income and desires for expenditures now and in the future would determine the extent of debt. Whether that debt is held privately or by government would depend on where the interest rate was lowest. If government debt carries a lower interest rate than national debt (and it always has in the U.S.) all the borrowing would take place by the national government and the median voter himself or herself would have no private debt.

Other consumers, however, would not be so lucky because it unlikely that either their preferences (the exponents of their utility functions) or their lifetime budget constraints (income flows) are identical with those of the median voter. Some voters would wind up with more total debt than optimal (and so privately save to bring it down to ideal levels) and others would wind up with less total debt than optimal (and so borrow privately to bring up to ideal levels).

At first this prediction may seem ridiculous, but recall that many young people borrow quite a bit, that many middle aged persons do relatively little net borrowing or saving and that older persons often save a lot. That persons of middle age tend to be moderate debtors is consistent with the relatively moderate levels of debt exhibited by the federal government over most of this period—indeed essentially all of it except instances that may arguably been considered emergencies—world war II and the financial crisis. So, one cannot reject this version of a well-functioning electoral based policy with respect to government finance out of hand.

Notice that the model treats tax payments for public services as if they were knowable amounts analogous to prices paid for ordinary goods. In previous "static" (one period) models of median voter driven expenditures and regulation, that "price" was fleshed out with assumptions about the tax system (proportional taxes, head taxes, etc.) The same could be done above although it would have made the notation more complex and directed attention away from the aspect of greatest importance for this lecture. For example, if government services are paid for with a permanent proportional tax on income and the cost of producing G is e then with a long term balanced budget: $t \sum (Y_{1i} + Y_{2i}/(1+r)) = e(G_1 + G_1/(1+r))$ and so $t = e[G_1 + G_2/(1+r)] / [\sum (Y_{1i} + Y_{2i}/(1+r))]$. The cost of the median voter in period 1 with income Y_1^v is just $t Y_1^v = Y_1^v e[G_1 + G_2/(1+r)] / [\sum$

$(Y_{1i} + Y_{2i}/(1+r))$]. D_1 is the median voter's expenditure on G_1 divided by G_1, which can be approximated as: $D \approx Y_1^v 2e / [\sum (Y_{1i} + Y_{2i}/(1+r))]$, when $G_1 \approx G_2/(1+r$.

More important than the specific implications of the model are the more general conclusions that (i) private and public debt are simultaneously determined in an electorally driven government, because the same rationale (the optimal timing of expenditures to maximize lifetime utility) drive such decisions whenever voters are rational and forward looking and (ii) that if voters are forward looking, current expenditures are partly determined by anticipated future expenditures. (iii) Moreover, government debt is simply one of the debt instruments that voters use to "smooth" lifetime consumption in order to maximize their lifetime utility, thus (iv) personal and national debt are partially codetermined when voters are forward looking, have reasonably good information about the future, and public policies are (largely) driven by electoral pressures (e.g. desires to be reelected). (v) Stability in national debt issuance would be determined much as the demand for social security is determined—by generational turnover—the median voter's identity changes through time, but has relatively similar interests because they tend to be mid-life voters.

III. Appendix on the Political Economy of Debt Finance: A Series of Short Overviews of other Related and often less Optimistic Political Explanations for Deficits

Ramsay Borrowing: Debt as a Method of Tax-Burden Smoothing

The most developed of the pure public finance explanations for debt finance during a business cycle notes that borrowing can be used to reduce aggregate dead weight losses and/or to reduce the effects of business cycles. From a Ramsay taxation perspective, there are normative reasons to **smooth out the path of taxation through time**, because dead weight losses from taxation tend to increase with the square of marginal tax rates. Borrowing during recessions and paying back loans during booms allows marginal tax rates to fluctuate less. A more or less constant tax rate can reduce the (present value of) deadweight loss from a series of high (during recessions) and low tax rates (during booms) that generates the same (present value of) revenues.

Thus, under a Ramsay tax norm, increased borrowing during recessions increases social welfare by reducing the total burden of taxation. (Note that this effect does not rely upon Keynesian effects, but on ideas associated with tax burdens generated in partial equilibrium models.) The Ramsay approach implies that tax rates should be held fairly constant rather than raised and lowered to adjust to cash flow problems faced by governments over a business cycle. Money should be borrowed during recessions and paid back during booms. This rationale for borrowing reduces long run

present discounted value of the deadweight losses of taxation.

A more or less similar case occurs when a capital good is to be financed. The deadweight loss of taxation can be reduced by spreading the tax payments out through time, rather than paying for it in the first period with relatively high tax rates. Thus, it may make sense to borrow to pay for school buildings, roads, bridges etc, as a way of keeping marginal tax rates low. (This would not, however, be the case for ordinary expenditures for labor or maintenance, since these have to paid for every year in every case.)

A. A bit of calculus can demonstrate the Ramsay case for public debt fairly easily.

i. Suppose that revenue of amount T is required in present value terms over time periods in which income is Y_1 and Y_2.

$$T = t_1Y_1 + t_2Y_2/(1+r)$$

ii. The burden of the tax, however is higher that the revenue generated because of the deadweight loss (excess burden) of the taxes used. The burden can be approximated as:

$$B = t_1Y_1 + at_1^2Y_1 + (t_2Y_2 + at_2^2Y_2)/(1+r)$$

where $at_1^2Y_1$ and $at_2^2Y_2$ represent the excess burden of the taxes in periods 1 and 2, respectively.

iii. A Lagrangian can be formed to represent the problem of minimizing the burden of financing a given long term present value of revenue.

$$L = t_1Y_1 + at_1^2Y_1 + (t_2Y_2 + at_2^2Y_2)/(1+r) + \lambda\,[T - t_1Y_1 - t_2Y_2/(1+r)]$$

iv. Differentiating with respect to t_1 and t_2 yields:

$$Y_1 + 2at_1Y_1 = \lambda\, Y_1$$

which after division by Y_1 can written as: $1 + 2at_1 = \lambda$

and $(Y_2 + 2at_2Y_2) / (1+r) = \lambda Y_2/(1+r)]$

which can be written as: $1 + 2at_2 = \lambda$

These two first order conditions imply that:

$$1 + 2at_1 = \lambda = 1 + 2at_2$$

or

$$t_1^* = t_2^*$$

v. Minimizing the burden of taxation requires equal tax rates through time, given our assumptions about excess burden. The specific tax rate also has to be sufficient to produce revenue

$$T = t_1Y_1 + t_2Y_2/(1+r) \quad \text{so } t^* = T / [\,Y_1 + Y_2/(1+r)]$$

If present expenditures and future expenditures do not exactly equal t_1Y_1 and t_2Y_2, then **borrowing (or saving) will be necessary** to minimize the burden of taxation.

The above analysis of tax smoothing can be generalized easily to N time period governmental taxation for a given present value of tax revenues.

Government **bonds are not net wealth from this Ramsay-based perspective**, because they are offset by an equal amount of future tax payments (a point stressed in Barro 1974 and in Ricardo 1820). If taxpayers are forward looking (as postulate by Ricardo and by Barro), then the timing of taxes is less relevant than the present value of the revenues generated (and their associated burdens).

An additional efficiency case for debt finance is associated with Keynesian macroeconomic theory. If one accepts Keynesian, post-Keynesian, or neo-Keynesian reasoning with respect to debt, debt may also be used to increase aggregate demand to reduce the losses associated with business cycles (during recessions).[4]

Intergenerational Tax Shifting and Electoral Pressures Favoring Excessive Debt

Government borrowing (tax-timing) has a variety of distributional effects, because the pool of taxpayers and distribution of income often changes between the time that the debt is issued and the time at which it will be paid. This potentially allows voters in the present generation to shift the tax cost of at least some of their present government services to members of the future generation.

New taxpayers are born, while existing ones age and eventually die. Average income tends to increase through time, but individual income undergoes a life cycle, rising through most of one's work life and declining after retirement. Long term debt financing, consequently, tends to affect **inter-generational distribution of taxation** and excess burden. Under a proportional income tax, retired and dead persons pay less toward retiring bonds then they would have paid for government services at the time the bonds were taken out.

Another distribution effect occurs because of differences in the ownership of government bonds. Although the average person holds the average amount of government bonds, and thuse has

[4] Unfortunately, as Buchanan and Wagner (1977) point out—and as seems to be broadly consistent with the deficit record of the U.S.—the politics of Keynesian macro policy tends to be biased in favor of debt finance (and larger governments). The bias is introduced by the conclusion that (i) during a recession, deficits reduce unemployment and (ii) during a boom, deficits also reduce unemployment. So, if one attempts to minimize unemployment, deficits should always be run. This bias is reinforced by fiscal illusion and free riding: voters broadly enjoy government expenditures

assets equal to that required to retire the debt (e.g. the bonds can just be turned in to pay for their retirement), that balance is not true for most persons in the country of interest. Persons that own fewer bonds than their tax burdens will have to be additional taxes to retire "their share" of the debt, while those who own more bonds than necessary to pay their "share" will not bear an extra tax burden because of the borrowing undertaken by previous generations. Those paying additional taxes may do so without benefiting from the expenditures financed by that borrowing (see Buchanan and Roback, 1987). That is to say, at the micro-economic level of analysis, the children of persons who do not hold government bonds equal to their future tax burden, bear a relatively greater "inherited" tax burden than those who inherit sufficient bonds to pay for their share of the debt.[5]

These distributional effects can cause taxpayers to borrow more to finance government bonds than they would have had the loans been private loans rather than government ones. Biases that favor's debt financing over taxation at the margin may undermine long term growth by reducing the supply and accumulation of capital. Several papers argue that government debt finance tends to "crowd out" private debt finance and capital formation and therefore reduces economic growth. See, for example: Aschauer (1989), Ganelli (2003), Diamond (1965), Kumar and Woo (2010), etc. See Elmendorf and Mankiw (1998) for a survey of this literature. The **crowding-out** hypothesis is a long run argument that suggests that even if deficits can increase aggregate demand in the short run, there are long run costs that need to be taken into account. It is such effects—and associated macro risks (see Rogoff and Reinhart 2011) that imply that a bias in favor of "excessive" government debt has negative effects on long term growth that may not be fully accounted for by electoral pressures. (Those yet unborne, of course, cannot vote.)

Variations in the Electoral Politics of Debt

The actual level of public debt reflects political decisions rather than the recommendations of economists (except insofar as these may affect voter or legislator opinions). In a competitive democracy, political outcomes reflect the perspective of the median voter.[6] The median voter is the voter whose ideal fiscal package lies exactly in the middle of all voter ideal points. (The median voter model and related public choice models will be have been developed earlier in the course.) Recall

---

and dislike paying taxes to pay for them.

[5] Borrowing to fund public education is one of the rare cases in which the beneficiaries of debt finance tend to be members of future generations of taxpayers.

[6] In the stochastic voting literature, candidates are assumed to be only imperfectly informed of voting behavior. In such models, vote maximizing candidates converge to the average voter's

that in two party elections, candidates converge to the median voter' s position and, would, if they have any desire to be reelected, behave as good agents for the electorate and enact the policies that they were elected to implement. That is to say, in first-past-the-post elections, candidates who deviate from the median position of the electorate will not be successful in the electoral contest. This is largely true under proportional representation as well, if representatives rather than coalitions (parties) are voted on.[7]

If we accept the median voter model as a first approximation of political decision making in democracies, the current deficit reflects the fiscal circumstances and discount rate of the median voter at a given moment, and the cumulative debt is a consequence of the series of median voter preferences, circumstances, and political incentives in previous periods. We can, thus, use "single decision-maker" models to characterize a variety of debt-taxation choices. This perspective was used above in section II and will be used below to analyze somewhat different choice settings (voter preferences, expectations, knowledge, etc.) than modelled in section II.

Barro, Debt Neutrality, and the Median Voter

In Barro (1974, 1979) classic, if controversial, papers on the national debt, he reinvents and extends what is known as the **Richardian Equivalence** of debt and taxes. Barro's models assume that the population of voters is homogeneous, and consequently all voters make identical decisions about the optimal debt level. The homogeneity of voters is used to facilitate analysis of other problems, but it turns out to be an important assumption. Within an electoral context, every voter in the Barro model agrees with the every other voter (including the median voter), and thus the policy result is Pareto optimal. This normative conclusion is unlikely to be the case when the variety of voter interests are taken into account. The main analytical insight of Barro's original piece (1974) public debt was to note that even finite-lived individuals might have an infinite planning horizon if they care about the welfare of their descendants. Such persons have "dynastic" utility functions.

---

ideal point rather than the median voter's position.

[7] In the absence of substantial party discipline (and monopoly power) the policies adopted will tend to reflect the position of the median legislator, the median of the district medians. However, if party elites determine representation and platforms, internal party politics become important. To the extent that party leadership is determined via winner take all elections among party members, the pivotal voter is the median member of the dominant political party. This may also be the case in coalition government, although party driven coalition government is more complex and depends on strategies adopted by the dominant and marginal members of the coalition. However, to the extent that the dominant party is the agenda setter on major policy issues, policies will tend to reflect the interests of the median voter of the dominant party.

An implication of the infinite planning horizon result is that for purposes of analysis one can neglect intergenerational aspects of the politics of government finance. The following two-period model of the median voter's choice captures essential features of the Barro model and is used for illustrative purposes throughout the remainder of the appendix. It is a generalization of the exponential utility model developed in section II to other "conventionally shaped" utility functions that may or may not be exponential.

i. Assume that individuals have infinite planning horizon, which in the context of a two-period model implies that voters in period 1 act as if they will be alive in period 2.

ii. The median voter faces both private and public budget constraints. He faces a private budget constraint that requires the present discounted value of disposable income to equal the present value of personal consumption,

$$(1-t_1)Y_1 + (1-t_2)Y_2/(1+r) = C_1 + C_2/(1+r).$$

Number subscripts denote time periods, Y is income, and C is private consumption. The discount rate is r, and the marginal tax rates are t1 and t2. In addition, in his role as a voter, the median voter faces a public budget constraint that requires the present discounted value of tax receipts to equal the discounted value of government expenditures,

$$n(t_1Y_1 + t_2Y_2/(1+r)) = G_1 + G_2/(1+r),$$

where n is the number of taxpayers, and G1 and G2 are the public services provided in periods 1 and 2 respectively.

iii. The median voter's utility function is strictly concave and increasing in both personal consumption and government services in the two periods,

$$U = u(C1, G1, C2, G2).$$

First order conditions for the implied Lagrangian optimization problem may be used to characterize the utility maximizing levels of taxes, consumption, and government services through time.

iv. The Lagrangian equation is:

$$L = u(C_1, G_1, C_2, G_2) + \lambda_1 [(1-t1)Y_1 + (1-t_2)Y_2/(1+r) - C_1 - C_2/(1+r)]$$
$$+ \lambda_2 [n(t_1Y_1 + t_2Y_2/(1+r)) - G_1 - G_2/(1+r)] \quad (1)$$

v. and partial derivatives over the control variables: C_1, C_2, G_1, G_2, T_1 and T_2, are:

$$L_{C1} = U_{C1} - \lambda_1 = 0 \quad (2.1)$$

$$L_{C2} = U_{C2} - \lambda_1/(1+r) = 0 \quad (2.2)$$

$$L_{G1} = U_{G1} - \lambda_2 = 0 \quad (2.3)$$

$$L_{G2} = U_{G2} - \lambda_2/(1+r) = 0 \quad (2.4)$$

$$L_{t1} = -Y_1 \lambda_1 + nY_1 \lambda_2 = 0 \quad (2.5)$$

$$L_{t2} = (-Y_2 \lambda_1 + nY_2 \lambda_2)/(1+r) = 0 \quad (2.6)$$

$$L_{\lambda 1} = (1-t_1)Y_1 + (1-t_2)Y_2/(1+r) - C_1 - C_2/(1+r) = 0 \quad (2.7)$$

$$L_{\lambda 2} = n(t_1Y_1 + t_2Y_2/(1+r)) - G_1 - G_2/(1+r) = 0. \quad (2.8)$$

(Subscripted variables denote partial derivatives with respect to the variables subscripted.)

vi. Equations 2.3 and 2.4 imply that the public service levels favored by the median voter will satisfy the usual criteria for intertemporal choice:

a. Public services will be provided at the level where the marginal rate of substitution between government services in period 1 and period 2 equals the intertemporal rate of transformation.

b. A similar condition holds for private consumption. However, the partial derivatives with respect to taxes, equations 2.5 and 2.6, do not contain tax rates as a variable, and hence tax rates are not adjusted in the same manner as public and private services.

Because of the implicitly assumed neutrality of debt, the timing of taxes does not affect utility as long as the budget constraints are satisfied.[8] This is the Ricardian Equivalence theorem within the context of an electoral model. Individuals are indifferent between debt and taxes as fiscal instruments.

If voter all have the same preferences and income flows—a highly unlikely circumstance—not only are the politics of debt formation in this model marked by unanimity, but also by indifference. **A model where individuals are fiscally homogeneous and debt is neutral has no direct implications regarding debt formation in equilibrium**.[9]

---

[8]Note that both equations 2.5 and 2.6 are satisfied as long as the two budget constraints are satisfied. The first order conditions imply that $Y_1 \lambda_1 = nY_1 \lambda_2$, and $Y_2 \lambda_1/(1+r) = nY_2 \lambda_2/(1+r)$. Dividing the first equation by the second yields: $Y_1(1+r)/Y_2 = Y_1(1+r)/Y_2$ which always is true. In a pure Barro type model, debt is neutral in that debt levels do not affect relative prices of government and private services, income levels or interest rates.

[9]In Barro's (1979) extension of his neutrality paper, debt levels are adjusted to minimize collection costs which vary with tax collection and income levels. In this paper, taxes (and debt) may be non-neutral because of dead weight losses generated by the tax code and its associated enforcement process. Minimizing collection costs allows an "optimal" time path of debt and taxes to be characterized.

Buchanan-Roback and the Median Voter

Buchanan's micoeconomic approach drops the assumed homogeneity of tax payer-voters. Buchanan allows for individual diversity, not only in incomes and tastes, but also in future tax obligations. In the Buchanan model, Ricardian equivalence may hold for the average taxpayer without holding for the majority of taxpayers.

Consider the following modified Barro model which is a variation of the Buchanan and Roback (1987) model. Assume that the distribution of income has a positive skew so that the median voter pays less than the average tax in both the present and future periods. The lower price of government services tends to increase the quantities of public services demanded relative to the original Barro setting. However, this sort of voter heterogeneity does not affect the choice of fiscal tools as long as the ratio of the median voter's tax obligation to the total tax burden is the same in each period.

Now suppose that the median voter's relative cost share differs substantially in the two periods. This would be the case for a median voter who expects to retire in period two. It would also be the case in an explict intergenerational context for voter-taxpayers whose children have *relatively* poor prospects for future income (and so pay relatively low taxes) or have no children. In such cases the median voter has a clear incentive to borrow in his or her period of high taxes and repay the loans in period where his or her expected taxes are relatively low, thus avoiding part of the cost of the public service financed with the debt.

i. To see this, suppose that the median voter expects to earn less income in period 2 than in period 1.
   a. Given the variation in individual incomes now assumed for the two periods, the public budget constraint becomes:

$$\sum_{i=1}^{n} t_1 Y_{1i} + \sum_{i=1}^{n} t_2 Y_{2i}/(1+r) = G_1 + G_2/(1+r) \qquad (4)$$

where the i-th individuals income in period t is denoted as Y_{ti}.

i. This new constraint changes the first order conditions for the partial derivatives with respect to taxes. The new first order conditions 2.5' and 2.6' become:

$$L_{t1} = -Y_1 \lambda_1 + \Sigma Y_{1i} \lambda_2 = 0 \qquad (2.5')$$

$$L_{t2} = (-Y_2 \lambda_1 + \Sigma Y_{2i} \lambda_2)/(1+r) = 0 \qquad (2.6')$$

a. Again, neither of these expressions contain taxes as a variable. Thus there no unique interior solution obtains for taxes.

b. These two first order conditions imply that tax rates in the two periods should be set such that:

$$Y_1 / \Sigma Y_{1i} = Y_2 / \Sigma Y_{2i} \quad (5)$$

c. which is impossible unless the ratio of median personal to aggregate income is the same in both periods.

d. **Absent this, a corner solution for taxes will hold**. And, taxes will be set at zero in period 1, which implies 100% debt finance of services in that period. That is to say, if the left-hand side is greater than the right-hand side, services in both periods will be paid for by taxes in the second period. In such cases, first period services will be *entirely debt financed*.[10] If the right-hand side is smaller than the left-hand side, services in period 2 would be entirely funded with a surplus generated in period 2.

The assumed neutrality of debt (the lack of income effects), implies that the median voter will impose taxes in periods where his tax obligations are minimized for the desired service levels.

Tabellini and Alesina: Electoral Uncertainty and National Debt

The Tabellini and Alesina (1990) model adds electoral uncertainty to the median voter's policy decision. They assume that the current median voter cannot commit future governments (future median voters) to specific fiscal policies. That is to say, the current median voter directly controls only current tax and service levels. However, to the extent that borrowing policies constrain future political decisions (that is to say that future governments will not default on the national debt), current debt decisions become an instrument through which the current policy makers can influence future tax and service decisions.

The Tabellini and Alesina analysis can also be captured with a minor extension of the simplified median voter model developed above.[11]

---

[10]This extreme conclusion is a consequence of debt neutrality. If the level of period 1 debt modestly affects period 2 income or income, period 1 services will be less than fully debt financed. However, only in cases where there are extreme non-neutrality would an individual who expects to earn below average income in period 2 prefer balanced budgets in both period to first period debt.

[11]Vaughn and Wagner (1992) argue that all the various approaches to debt can be combined into single unified theory. This can easily be done here by adding electoral uncertainty to the Bu-

i. Suppose there are two possible political outcomes in period two.
   a. The current median voter may get to decide public service in period 2 as well.

   b. Or, some other voter set tax and expenditure policies in period 2, given fiscal obligations (debt or surplus) adopted in period 1.

   c. Let α be the probability of the first electoral scenario and $(1-\alpha)$ be the probability of the second.

   d. In this case the objective function of the median voter of period 1 becomes:

$$U^e = \alpha\, u(C_1, G_1, C_2, G_2) + (1-\alpha)\, u(C_1, G_1, C'_2, G'_2) \qquad (5)$$

ii. The median voter solves two related constrained optimization problems.
   a. The first one is identical to the problem described above, the case in which he or she determines fiscal policies in period 2.

   b. The second optimization problem takes account of the possibility that the current median voter will not be the median voter in period 2. In this case, C'_2, G'_2 and T'_2 are not control variables for the median voter of period 1. However, the current median voter's choice of T_1 indirectly affects the second median voter's opportunity set by altering the amount of discretionary income available to the government in period 2. In the Tabellini and Alesina model future governments cannot renege on debt obligations incurred by past governments.)

   c. To capture these effects, a third constraint, the reaction function of the new median voter which specifies T'_2 (and thereby, indirectly, G'_2 and C'_2) as a function of the tax rates in the first period, is added to the model.[12]

   d. The original Lagrangian is denoted as L_1 and the second Lagrangian as L_2, so the joint Lagrangian is:

---

chanan-Roback model. However, such a combined model would not serve the purpose of this paper which is to demonstrate how choice settings affect the politics of debt finance.

[12] The second Lagrangian is $L2 = u(C_1,G_1,C_2,G_2) + \lambda_1 [(1-t_1)Y_1 + (1-t_2)Y_2/(1+r) - C_1 - C_2/(1+r)] + \lambda_2 [n(t_1Y_1 + t_2Y_2/(1+r)) - G_1 - G_2/(1+r)] + \lambda_3(T'_2 - t(T_1))$

$$L = \alpha L_1 + (1-\alpha)\, L_2 \tag{6}$$

e. Differentiating with respect to the control variables yields the following first order conditions:

$$L_{C1} = \alpha(U_{C1} - \lambda_1) + (1- \alpha)(U'_{C1} - \lambda_1) = 0 \tag{7.1}$$

$$L_{C2} = \alpha U_{C2} - \alpha\lambda_1/(1+r) = 0 \tag{7.2}$$

$$L_{G1} = a(U_{G1} - \lambda_2) + (1-a)(U'_{G1} - \lambda_2) = 0 \tag{7.3}$$

$$L_{G2} = \alpha U_{G2} - \alpha\lambda_2 /(1+r) = 0 \tag{7.4}$$

$$L_{t1} = -Y_1 \lambda_1 + nY_1 \lambda_2 - (1-\alpha)T'_{2t1} \lambda_3 = 0 \tag{7.5}$$

$$L_{t2} = \alpha(-Y_2 \lambda_1 + nY_2 \lambda_2)/(1+r) = 0 \tag{7.6}$$

$$L\lambda_1 = (1-t_1)Y_1 + (1-t_2)Y_2/(1+r) - C_1 - C_2/(1+r) = 0 \tag{7.7}$$

$$L\lambda_2 = n(t_1Y_1 + t_2Y_2/(1+r)) - G_1 - G_2/(1+r) = 0 \tag{7.8}$$

$$L\lambda_3 = (1- \alpha)(T'_2 - t(t_1)) = 0 \tag{7.9}$$

f. Focussing again on the rate of tax substitution between periods 1 and 2 characterized by equations 7.5 and 7.6, we find that tax rates will be set such that:

$$[Y_1 \lambda_1 + (1-\alpha)T'_{2t1} \lambda_3]/\alpha[(Y_2 \lambda_1)/(1+r)]$$

or simplifying:

$$T'_{2t1} = 0 \tag{8.0}$$

which is a function of tax rates in period 1.

iii. An interior solution is possible in this case even with the assumed debt neutrality.

a. Setting the marginal influence of current taxes on next period taxes equal to zero implies that period 1 tax rates are set to maximize the tax receipts in period 2.

b. By maximizing tax receipts, the current median voter indirectly maximizes his control over

expenditure levels and minimizes tax burdens in period 1.

c. Deficit finance in period 1 arises whenever the desired expenditure level is above the revenue generated by the optimal rate in period 1 ($nt^*_1 Y_1 < G_1$).[13]

Whether strategic elements of government finance implies deficit finance is a matter of the specific geometry of the reaction (best reply) function of the anticipated alternative median voter in period 2.

Lifetime and Production Cost Uncertainties and National Debt

The above analysis of the level and causes of government debt demonstrates that under complete certainty there are a number of factors that can generate significant use of debt finance as a method of shifting the burden of public programs to other tax payers (and their heirs) or as a means of constraining the choices of successive governments. The Buchanan and Tabellini and Alesina models suggest that changes in the original Barro model that affect expected future tax burdens or service levels affect debt levels in the present period. Models that take account of rational ignorance, fiscal illusion, and informational changes thus, may also affect expected future tax burdens and thereby deficits in the present.

For example, if the Barro model is modified to reflect uncertainty about whether the current median-voter-taxpayer (or his children) will survive to be taxpayers in period 2, anticipated future tax burdens are reduced relative to the original model. This transforms the Barro model to one resembling the Buchanan model previously analyzed. Uncertain survival of the median voter and his progeny causes additional debt finance to be undertaken.

A similar effect can arise if voters are uncertain about the costs of future services. Uncertain future service levels or future costs tend to encourage substitution of the more certain current services for future services relative to the original complete certainty model. To see this, consider the following modification of the Barro model. Suppose that the average cost of government services in period 2 may be one of three amounts: 1-k, 1, or 1+k, each with probability one third. The median voter's optimization problem becomes maximize:

---

[13]Note that corner solutions are not ruled out by equation 8. If period 2 tax rates tend to rise as period 1 tax rates fall over the entire range, then the same corner solution as in the Buchanan analysis is implied, as current taxes are reduced to zero and the entire period 1 government service level is debt financed.

$$L = (L^- + L^o + L^+)/3 \qquad (9)$$

b. where L^- is the original Lagrangian with the balanced budget constraint modified to account for the lower cost of government services, 1-k,

c. L^o is the original Lagrangian, and L^+ is the original Lagrangian with the balanced budget constraint modified to account for the higher cost of government services.

d. The median voter can still select a value for G_2, but both T_2 and C_2 are now determined by the actual cost of government services, and consequently they are no longer control variables.

e. Differentiating with respect to the remaining control variables yields the following first order conditions. (Terms superscripted with a "-", "o" or "+" are evaluated at period 2 government prices 1-k, 1, k+1 respectively.)

$$L_{C1} = [(U^-_{C1} - \lambda_1) + (U^o_{C1} - \lambda_1) + (U^+_{C1} - \lambda_1)]/3 = 0 \qquad (10.1)$$

$$L_{G1} = [(U^-_{G1} - \lambda_2) + (U^o_{G1} - \lambda_2)\ (U^+_{G1} - \lambda_2)]/3 = 0 \qquad (10.2)$$

$$L_{G2} = [(U^-_{G2} - \lambda_2(1-k)/(1+r)) + (U^o_{G2} - \lambda_2)/(1+r))$$

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ U^+_G

$$L_{t1} = -Y_1 \lambda_1 + nY_1 \lambda_2 = 0 \qquad (10.4)$$

$$L_{\lambda 1} = (1-t_1)Y_1 + (1-t_2)Y_2/(1+r) - C_1 - C_2/(1+r) = 0 \qquad (10.5)$$

$$L_{\lambda 2} = n(t_1Y_1 + t_2Y_2/(1+r)) - G_1 - G_2/(1+r) = 0 \qquad (10.6)$$

iii. The marginal rate of substitution between current and future government expenditures is:

$$\frac{[(U^-_{G1} + U^0_{G1} + U^+_{G1})]/3}{[(U^-_{G2} + U^0_{G2} + U^+_{G2}]/3} = 1+r \qquad (11)$$

iv. Government services in the two periods are timed so that the ratio of the expected marginal

utility from government services in period 2 to the expected marginal utility of government services in period 1 equals one plus the discount rate.

v. Equation 11 is, in expected value terms, analogous to equation 3 above.

vi. For any given values of current and future consumption and government service levels, the expected marginal utility of G_2 is now below that of the original, risk-free, choice.

a. The concavity of U implies that U^{+}_{G2} closer to U^{O}_{G2} than U^{-}_{G2}. Consequently, $U_{G2} > [(U^{-}_{G2} + U^{O}_{G2} + U^{+}_{G2}]/3$.

b. The numerator of equation 11 is approximately U_{G1}.[14]

c. Only a single value of G_1 is used to evaluate U_{G1}.

d. In order to return the marginal rate of substitution to its equilibrium ratio, consumption of G_1 must be increased relative to that of the complete certainty case.

Future cost uncertainty leads to the substitution of current for future government services. The constraints under this probabilistic choice are equivalent to those of the original complete certainty case in an expected value sense.[15] Since tax burdens are again assessed to minimize the median voter's tax share, cost uncertainty has no direct effect on the median voter's preferred timing of tax receipts. Consequently, while total tax revenues may decline somewhat under future government service cost uncertainty as planned future service levels decline, there is no particular reason for changing the timing of taxation. Debt is still neutral.

However, for any given tax rate in period 1, the size of the deficit implied under service cost uncertainty is larger than it would have been under the initial Barro assumptions. Similar conclu-

---

[14]Under the separable utility function used by Tabellini and Alesina, $U_{G1G2} = 0$, and the numerator is exactly U_{G1}. In other cases the effect of uncertain levels of service costs and therefore levels in period 2 are still approximately equal to U_{G1} as long as the increase in the marginal utility of G1 induced by a decline in G2 is approximately equal to that of the decrease in the marginal utility of G1 caused by an increase in G2. As long as extreme complementarity between current and future government services does not exist, the expected marginal utility of G_1 will increase relative to the expected marginal utility of G_2.

[15]The mathematical equivalence occurs because of the assumed average (expected) price being equal to the original uncertainty value of 1. Here, $G_2((1-k) + 1 + (1+k))/3 = G_2$.

sions hold for the Buchanan, and Alesina and Tabellini models. The debt effects of their extensions of the Barro model arise because of changes in the fiscal constraints that affect the timing of taxation. In this example, government debt increases because government cost uncertainty affects the timing of government services.

Finite Planning Horizons and National Debt

Several other informational problems exist which also tend to increase incentives for debt finance beyond that implied in the certainty models of debt formation. For example, (1) planning horizons may be shorter than the duration of a particular government, which allows the possibility that budgets may not be balanced in the "long run." The fact that forecasting errors rise rapidly as values further and further into the future are estimated implies that there comes a point where additional forecasts and planning are essentially without value. If this occurs before all debt is expected to be retired, long term borrowing becomes effectively a "costless" method of funding current government services.

Given debt neutrality, a planning horizon shorter than the anticipated debt repayment schedule clearly encourages debt finance. Given positive information costs, individuals may not uniformly gather information about government services, and moreover may remain ignorant of whole areas of fiscal policy. In many cases the expected benefits associated with being informed on an issue are below the costs of obtaining the information. Moreover, the same residual uncertainty that diminishes the benefits of becoming "informed" about future programs also tends to increase the cost of becoming "informed" about such programs. Consequently, fiscal ignorance about future programs tends to exceed that of fiscal ignorance about current programs. The extent to which any consequent biases affect the timing of taxation and expenditures is a matter of the extent and direction of the biases engendered.

As developed above, if fiscal ignorance merely increases uncertainty about the costs of future programs, it would still affect the timing of public service levels and thereby debt levels. Moreover, if future benefits of government programs or future tax burdens are systematically underestimated, the result would be an increase in debt levels. A decline in the benefits of future services makes current service relatively more attractive, while a decline in the anticipated future tax burden tends to cause the median voter to shift tax burdens into the future.[16]

---

[16] Such an effect, as seen above in the Buchanan model, causes debt finance to increase as tax burdens are shifted to periods in which anticipated burdens are reduced. Such biased assess-

Informational "Shocks" and Fiscal Uncertainty

When voters rationally accumulate information, their expectations about future costs, life expectancy, and holding office are affected by past efforts to accumulate and analyze data/information and new information that is relevant for such decisions. New information may be generated more or less randomly by nature or distributed strategically by persons and groups interested in affecting voter beliefs and through such effects public policies..

To see how such a process might operate, consider the following model of persuasion, based on Congleton (1986), in which two groups attempt to influence the decisive voter's expectation about the cost of a future government service. Suppose that campaign and other messages have at least a minor affect on his assessment of the likely consequences of the policies of interest.

In particular, suppose that the median voter (or his representative) has Bayesian priors on the range of possible costs that might occur, and updates these priors based on messages sent by the lobbying groups. In such a setting, it is easy to find cases where the process of public debate increases rather than decreases variance. For purposes of illustration assume that initially the average cost of future services can only be any one of three levels, 1-k, 1, and 1+k, where k is a random choice shock from an unknown probability distribution with mean zero.

a. The median voter's uninformed prior is that each of these prices is equally likely, $P(1+k) = P(1) = P(1-k) = 0.333$.

b. This implies that the expected average cost of future services before any persuasive efforts are undertaken by the lobbying groups is 1.

Interest groups that favor increased current government services have an incentive to send messages that future prices will be higher than expected, because higher expected future costs tend to cause substitution away from future programs toward current programs. Similarly, interest groups that favor the postponement of government services (or regulations) to period 2 would send messages that the average cost of future services will be lower than expected. Given the assumed

---

ments of tax burdens are easy to imagine. For example, individuals (an the Congress) may easily underestimate the extent to which current policies increase future unfunded fiscal liabilities. This might be argued of various government sponsored insurance programs in the U. S., which causes future tax burdens to be underestimated. In the case of insurance to the Banking industry, or social insurance, future tax obligations can not be known with certainty until the actual insurance liability arises in the future.

range of costs, the former can plausibly argue that actual costs will be 1+k; while the latter would argue that future service costs will be only 1-k. The median voter is naturally skeptical of messages sent by special interest groups, but believes that each message is slightly more likely to be true than false.

a. For purposes of illustration, let the probability that a particular message is heard be .4 if the stated value it is true and .3 if it is false and one of the other values actually obtains.

b. For example, the probability that a message that the future costs equals 1+k is heard is $P(M^+ | 1+k) = .4$ if 1+k is the true value and is $P(M^+ | 1) = .3$ if 1 is the actual value, and is $P(M^+ | 1-k) = .3$ if 1-k is the actual value.

c. (Superscripted "-", "o", and "+" are used to denote messages regarding the cost of future government services.)

The probability of hearing a particular message is the probability that it would be heard under one of these three circumstances.

a. Either it is true or false and one of the other cost levels obtains.

b. For messages M_j : $j = 1, 2, 3$ and average cost levels C_i , $i = 1, 2, 3$; the probability of hearing message M_j is $P(M_j)=\Sigma P(C_i)P(M_j | C_i)$, which given the assumed values of $P(M_j | C_i)$ is $(.33)(.4) + (.33)(.3) + (.33)(.3) = .33$ for all three messages.

The voter updates his priors after hearing the various messages using Bayes Law.[17]

a. The posterior probability assigned to 1+k is the following after a M^+ message is:

$$P(1+k | M^+) = [P(1+k)(P(M^+ | 1+k)]/P(M^+) \quad (12)$$

or substituting:

$$P(1+k | M^+) = (.33)(.4)/(.33) = 0.4$$

b. The M^+ message is persuasive in the sense that it causes the individual to revise his assess-

[17] Any process of updating which has qualitatively the same effects would yield similar con-

ment of the probability that service costs equals 1+k, from 0.33 to 0.4.

In this quasi Bayesian model of learning and persuasion, messages modestly influence an individual's probability assessment of alternative cost levels and thereby affect his expections about the costs of future programs. Table 1 reports successive posteriors for an alternating sequence of M+ and M- messages, and the mean and variance of each prior/posterior distribution.

Average Cost of Government Services	Original prior	M^+ message (1)	M^- message (2)	M^+ message (3)	M^- message (4)
1-k	0.33	0.3	0.36	0.32	0.41
1	0.33	0.3	0.27	0.24	0.17
1+k	0.33	0.4	0.36	0.43	0.41
Expected Cost	1	1+0.1k	1	1 + 0.108k	1
Variance	$.66(k)^2$	$.7(k)^2$	$.728(k)^2$	$.756(k)^2$	$.826(k)^2$

Note that each successive message has a small effect on both the expected cost of the government service and the variance of the estimate. Each successive message is somewhat persuasive, and consequently the expected cost moves in the direction of the message heard. The final assessment reflects the values of the original priors and the cumulative effect of all the messages heard. In the case represented in the table, the same number of M^+ and M^- messages were heard with generally offsetting effects on expected costs. However, although the expected cost of services is not much affected, the message series significantly *increased the perceived variance* of the estimated future cost of government services. A series of "extreme" messages tends to increase the variance of the distribution of posteriors. If voters are risk averse, a series of extreme messages may effect policies through effects on uncertainties even if they do not expect expected (mean) costs.[18]

The effect of such policy debates are the same as those associated with the move from a certain future cost environment to an uncertain future cost environment analyzed above.

Based on the results in the uncertain cost section above, the end result of the competitive

---

clusions. That is to say, as long as $dP(M^+)/dM^+ > 0$, messages will be persuasive at the margin.

[18]See Husted, T. A., Kenny, L. W. and Morton, R. B. (1991) for general empirical support for this Bayesian approach to messages. They find that voters often have expectations with greater error variances associated with them after U. S. Senate elections. See table 2.

persuasion will be an increase in current (period 1) government expenditures and thereby, ceterus paribus, an increase in current deficits (or a reduction in current surpluses). The proponents of increased current government service levels do not have to win the public debate to at least partially achieve their policy goals. It is sufficient to increase the uncertainty of future alternatives.

Interest Groups, Voter Ignorance, and Government Finance

There are a variety of interest groups that have interests that are affected by the timing and extent of government expenditures and also by timing and extent of taxes. In this section of the lecture, the possible influence of debt-oriented interest groups on fiscal policies is analyzed. In a pure voting model of government finance, the median voter (if one exists) indirectly determines the distribution of government services and the financial means used to attract economic resources into the public sector.[19]

In a model augmented with the effects of politically active special interest groups, policies open to the influence of interest groups are determined at the margin by the relative power of alternative interest groups. The Buchanan-Roback model indicates that the median voter may himself have a special interest in the timing and composition of government finance.[20] The analysis of this section demonstrates that interest groups will tend to find debt finance an attractive fiscal means to advance their ends.

There are many interest groups who are directly affected by government decisions concerning the level and timing of taxation and who therefore have an active interest in fiscal policies. For example, Alesina (1988) argues that the history of West European debt defaults (both literal defaults and monetizations [e.g. inflation]) and repayment reflects changes in the relative power of three coalitions: rentiers, entrepreneurs and workers. Many other politically active groups also have an interest in the timing of taxation and government services. For example, pro-service interest groups often

---

[19]In cases where a combination of voting rules and party discipline gives particular parties control of government, than the rather than the median voter, the median party member may be decisive. In such cases, changes in parties will cause substantial policy shifts, since the median party member's ideal point may be substantially distant from the median voter's ideal point. This modification does not significantly change the above analysis, which is cast in terms of the decisive voter. Moreover, in coalition governments, the decisive coalition member is often a centrist party.

[20]Cukierman and Meltzer (1989) demonstrate this point in a somewhat richer over-lapping generations model. However, their model of debt finance is not neutral in the sense of Barro or Alesina and Tabellini. In the Cukierman and Meltzer (1989) model, government debt issues bid up interest rates and crowd out private investment rates which reduces growth rates and future income levels.

appear to believe (or at least argue) that their particular area of interest is at a "crisis point" and therefore require *immediate* increases in government services, subsidies, or regulations. Here, the environmental, and education lobbies come to mind.[21]

If voters are perfectly informed, and a stable institutionally determined voting equilibrium exists, then special interest group influence is essentially ruled out. In such cases, voter preferences directly determine fiscal policies as weighted by the collective decision making arrangements. On the other hand, if voters are only partially informed about fiscal issues or remain completely ignorant of fiscally relevant policy details, several perfectly legal non-voting opportunities arise through which interest groups may strategically manipulate information costs to affect policy decisions as in the illustrated in the previous subsection. Illegal means also arise as a consequence of the imperfect knowledge of voters, but for the purposes of this paper it is assumed that bribery and other such efforts have only minor effects on general fiscal policy decisions.[22]

The above analysis of voter interests implies that interest groups who are able to persuade the median voter that current government services are relatively more valuable than future services, and/or that future taxes will be less burdensome than current taxes induce the median voter to increase the stock of debt issued in the current period. Casual observation suggests that the messages of groups favoring immediate service levels and tax postponement are more commonly heard than those espousing policies that encourage government account surpluses.

If this assessment is true, the balance of interest group power tends to increase the level of current deficits at the margin. The extent to which such groups have effects on political outcomes beyond their votes, is a matter of their ability to invest resources to persuade voters or their representatives of the relative merits of their positions.

---

[21]It bears noting that the degree of intergenerational altruism or foresight is not a decisive variable in this context. Many of the groups that favor speeding up the delivery of public services are, at least in public, motivated by concern about effects on future generations. For example, environmentalists argue that argue that reducing current emissions of "green house" gases will benefit future generations and reduce the long run cost of achieving a desirable distribution of global temperatures.

[22]Under some institutional arrangements, direct monetary incentives are legal and provide a more direct method by which interest groups may affect the votes of elected representatives. For example, a firm might hire a representative as a consultant, or director on its board of directors; or purchase services from firms in which a representative has an indirect economic interest. These indirect "purchases" of votes are neglected here in order to focus on informational aspects of vote-determined political processes. Analysis of the purely economic methods by which votes may be influenced is beyond the scope of this paper. See Buchanan Tollison and Tullock (1980) for an

The extent to which a given array of interest groups is able to influence public policy is partly a matter of local institutional arrangements, partly a matter of the resources invested by other groups, and partly a matter of the persuadability of voters and/or their representatives.[23] The effects of interest groups will be studied in more detail after the midterm.

Incentives to organize and become politically active are a matter each respective interest group's expected relative gains net of organizational costs, see Olson (1965). The same uncertainty, and imperfect information that tends to encourage median voters to use deficit finance, tends to make groups favoring immediate public services paid with future taxes larger and more effective groups than those groups favoring surpluses and postponement of government services. Such groups tend to have both greater interests at stake and lower organization costs than anti-deficit groups.

Future taxpayers are clearly not personally active current policy debates. Their interests are represented only indirectly and insofar as current taxpayers have a direct interest in reduced deficit spending or believe that their children will be relatively better off than they themselves are. In an environment where median income is rising at a substantially slower rate than average income, the interests of future taxpayers tend to be under-represented.

IV. A Sample of Political Economy of Debt References

Alesina, A. (1988) "The End of Large Budget Deficits," in Giavazzi, F. and Spaventa, L., Eds. High Public Debt: the Italian Experience. Cambridge:Cambridge University Press, 34-79.

Austin-Smith, D. (1987) "Interest Groups, Campaign Contributions, and Probabilistic Voting," Public Choice 54: 123-139.

Barro, R. J. (1974) "Are Governments Net Wealth?" *Journal of Political Economy* v82: 34-79.

Barro, R. J. (1979) "On the Determination of the Public Debt," *Journal of Political Economy* v87: 940-971.

Buchanan, J. M. (1958) *Public Principles of Public Debt*, Homewood, IL: Richard D. Irwin.

Buchanan, J. M., Tollison, R. D., and Tullock, G. (1980) *Towards a Theory or the Rent-Seeking Society*.

---

overview the rent-seeking approach to such political "markets."

[23] It is clear that if individuals were entirely unpersuadable, because they were perfectly informed or ideological zealots, resources would not be invested in information based lobbying activities, since such efforts would be ineffective. See Congleton (1991).

College Station: Texas A&M University Press.

Buchanan, J. M. and Roback, J. (1987) "The Incidence and effects of Public Debt in the Absence of Fiscal illusion," Public Finance Quarterly 15:5-25.

Coughlin, P. J. Mueller, D. C. and Murrell, P. (1990) "Electoral Politics, Interest Groups, and the Size of Government," *Economic Inquiry* 28: 682-705.

Congleton, R. D. (1986) "Rent-Seeking Aspects of Political Advertising," Public Choice 49: 249-263.

Congleton, R. D. (1989) "Campaign Finances and Political Platforms: The Economics of Political Controversy," *Public Choice* 62: 101-118.

Congleton, R. D. (1991) "Ideological Conviction and Persuasion in the Rent-Seeking Society," *Journal of Public Economics* 44: 65-86.

Cukierman, A. and Meltzer, A. H. (1989) "A Political Theory of Government Debt and Deficits in a Neo-Ricardian Framework," *American Economic Review* v79: 713-732.

Denzau, A. and Munger, M. (1986) "Legislators and Interest Groups: How Unorganized Interests Get Represented," *American Political Science Review* 80: 89-106.

Husted, T. A., Kenny, L. and Morton, R. B. (1991) "Campaign Expenditures and Voter Information: Evidence on the Malfeasance of Elected Officials," mimeograph: American University.

Lucas, R. E. and Sargent, T. J., eds. (1981) *Rational Expectations and Econometric Practice*. Minniapolis: University of Minnesota Press.

Lucas, R. E. (1992) "On Efficiency and Distribution," *Economic Journal* v102: 233-247.

Olson, M. (1965) *The Logic of Collective Action*. Cambridge: Cambridge University Press.

Plott, C. R. (1967) "Equilibrium and Majority Rule," *American Economic Review* 62:787-806.

Puviani, A. (1897) Teoria della Illusione Nelle Entrate Publiche. Perugia.

Puviani, A. (1903) Teoria della Illusione Finanziaria, Palermo.

Riker, W. H. (1982) "The Two-Party System and Duverger's Law: An Essay on the History of Political Science," American Political Science Review 76: 753-766.

Tabellini, G. and Alesina, A. (1990) "Voting on the Budget Deficiet," *American Economics Review* 80: 37-49.

Tullock, G. (1967) *Towards a Mathematics of Politics*. Ann Arbor: University of Michigan Press.

Tullock, G. (1981) "The Rhetoric and Reality of Redistribution," *Southern Economic Journal* 47:895-907.

Tabellini, G. and Alesina, A. (1990) "Voting on the Budget Deficit," *American Economic Review* v80: 37-49.

Vaughn, K. I. and Wagner, R. E. (1992) "Public Debt Controversies: An Essay in Reconciliation" *Kyklos* v45: 37-49.