Reducing Current Taxes to Raise Future Revenue*

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Abstract

A government which raises taxes in the current period may induce workers to invest in finding ways to reduce their tax payments, and so may reduce the government's ability to raise revenue in the future. Therefore, a government that fears it may have to raise much revenue in the future may set taxes in the current period at a lower level than that which would maximize revenue, or that would maximize social welfare in that period.

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1 Introduction

In his great budget speech of 1853, the British Chancellor of the Exchequer, William Gladstone, referred to levying an income tax, which Prime Minister Pitt had introduced during a war, in 1798-99. Gladstone said:

> If you do not destroy the efficacy of [the income tax] it affords you the means, should unhappily hostilities again break out, of at once raising your army to 300,000, and your fleet to 100,000, with all your establishments in proportion. And, much as may be said of the importance—in which I concur—of an army reserve and navy reserve, and of having your dockyards and your arsenals well stored, I say this fiscal reserve is no less important; for, if it be used aright, it is an engine to which you may resort, and with which, judiciously employed, if unhappily necessity arise—which may God in his mercy avert!—with it judiciously employed you may again, if need be, defy the world. This, then, is the purpose which the income-tax has served—that in a time of vital struggle it enabled you to raise the income of the country above its expenditure of war and civil Government; and that service so performed was performed at a time when men do not minutely inquire is let loose, and when whole plains are besmeared with carnage, are the times when it is desirable that you should have the power of resort to this mighty engine, to make it again available for the defence and the salvation of the country.
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> ...I say, therefore, Sir, that if we rightly use the Income-tax, when we part with it we may look back upon it with some satisfaction, and may console ourselves for the annoyance it may have entailed, by the recollection that it has been the means of achieving a great good, immediately to England, and ultimately to mankind.

This paper formalizes the idea and explore its implications, contributing to the literature in public finance, in particular to the analysis of intertemporal taxation. I shall consider how tax rates in one period can affect tax revenue in future periods, showing that a ruler in year y who anticipates that he may have to raise much revenue in year $y+1$ may limit the taxes he levies in year y. For an analogy, consider resistance to antibiotics. It may be best to withhold an antibiotic from a patient who is moderately ill, because

a current dose could make the antibiotic less effective were the patient later to become gravely ill.[1]

2 Literature

The analysis of intertemporal taxation relates to work by Barro (1979), who shows why reducing the deadweight loss from taxation requires government to smooth out taxes over time. The analysis also relates to option value—delay taking an action today because the future will reveal more information about what action is best.

Svensson (1988) models the incentives of an incumbent to reduce the ability of a successor with different preferences from raising much tax revenue. In particular, weak property rights push economic activity into the untaxed sector, thereby reducing the optimal tax level. Svensson (1998) also reports empirical support for his model, showing that high levels of political polarization are associated with poor protection of property rights.

3 Assumptions

3.1 State of nature

In period 2 the state of nature is either peace or war, with optimal provision of a public good higher in war than in peace. Let the probability that the state of nature will be war be π; with probability $1-\pi$ the state of nature will be peace.[2] Though I speak of war and of peace, the interpretation applies to any states of nature where the benefits of governmental spending differ. So peace can represent a time without a natural disaster, and war a time with it. Or, peace can be interpreted as a situation where government spending on medical research may be unproductive, whereas war is a situation where scientific advances make medical research productive.

[1] The opposite effect, analytically analogous, but not explored here, can occur if government better learns how to collect taxes the higher are current taxes—seeing how individuals evade high taxes in peace time, government may know how to control evasion in war time. Were such learning powerful, government would raise taxes in peace time in anticipation of raising taxes even more in war time.

[2] We can think of π as representing the probability of a regime switch.

The marginal benefit of government spending is γ up to the quantity q_s in state of nature s, with $q_p < q_w$, and is zero for greater levels. The population, of homogeneous individuals, has size N. To make things interesting, that is to suppose that taxation is socially worthwhile, $N\gamma$ must exceed 1.

The state of nature in period 1 is peace. For simplicity, the intertemporal discount rate is 0.

I shall suppose that spending must be contemporaneously financed by taxes. An alternative to keeping some tax in reserve for future contingencies is to borrow when the need arises. The qualitative conclusions continue to apply if government can borrow in period 1, raising taxes in period 2 to repay the debt. But the results do require that government cannot continue to borrow indefinitely or without limit. Borrowing may be especially difficult during a war: persons who think the country may be invaded will be unwilling to lend. In any case, the quantities q_p and q_w can be interpreted as the gap between what government would spend in a first-best solution, and the amount it can borrow, the gap requiring financing by taxation.

3.2 Taxpayers

All individuals are identical. Labor supply by each individual is exogenously fixed, at 1, which can be employed in either the taxed or the untaxed sector. Entering the untaxed sector involves a fixed cost, F.[3] The marginal product of labor is higher in the taxed sector than in the untaxed sector. This captures the finding that tax evasion varies by source of income, with the largest category of tax evasion arising from under reporting of business income, with about 57 percent of income not reported (see Slemrod 2007). Also consistent with the assumptions is the result by Giles and Caragata (2001) that in New Zealand an increase in taxes is associated with an increase in the size of the underground economy.

The wage, or marginal product, in the taxed sector is Y_t; the wage in the untaxed sector is Y_u. In a one-period model (say in period 2), a person's utility in the taxed sector is $(1-t)Y_t+\gamma tY_t+\gamma G_{-i}$, where G_{-i} represents taxes paid by all persons other than the one in question. To simplify the algebra, I shall ignore the term γtY_t; that is, I shall ignore the benefit an individual obtains when the taxes he pays increase the provision of the public good. As long as $\gamma < 1$, the qualitative results do not depend on this simplification.

[3]This cost can also be interpreted as a morale cost, as in Frey and Schneider (2000).

Note also that if γ is small, or if the public good is lumpy (say that a fighter plane costs \$100 million, so that added tax revenues from one person do not allow government to provide an additional fighter plane), then any one person's tax payment may contribute very little to increasing the provision of the public good.

A person who works in the untaxed sector in period 2, and who had not invested in tax evasion in period 1, has utility $-F + Y_u + \gamma G_{-i}$. These two expressions determine the maximum tax rate feasible in period 2. If people had invested in tax evasion in period 1, then no tax revenue is collected in period 2.

In the absence of tax evasion, the optimal tax rate in a period with the state of nature s must satisfy $tY_t = q_s/N$.

Note that the question discussed here is not whether a high tax always reduces revenue. The question is whether anticipation of high taxes induces investment in tax evasion, and so reduces the tax revenue that could be collected in the future. Thus, we can suppose that only a fraction f of the population might engage in tax evasion. Then in peacetime, a tax increase reduces the tax revenue from a fraction f of the population, and increases it from a fraction $(l - f)$ of the population, so that aggregate tax revenue can increase. But in wartime, for any given tax rate (including the revenue-maximizing one), tax revenue will be less (from the f people) because the high tax in peacetime induced them to invest in tax evasion.

The timeline follows:

- Government imposes a linear income tax for period 1.
- Each individual invests or not in tax evasion.
- Government collects tax revenue, using it to provide a public good.
- Nature determines the state of nature for period 2.
- Government imposes a linear income tax in period 2.
- An individual who had not previously invested in tax evasion in period 1 now invests or not in tax evasion.
- Government collects tax revenue, spending it on a public good.

4 Optimal taxation

4.1 Period 2

In period 2 the state of nature will be either peace or war. If individuals invested in tax evasion in period 1, then government collects no revenue in period 2. If they had not invested in tax evasion in period 1, then the maximum tax government can collect in period 2 makes an individual indifferent between working in the taxed and untaxed sectors in period 2. That is,

$$(1 - t_2)Y_t = Y_u - F, \tag{1}$$

or

$$t_2 = (Y_t - Y_u F)/Y_t. \tag{2}$$

In contrast, the first-best tax rate in state of nature s, absent tax avoidance, is

$$t_s = q_s/(NY_t). \tag{3}$$

4.2 Period 1

To make the problem interesting, suppose that if peace is expected over two periods, then tax evasion is not a problem. That is,

$$\left(1 - \frac{q_p}{NY_t}\right) Y_t \geq -F + 2Y_u. \tag{4}$$

Consider next the possibility of war, which occurs in period 2 with probability π. Then the maximum tax rate in period 1 which would not induce an individual to invest in tax evasion satisfies

$$(1 - t)Y_t + \pi(1 - t_w)Y_t + (1 - \pi)(1 - t_p)Y_t = 2Y_u - F. \tag{5}$$

The solution is

$$t = \frac{1}{NY_t}(NF + 2N(Y_t - Y_u) - \pi(q_w - q_p) - q_p). \tag{6}$$

Subtracting from this t_p yields $(NF + 2N(Y_t - Y_u) + \pi(q_p - q_w) - q_p)/q_p$, which for sufficiently large q_w and π is necessarily negative. That is, the first-best tax, t_p, in time of peace in period 1 is not feasible: imposing that

tax would induce an individual to invest in tax evasion in period 1. To avoid such tax evasion, government must impose a tax that generates less revenue than q_p, or government must provide less of the public good than it would were tax evasion not a problem. For an extreme example, suppose that when war is not foreseen, the tax that maximizes social welfare in period 1 is also the tax that would just avert individuals from investing in tax evasion. Then any value of $\pi > 0$, or any possibility that war would erupt in period 2, would lead government in period 1 to adopt a tax rate lower than t_p; for if it did set the tax rate at the level that maximizes welfare in one period, individuals would invest in tax evasion.

5 Extensions

Leviathan How would a Leviathan government, one that aims to maximize tax revenue, behave? Note that such a government faces a credibility problem— because in period 2 it would want to maximize tax revenue, setting the tax at that level which makes a taxpayer just avoid evasion, the only policy the Leviathan government could credibly adopt in period 1 is to set a zero tax. That is, a revenue-maximizing government will collect less revenue in the initial period than would a welfare-maximizing government. But, note that over the two periods, the Leviathan would raise more revenue.

State of war in period 1 A similar analysis applies if the state of nature in period 1 is war, with π the probability that the state of nature is war in period 2. Were government to impose a tax of $q_w/(NY_t)$ in period 1, and with a positive probability that government will also impose a tax of $q_w/(NY_t)$ in period 2, then an individual taxpayer would have an incentive to invest in tax evasion in period 1. To avoid that, government must impose a tax rate of less than $q_w/(NY_t)$ in period 1.

Infinite horizon We can modify the model to consider an infinite horizon. In any period, the government may choose a tax lower than the tax that maximizes welfare in any one period, because it fears that it will need high revenue in the future.

To be explicit, suppose that $q_p = 0$, and so we need only consider spending in time of war. Let the discount factor be δ. Let the equilibrium tax in time

of war be t_w. Then in time of war the maximum tax rate satisfies

$$(1-t)Y_t + \Sigma_{i=0}^{\infty}\delta^i\pi(1-t_w)Y_t = Y_u - F. \tag{7}$$

Setting $t = t_w$ gives the solution

$$t_w = \frac{\delta(F - \pi Y_t + Y_t - Y_u) - F - Y_t + Y_u}{Y_t(\delta(1-\pi) - 1)}. \tag{8}$$

Budget surplus The argument presented here argues against raising taxes in times of low need for public services, with the aim of establishing a "rainy day fund" that could be used when the need for public services is high. For the higher taxes in an early period can induce individuals to invest in tax evasion. An alternative to a rainy day fund is a rainy day tax, that is a tax, such as Gladstone advocated, which can be imposed in the future. Relatedly, the logic of this argument suggests that Republicans who want to cut spending or government revenue may gain little from cutting taxes. The tax cut makes it easier for Democrats to raise taxes in the future.

This reasoning is consistent with the empirical results reported by Romer and Romer (2007). They find that tax cuts in one period may increase spending in future periods, and that the main effect of tax cuts on the government budget is to induce subsequent legislated tax increases.

6 Conclusion

William Gladstone appeared to recognize that tax policy should consider the needs for tax revenue in the event of a severe, perhaps unlikely, event, such as a war. In this view, he appears to have discovered some hundred years before Milton Friedman did the existence of the "Peso Problem."[4]

To understand government we must ask not only what taxes government imposes but also what taxes it does not impose. Furthermore, when asking whether government is spending too much or too little, we should not look only at the current period but instead ask how current taxes will affect future revenues. The problem here resembles the peso problem in financial economics.

In the early 1970s, the exchange rate between the Mexican peso and the US dollar was fixed, with Mexican banks offering far higher interest rates

[4]For an exposition of the peso problem, see Sill (2000).

than US banks. That, said Friedman, is anomalous, since investors had arbitrage opportunities. If, however, investors feared a future devaluation of the peso (as indeed happened in 1976), then the current interest rate would reflect the devaluation risk. In other words, large events, even if unlikely, can strongly affect current events. The same holds for taxation.

7 Notation

F An individual's cost of entry into untaxed sector

G_{-i} Amount of tax revenue collected from other than person under consideration

N Population size

q_s Level of public good with positive benefits in state of nature s

t_1 Tax rate in period 1 which makes individual indifferent between investing and not in tax evasion

t_s Tax rate in period 2 when state of nature is s

Y_i Pre-tax income in sector i

δ Intertemporal discount factor

γ Marginal value of public good

π Probability that in period 2 state of nature will be war

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