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## Public Debt and Taxes

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The national debt, representing the accumulation of past choices to borrow rather than levy taxes, is frequently thought to constitute a burden on future generations. This burden is sometimes viewed as operating through direct income transfers from younger to older generations, and is sometimes described through the crowding-out of private capital formation. Alternatively, it has been argued that (domestically held) government bonds represent internally canceling debts and credits, and are therefore of negligible economic significance.

The first section of this chapter provides a brief examination of the historical development of national debt in the United States and the United Kingdom. In both cases, the principal increases in the ratio of debt to income are associated with wars and major economic contractions. The normal peacetime pattern, which applies also to the post-World War II period, is a declining debt-income ratio. The current ratios in both countries are not high by historical standards.

The next section discusses the effect of shifts between taxes and debt issue on perceived private wealth. The analysis centers around the so-called Ricardian theorem, that substitution of debt for taxes would not alter perceived private wealth. The sensitivity of this proposition is examined in relation to the finiteness of life, the imperfection of private capital markets, uncertainty about future tax liabilities, and some other factors. Finiteness of life would not be important if the typical individual were connected to future generations by private intergenerational transfers, either from parents to children (during life or at death) or from children to parents. The imperfection of capital markets is significant only if the government has some technical advantages over the private sector in the execution of loans—which is more likely to be important in underdeveloped countries than in developed countries

such as the United States. Uncertainty about future tax liabilities has an ambiguous effect, but, overall, the Ricardian theorem stands up theoretically as a plausible first-order proposition.

The final section relates the wealth effect of debt issue to the central economic questions, which include the burden of the debt on future generations, the crowding-out of private investment, and fiscal policy. The analysis demonstrates that the validity of the Ricardian theorem rules out a public debt burden or a crowding-out effect on private investment. The theorem also ensures that fiscal policy, in the sense of tax changes accompanied by compensating adjustments of the government deficit, is impotent as a device for stabilizing the economy.

### Some Data on Public Debt

Table 1 provides an overview of the behavior of the national debt in the United States since 1860. The first column shows the par value of nominal, interest-bearing federal debt net of holdings by U.S. government agencies and trust funds and the Federal Reserve. This concept of national debt is limited to the funded portion that corresponds to interest-bearing government bonds. As discussed by Feldstein (1974), the debt definition can be widened substantially to include the anticipated expenditures payable under social security and other governmental transfer programs. However, the present chapter limits consideration to the narrow national debt concept. The second column expresses the quantity of debt in real terms after division by a general price index (the GNP deflator), and the third column indicates the ratio of nominal debt to nominal gross national product. The quantity of public debt outstanding in 1860 amounted to only 1% of GNP.<sup>1</sup> During the Civil War, extensive deficit finance increased the debt-GNP ratio to about 25% in 1865. The long, essentially peacetime period that followed showed a steady decline of the national debt to about 2% of GNP in 1916. The figure rose sharply during World War I to a peak value of just under 30% of GNP, and then fell during the postwar period to about 14% in 1929. The large federal deficits and the decline in nominal income during the Great Depression increased the ratio to more than 40% in 1940. The ratio then increased sharply to just over 100% because of the vast debt issues of World War II. As in the peacetime periods following the Civil War and World War I, the debt-GNP ratio since World War II has steadily declined. However, because of the chronic inflation associated with the "new monetary standard,"<sup>2</sup> the debt figures expressed as dollars do not show the steady decline that characterized the earlier postwar periods. In 1974 the ratio fell below 20%, but increased to 24% in

<sup>1</sup>An interesting note about the pre-1860 period is the experience in 1835 when the national debt was entirely paid off and the government sought desperately for outlets for its surplus. Apparently this problem was solved by the motivation for deficit finance during the sharp economic contraction that began in 1837. For a discussion of this episode, see Dewey (1931, p. 221).

<sup>2</sup>See Klein (1975, pp. 461-484) on the significance for long-run price level behavior of the shift from the gold standard to a paper money regime.

**Table 1***Values of Government Debt and Expenditures in the United States for Selected Years*

Year	Federal government				State and local government			
	(1) $B_f$	(2) $B_f/P$	(3) $B_f/Py$	(4) $G_f/Py$	(5) $B_{sl}$	(6) $B_{sl}/P$	(7) $B_{sl}/Py$	(8) $G_{sl}/Py$
1860	.06	.4	.01 <sup>a</sup>	.01 <sup>a</sup>				
1865	2.22	8.7	.24 <sup>a</sup>	.10 <sup>a</sup>				
1867	2.24	8.8	.23 <sup>a</sup>	.04 <sup>a</sup>				
1880	1.71	9.1	.13	.02				
1902	.93	5.6	.041	.02	2.1	12.7	.09	.05
1916	.91	3.8	.018	.02	4.5	19.0	.09	.06 <sup>b</sup>
1918	20.5	59.9	.26	.23	5.1	14.9	.06	
1922	21.6	67.1	.29	.04	7.9	24.5	.11	.08
1929	14.9	45.3	.14	.03	13.6	41.3	.13	.07
1940	41.5	142.6	.42	.10	16.4	56.4	.16	.08
1945	228.2	600.5	1.07	.40	13.4	35.3	.06	.04
1948	193.6	364.6	.75	.13	17.0	32.0	.07	.06
1956	198.1	314.9	.47	.17	44.5	70.7	.11	.08
1964	218.1	300.0	.34	.19	90.4	124.3	.14	.09
1974	269.9	231.9	.19	.21	211.2	181.4	.15	.11
1976	408.5	305.3	.24	.23	236.3	176.6	.14	.11

Source: Barro 1978a.

<sup>a</sup> Based on a trend value of real GNP.<sup>b</sup> Value is for 1913.

Key:  $B_f$  is nominal, par value, interest-bearing federal debt in billions of dollars, net of holdings by federal agencies and trust funds and the Federal Reserve. Values since 1916 are at the end of the calendar year; earlier values are at midyear.

$P$  is the GNP deflator (1972 = 1.0).  $y$  is real GNP (1972 dollars).

$G_f$  is total nominal federal expenditure.

$B_{sl}$  is the end-of-year value in billions of dollars of net nominal state and local government debt.

$G_{sl}$  is total nominal state and local government expenditure less transfers from the federal government to the state and local sector.

1976 and 1977 as a consequence of the strong economic contraction. These figures show that the current debt-GNP ratio is not high by historical standards, and is well below the values that prevailed during the 1950s.

Over the past 50 years, federal spending has increased dramatically as a percentage of GNP, rising from 3% in 1929 to 23% in 1976 (see Table 1, column 4). Since World War II, this increased federal spending has been accompanied by a steady decline in the debt-GNP ratio.

State and local government debt and spending are shown in columns 5 through 7. Here, the debt-GNP ratio (column 7) has increased from 1902 (9%) to 1940 (16%), except during World War I, when the rise in nominal GNP reduced the ratio. After a sharp decline during World War II, the ratio of state and local government debt to GNP rose gradually to its pre-World War II level, which was attained by the mid-1960s. The ratio has remained steady at that value to the present.

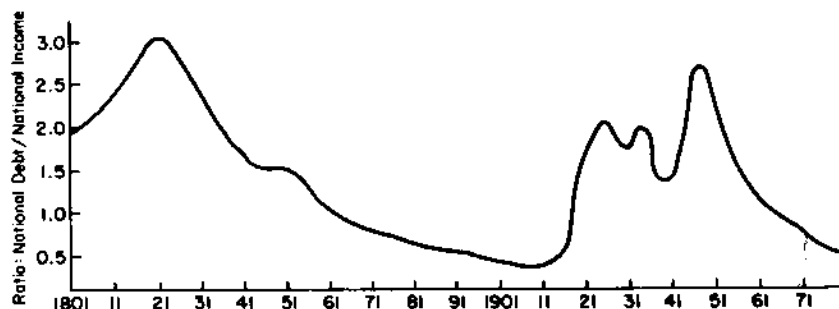


Figure 10.1. Behavior of the British national debt [from Benjamin and Kochin (1978)].

It is interesting to compare the U.S. experience with that of Great Britain. Figure 1, which is taken from on-going research by Benjamin and Kochin (1978), plots the ratio of British national debt to national income since 1801. As with the U.S. experience, there is a strong positive effect of major wars on the debt-income ratio. The extensive deficit finance of the Napoleonic Wars produced a debt-income ratio of almost 3.0 in 1821—a value almost three times the peak ratio reached in the United States in 1945. The British experience shows a long period of declining debt-income ratios from 1821 until the start of World War I. A strong increase in the ratio during the war was extended to the depressed economic period of the 1920s and early 1930s. A further sharp expansion of national debt occurred during World War II, although the peak debt-income ratio remained somewhat below that attained in 1821. Finally, as with the U.S. experience, the British debt/income ratio has steadily declined since World War II. Again, the current ratio of public debt to national income is not high by historical standards.

### Economic Effects of the Debt-Tax Choice

What difference does it make for the economy if the national government finances its expenditures by debt rather than by taxation? The argument that there is no first-order difference, which dates back to Ricardo (1951, Vol. 1, pp. 244–248, Vol. 4, pp. 184–189), begins by observing that public debt issue implies a stream of future interest payments and possible repayments of principal. These future payments must be financed either by future taxes (including future money creation, which is a form of taxation that works through its effect on the price level) or by additional deficits, which would further increase future interest and principal payments. The option of financing interest payments solely through new debt issue raises the possibility that taxes could be escaped through perpetual deficit finance. But this possibility depends on a chain-letter mechanism in which individuals would be willing to hold ever-expanding amounts of public debt without regard to the government's limited capacity to raise revenue for debt repayment.<sup>3</sup> Generally, it

<sup>3</sup>In the case where the interest rate, net of expected inflation, on the public debt exceeds the long-run real growth rate of the economy (which turns out to be a necessary condition for the efficient operation of

seems safe to ignore this "free lunch" possibility, and to assume that debt issue implies a corresponding increase in the total of taxes that must be collected. As a simplification, I also assume that the future interest payments implied by current debt issue are exactly matched in magnitude and timing by additions to future taxes.

This case, in which future interest payments are not financed by additional debt issue and in which future taxes are not high enough to retire outstanding debt, turns out to be adequate for examining the major economic effects of the debt-tax choice.

Suppose that an additional \$1 million of current government expenditure is financed either by current taxes or debt. In the former case, individuals experience an additional one-time tax liability of \$1 million. In the latter case, assuming the interest rate on government bonds to be 5% per year, government interest payments and, by assumption, tax collections are raised "forever" by \$50,000 per year. (It is assumed that there are no direct administrative costs associated with public debt issue, and also that, aside from the difference in timing, the incidence of the \$50,000 annual tax is identical to that of the lump-sum \$1 million collection. Otherwise, an additional pure income redistribution effect would be added to the analysis.) Basically, the representative taxpayer would view the choice between debt issue and taxation as equivalent to the choice between a share of the \$1 million current tax and a like share of the \$50,000 annual tax in perpetuity. The two options would be viewed as equivalent—producing what economists call the Ricardian equivalence theorem on the public debt (see Ricardo 1951)\*—under the following conditions: (a) there is no possibility of escaping part of the perpetual tax liability, either by dying (which introduces an effect of finite lives) or by leaving the jurisdiction of the government; (b) everyone can borrow and lend funds at the same interest rate as the government; (c) there is no certainty about future tax shares, which might be induced by uncertainty about individual income or other characteristics that determine tax shares; (d) the future tax liabilities implied by public debt are accurately perceived; (e) the volume of government expenditures is independent of the method of finance; and (f) no other channels exist for effects of the choice of finance method on the prices, rates of return, and so on, faced by individuals.

Considering the length of this list, it is obvious that not all of these conditions could be exactly satisfied. In evaluating these factors it is therefore useful to distinguish between first- and second-order effects and to weigh the likely balance of forces. I discuss, first, the various issues from the viewpoint of the effect of debt issue on how individuals evaluate their personal wealth—and second, the connec-

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the private sector), perpetual deficit finance would require a continually rising ratio of public debt to national income. For a discussion of this and related matters, see Barro (1976, pp. 343-349). The chainletter aspect of perpetual deficit finance has been referred to as a Ponzi scheme by Miller and Upton (1974, p. 181) in honor of the "Boston money-manager" of the 1920s, who paid people 50% interest on funds deposited with him. He did so by using the proceeds of new deposits to pay off old depositors. While it worked, it was a good deal. Those who got in (and out) early made money, but the bubble eventually burst, and those who still had deposits with Ponzi lost everything."

\*A discussion of the Ricardian theorem is contained in Buchanan (1958, pp. 43-46, 114-122). See also de Marco (1936, 377-98) and Bailey (1971, 156-158).

tion of these wealth perceptions to the burden of the public debt argument, to crowding-out of private investments, and to fiscal policy.

## Finite Lives and Related Matters

Suppose that interest payments and associated tax liabilities extend beyond the expected lifetime of the representative current taxpayer (as is clearly the case when the debt principal is "never" paid off). In this situation, an individual who is unconcerned with the welfare of his descendants, and who can borrow and lend at the same interest rate as the government, would be better off with a share of the \$50,000 annual liability than with the like share of the single payment of \$1 million. Consider an individual who expects to live 20 years, and who meets the one-time tax cost of his share of \$1 million by reducing his interest-bearing assets by a like amount. Since these assets have a 5% yield, by assumption, annual income is reduced by the share of \$50,000—the same annual cost that arises under the debt-finance option and which could have been met from the interest on the same assets, which could then have been maintained intact. Although the two finance options balance in this respect, there is a difference in the taxpayer's estate after 20 years. Under the tax option, the estate is reduced by the share of \$1 million. Under the debt option, with no further tax payments required after 20 years (i.e., after death), this reduction does not apply. Anticipating this outcome, a taxpayer wishing to leave a zero (or fixed-size) estate, would therefore increase his lifetime expenditure under the debt option (financed by consuming the capital that would otherwise remain in the estate).<sup>5</sup> Thus, finite lives imply that the representative current taxpayer would perceive himself wealthier under debt issue than under taxation.

The choice of taxation versus debt produces a wealth effect associated with finite lives, because some of the future tax liabilities needed to pay future interest are shifted to members of later generations. If the added liabilities on descendants were fully counted in wealth calculations by current taxpayers, then the present distinction between the debt and tax options would disappear. Essentially, public debt issue enables members of current generations to die in a state of insolvency by leaving a debt for their descendants. Current taxpayers are "wealthier" if they view the implied governmental shifting of income across generations as desirable. In fact, most individuals already have private opportunities for shifting income across generations that they have chosen not to exercise. Parents make voluntary contributions to children in the form of educational investments, other expenses in the home, and bequests. Children—especially before the expansion of social security—provide support for aged parents. To the extent that private, voluntary, intergenerational transfers of this sort are operative—and casual observation suggests that such transfers, in the appropriate, broadly defined, sense, are pervasive—the shift from tax to

<sup>5</sup>The same conclusion applies if the taxpayer borrows to finance his share of the \$1 million tax cost, assuming that such loans at 5% interest must be secured by life insurance.

debt finance (or, analogously, the introduction of a pay-as-you-go social security scheme) would not present the representative individual with a new opportunity for extracting funds from members of other generations. Rather, the private response to debt issue or to more social security would be to shift private, voluntary transfers by an amount sufficient to restore the balance of income across generations that was previously deemed optimal. In this case, a shift from tax to debt finance would not affect the perceived wealth of a finite-lived taxpayer.<sup>6</sup>

A taxpayer can also escape some part of the future taxes associated with debt by leaving the jurisdiction of the government. Presumably, this option is more pertinent for state and local governments than for the national government, and is generally more important where out-migration costs are low. However, the incentive for individuals to leave an area with a large accumulated debt would arise only where the quantity of government-owned real capital was not sufficient to generate income offsetting the debt-finance costs. At a local level, therefore, debt issue will tend to be associated more with large capital projects than with financing of current expenditures. One further consideration involves the capitalization of taxes—especially property taxes—into property values. To the extent that a higher flow of anticipated future taxes is already reflected in reduced property values (and, correspondingly, in a reduced annual cost of housing, etc.), individuals would not be motivated to move out of the jurisdiction with these higher future taxes.

### Imperfect Private Capital Markets

The argument that debt and tax finance are equivalent depends also on the correspondence between private and governmental interest rates. Suppose, instead, that some individuals have poor collateral on private loan markets, and therefore face borrowing rates that are much higher than the government's rate, still assumed to be 5%. The high private borrowing rates would reflect both risk of default and administrative costs associated with the operation of loan markets. Suppose that the government reduces current taxes by \$1,000 on an individual (Person A) with a high or infinite borrowing rate, and substitutes the issue of a \$1000 bond, which would be held by a different individual or firm (Person B), who regards 5% per year from the government as a satisfactory rate of return. I assume that the \$50 per year flow of taxes to finance the interest payments on the bond are levied on Person A, so that no direct redistribution of income results. The net outcome of this debt-creation

<sup>6</sup>A rigorous treatment of this private offset effect is contained in Barro (1974, pp. 1095-1117). A complication to the analysis arises when some taxpayers have more or less than the average number of descendants. For example, individuals without children may have no ties to future generations and are therefore made better off by debt issue, although such individuals must be matched by other persons with an above-average number of children who are likely to be made worse off by debt issue. A second-order wealth effect from debt issue would arise if these individual effects do not cancel out through aggregation. Another second-order effect is the stimulus of debt issue toward reduced family size, which would be motivated by the corresponding reduction in family liability for the stream of future taxes.

process is that Person A borrows \$1000 at a 5% interest rate from Person B. With his high private borrowing rate, Person A is likely to be better off, because he may be willing to pay much more than 5% annual interest (even for a loan on which default is "impossible") in order to shift expenditures from the future to the present. Person B is satisfied, because the 5% yield is guaranteed by the government, although he would not accept such a return on a direct loan to Person A. Apparently, the shift to debt finance would therefore raise the average perceived wealth of current taxpayers.

The government's debt issue functions as a successful intermediation in the credit market, because it avoids the high transaction costs of private loan market operations that are implicit in the initially high borrowing rate of Person A. There is a hidden assumption that the government is more efficient than the private market in carrying out credit market operations. The omitted costs are those entailed by the collection of the flow of future taxes (rather than the single current tax) from Person A. If this individual is a poor credit risk who requires large "supervision" costs on the private market, he is likely, despite the government's coercive taxing powers, to be a similar risk on public loans. The argument that debt issue raises perceived wealth because of imperfect private capital markets assumes that the government is more efficient, at the margin, than the private market in carrying out the loan process.<sup>7</sup>

A related argument is that the superior marketability (which economists call liquidity) of public debt securities allows the government to sell its bonds at lower interest rates than those applicable to private obligations. This point seems to apply with most force to "high-powered" money—which consists, in the United States, of currency and reserves of commercial banks that are members of the Federal Reserve system—where the government has some clear monopoly power. In the United States, this monopoly position does not seem to extend significantly to interest-bearing debt, since the private market seems able to generate, at similar underlying administrative costs, close substitutes for both short- and long-term government securities. Therefore, from the liquidity standpoint, it seems unlikely that shifts between taxes and interest-bearing debt would, at the margin, significantly alter perceived private sector wealth in a developed country such as the United States.

## Uncertainty about Future Taxes

It is often argued that, since the future individual tax liabilities implicit in public debt issue are unpredictable, they would be heavily discounted in calculations of wealth positions.<sup>8</sup> In fact, risk-averse individuals would tend to give higher, rather

<sup>7</sup>Private bail bondsmen are perhaps a response to a differential collection efficiency that favors the private sector. Casual observation of the federal government's student loan program suggests that relative government efficiency in the credit markets is actually an amusing idea.

<sup>8</sup>See, for example, Bailey (1971, pp. 157-158); Buchanan and Wagner (1977, pp. 17, 101, 130). The contrary view is taken in Buchanan (1967, pp. 258-260), and in Barro (1974, pp. 1113-1115).

than lower, weight to a given anticipated amount of future taxes when the uncertainty attached to these liabilities increases.<sup>9</sup> On this count, the substitution of debt issue for current taxation will tend to diminish perceived wealth.

Offsetting this conclusion, some future tax liabilities reflect movements in uncertain future individual incomes, rather than changes in other individual characteristics affecting tax liability, shifts in tax procedures, and so on. A positive association between individual taxes and incomes would buffer changes in individual disposable incomes, and would therefore offset the other effects of uncertainty in wealth calculations. The overall effect of uncertainty on the perceived wealth effect of debt issue is generally ambiguous.

### Misperception of Future Taxes

It is also sometimes argued that the future taxes implicit in the public debt are largely ignored because of complexity in estimating them (Feldstein, 1976, p. 335; Buchanan and Wagner, 1977, p. 130). This problem, however, seems similar in its effects to uncertainty about future tax procedures as discussed earlier, which tend to magnify, rather than diminish, the average effective weight assigned to future taxes. In any event, it is unclear why misperceptions or "irrationality" would call particularly for underestimation of future taxes. At this level of analysis, one could just as well argue that government deficits, which are well publicized, make people nervous and induce them to feel poorer.

A more plausible argument is that unusual movements (either up or down) in the public debt—that is, government deficits not arising from the usual pattern associated with the business cycle, government expenditure changes, etc.—would be temporarily misperceived.<sup>10</sup> However, in a preliminary investigation (Barro, 1978c), I have been unable to isolate important effects of unusual (or usual) public debt movements on economic activity.

### The Volume of Government Expenditure

The preceding analysis has treated the amount and composition of government spending as fixed, while considering some consequences of different methods of finance. Therefore, it has been possible to abstract the analysis from evaluations of government expenditure programs. It has, however, sometimes been argued that the existence of the debt-finance option effectively "cheapens" government expenditure, because deficits are politically more popular than taxes.<sup>11</sup> This argument is

<sup>9</sup>I am assuming that private insurance markets and other institutions are not sufficient to provide full diversification of relative tax risks.

<sup>10</sup>The adjustment of the measured government surplus to obtain a "full employment surplus" that takes account of the automatic stabilizer role of the tax system seems to be consistent with this viewpoint. The full employment surplus is discussed in Council of Economic Advisers (1962, pp. 78–81).

<sup>11</sup>Buchanan and Wagner (1977) present this hypothesis as the major theme of their book. They attempt to explain much of the rise in the U.S. federal spending/GNP ratio since World War II as a

equivalent to the proposition that a shift, at the margin, from taxes to debt would substantially raise perceived private sector wealth, since a move toward deficit finance would only be politically popular in this circumstance. Therefore, the same theoretical objections may be raised against it.

## Public Debt and the Timing of Taxation

The set of arguments that includes finite lives, imperfect private capital markets, uncertainty about future taxes, and misperceptions of tax liabilities does not make an impressive a priori case for public debt issue to alter perceived private wealth in one direction or the other. In a country like the United States, in which the government's technical advantages at the margin in the loan process, or in creating liquidity are likely to be minimal, it is reasonable to conclude that substitution of debt issue for taxes will have a wealth effect of second-order magnitude (and of indeterminate direction).

One difficulty with this sort of negative conclusion is that it does not provide a basis for a positive theory of public debt issue. I have attempted to construct such a theory in another paper (Barro, 1978c) by focusing on the role of public debt issue as a mechanism for smoothing the time path of tax collection. Suppose that taxes entail collection costs or impose distortions on the private economy, and that these costs increase with the fraction of current national income that the government collects in taxes. Although public debt issue does not permit permanent escape from taxation, it does allow rearrangement of the timing of collections. With "collection costs" as an increasing function of the ratio of taxes to national income, the optimal method of public finance turns out to involve a pattern of debt issue that rules out any predictable changes in this ratio. This behavior raises a given total of tax revenues in a manner that minimizes the expected overall costs of collection.

Among the empirically important implications of this model, deficits would be used to finance temporary government expenditures, especially the large outlays during wartime, and debt issue would be large during recessions and small or negative during booms. During wartime, debt will avoid large temporary movements in the tax-income ratio; during recessions it will preserve stability of the tax-income ratio over the business cycle in the face of little cyclical fluctuation in government spending. Another result is that the debt-income ratio will tend to decline rather than remain constant during peacetime periods, to average out, ex ante, the large positive effects on debt issue of wars and severe contractions; and nominal debt will grow, other things equal, one to one with the anticipated rate of

response to a structural change to a "Keynesian debt policy" that made deficits politically more popular than before. However, this hypothesis seems to conflict with the observation that the federal debt/GNP ratio (Table 1) has actually fallen in the post-World War II period in a manner similar to that after World War I and the Civil War. Detailed empirical analysis of annual public debt movements that I have carried out, as discussed below, indicates that the economic structure that determines the amount of deficit finance has been reasonably stable since at least the 1920s.

growth of nominal national income. The last effect is especially important during the inflation of the last decade in the U.S., when much of the federal deficit for these years (although only about 30% of the total for 1975-1976) is associated merely with maintaining the anticipated real value of the outstanding interest-bearing public debt. Finally, the model also implies that certain variables—in particular, the size of the accumulated past debt and the level of government expenditure—would not be important determinants of current debt issue.

My empirical analysis suggests that the principal movements in publicly held, interest-bearing federal debt in the United States since World War I can be explained by three variables: (a) the movement in federal expenditures relative to "normal"—which captures, in particular, the strong response of debt issue to temporary wartime spending; (b) the movement in real GNP relative to trend, which captures the countercyclical response of debt issue; and (c) a one-to-one effect of the anticipated inflation rate on the growth rate of nominal debt. The effects of these three variables on debt issue appear to be reasonably stable over the post-World War I period. For example, the sharp expansion of federal debt for 1975-1976 emerges as a response of somewhat more than the usual size to the sharp contraction of output and to the high value of the anticipated rate of inflation. The overall extent of countercyclical debt movement is, actually, stronger than that called for by the model. However, results for the 1920s and 1930s appear similar in this respect to those for the post-World War II period. The evidence does indicate that the size of the outstanding debt (relative to GNP) and the level of government expenditure (as a fraction of GNP) are irrelevant to current debt issue. Overall, the analysis supports the theory of public debt that neglects direct wealth effects and focuses on the tax-smoothing role of deficits.

## The Burden of the Public Debt

The sense in which the domestically owned national debt constitutes a burden on future generations has occupied substantial attention of economists.<sup>12</sup> This topic is intertwined with the wealth effect of debt issue, as can be illustrated for the case of finite-lived taxpayers that was discussed earlier. Suppose that the representative current taxpayer is unconcerned with his descendants and, therefore, experiences an increase in wealth when taxes are replaced by debt. As Buchanan (1958) has argued, the burden on future generations is direct and involves, in particular, the liability for taxes that greets members of future generations as they are born. This first-order argument for debt burden is independent of complications that involve the crowding-out of private investment, the direct role of government expenditure programs, the observation that the resources utilized by government for current expenditures must come out of current output, and so on. The debt burden on future generations is analogous to the one that might arise under a pay-as-you-go social

<sup>12</sup>See, for example, the papers in Ferguson (1964), and the review by Tobin (1965, pp. 679-682).

security scheme involving no government purchases of goods and services. Currently old individuals receiving retirement payments would benefit initially at the expense of the currently young taxpayers. These currently young individuals would be able to recoup a portion of their losses, because members of later generations will be born with the liability to pay taxes to finance social security benefits to retirees. Overall, there will be a transfer of wealth from younger generations (including the currently unborn) to older generations.

While this kind of analysis captures the essence of the public debt-burden argument, it is incomplete because it does not discuss the restoration of economic equilibrium after the initial boost to wealth perceptions. Basically, the rise in perceived wealth will increase consumer demand and, therefore, any increase in saving—which increases the supply of private loanable funds—must fall short of the rise in the government's demand for borrowings. The resulting excess of demand over supply will increase interest rates to restore equilibrium in the loanable funds market. The depressing effect of this higher required rate of return on private investment constitutes a crowding-out of public borrowing. Franco Modigliani (1961, pp. 730–755) has labeled the associated long-run decline in the economy's capital-labor ratio as the burden of the public debt on future generations (in the sense that each generation, in aggregate, bequeathes a smaller capital stock to its descendants). Although a capital stock reduction would be predicted under the above assumption about wealth perceptions, this effect is not the essence of the debt-burden argument, which has been captured above by the direct intergenerational income transfers that are implied by debt issue or social security.

The arguments for debt burden and for crowding-out of private investment hinge on the assumption that debt issue raises perceived wealth. Neither a burden on future generations nor crowding-out would occur in the case discussed earlier, where the public intergenerational transfers implied by debt issue or social security are fully offset by compensating adjustments in voluntary private transfers. For example, there may be no net change in income distribution across generations if parents react to debt issue by increasing transfers to their children, or if children react by reducing transfers to their aged parents. With the corresponding absence of a shift in perceived wealth, consumer demand would not be stimulated by the movement from taxes to debt issue. It follows that the supply of private loanable funds would rise one to one with the cut in current taxes (increase in current disposable income), so that the extra governmental demand for funds implied by its debt issue would be fully absorbed by the private sector without an increase in the rate of return. Under these circumstances—when public debt issue leaves unchanged the value of perceived wealth—the crowding-out of private investment would not arise.

### *Imperfect Private Capital Markets*

Imperfect private capital markets (or the superior liquidity characteristics of government debt), which may be especially important for underdeveloped countries, also imply that public debt issue may raise perceived wealth. However, the

analysis of debt burden and crowding-out for this case is quite different from that described earlier. Substitution of debt for taxation can work, in part, as an effective governmental intermediation in credit markets. By cutting current taxes, the government can place some funds in the hands of individuals with high (or infinite) borrowing rates who have correspondingly high opportunity rates of return for investment or consumption purposes. These individuals would respond to the tax cut by raising their demands for commodities and—as they exhaust the opportunities with the highest imputed rates of return—by correspondingly reducing the interest they would be willing to pay on borrowed funds. On the other hand—neglecting the government's collection costs for future taxes—individuals or firms with interest rates equal to the government's rate would be initially unaffected by the tax cut. Because of the net increase in private commodity demand, it again follows that the government's increased demand for loanable funds would exceed the increase in private supply. With debt issue, therefore, the interest rate on risk- and transaction cost-free loans will again rise. However, as shown above, the imputed rate of return for the individuals with high borrowing rates must fall. Therefore, the government's credit market intermediation implied by its debt issue leads to a convergence of rates of return across the economy. The net effect on investment versus consumption is ambiguous, but the diversion of funds from low opportunity rates of return to high rates is clear. In this event, if the government actually has a technical advantage in capital market operations, the perceived wealth increase associated with debt issue is neither an illusion nor an expropriation of future generations, but is rather a movement toward a more efficient allocation of resources. Although it is appropriate in this case to view debt issue as raising perceived private wealth, it would be inappropriate to speak of a public debt burden or of a crowding-out of private investment.

## Fiscal Policy

The perceived wealth effect of public debt issue (produced in this case by a finite life effect, by imperfect private capital markets, or by other reasons for heavy discounting of future tax liabilities) is also a necessary condition for the efficacy of fiscal policy—that is, for the use of government deficits (surpluses) to stimulate (deflate) the economy.<sup>13</sup> Substitution of debt issue for taxation is assumed to raise perceived wealth, and thereby to increase aggregate demand. But if debt issue does not increase perceived wealth, the possibility of this sort of fiscal policy disappears. Therefore, the argument against a significant wealth effect of public debt issue is also an argument against the efficacy of fiscal policy.<sup>14</sup>

<sup>13</sup>I am abstracting here from the impact of changes in the level of government expenditures. That analysis would involve as a central element the economic function of these expenditures, as discussed in Bailey (1971, Chapter 9).

<sup>14</sup>It should not be inferred that a positive wealth effect of debt issue is sufficient to build a normative case for fiscal activism. Other considerations involve the adjustment of prices and rates of return, the timing of government policy, and the role of private expectations about government policy formation.

The weight of empirical evidence on the connection between public debt (or, analogously, the expected benefits less taxes implied by social security) and aggregate consumer demand suggests a minor impact of uncertain direction.<sup>15</sup> However, the evidence is surely not unanimous, and many estimation problems exist with this type of empirical analysis. Despite these results, which raise doubts about the possibility of important fiscal policy effects, some large econometric models nevertheless imply that "expansionary" fiscal policy would have a substantial positive impact on economic activity. These models essentially constrain a shift from taxes to debt to have a positive effect on consumer demand—usually by writing consumption as a positive function of current disposable income, without attempting to hold constant the value of anticipated future taxes.<sup>16</sup> This restricted specification unreasonably requires the response of consumer demand to a tax cut to be the same as that induced by a rise in real national income, independently of whether the tax cut is associated either with a deficit that would raise future taxes, or with a decline in the anticipated long-run government expenditures. Some analyses of income determination that do not impose these sorts of restrictions do not seem to show significant fiscal policy effects.<sup>17</sup>

It is thus fair to say that neither economic theories nor empirical analyses provide convincing evidence for the effectiveness of fiscal policy. The area of fiscal policy exhibits a wide gap between, on the one hand, the weight of theory and evidence, and, on the other hand, the general opinion of professional economists and policymakers.

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<sup>15</sup>The empirical literature includes Kochin (1974, pp. 385–394); Tanner (1970, pp. 473–485); David and Scadding (1974, pp. 225–249); Kormendi (1978); Feldstein (1974, pp. 905–926; 1977); Barro (1978b); Barro and MacDonald (1977); and Darby (1978).

<sup>16</sup>For example, in the Federal Reserve—MIT—Penn model, the key explanatory variable for consumption corresponds approximately to current personal disposable income (Modigliani 1971, p. 14). A similar current personal disposable income variable is used in the Brookings model, as reported in Suits and Sparks (1965, Chapter 7).

<sup>17</sup>The "St. Louis model" reduced-form equations, which use high-employment government expenditures rather than a deficit variable as a fiscal measure, are reported in Andersen and Jordon (1968, pp. 11–24). An updated view of this model is contained in Carlson (1978, pp. 13–19). Some reduced-form effects on unemployment and output of debt issue and of the "unanticipated" part of this issue are reported in Barro (1977, p. 114; 1978c, Section III).

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