

**Ricardian Equivalence**

The *Ricardian equivalence* or *tax-discounting* hypothesis asserts that the path of government debt, given a path of government purchases, is irrelevant to the evolution of the economy. It is an extension of the permanent-income and life-cycle hypotheses to include government purchases, taxes, and debt.

To see the intuition behind Ricardian equivalence, suppose that the government, while keeping its path of purchases unchanged, decides to reduce current lump-sum taxes by  $B$  dollars per capita and issue  $B$  dollars of debt per capita instead. For simplicity, suppose the debt comprises perpetuities paying a coupon rate  $r$ . According to conventional theory, such a refinancing stimulates the economy and raises interest rates. Ricardian equivalence asserts that it has no such effects. The logic is simple. On the one hand, the representative individual gives up  $B$  dollars in the initial period to buy the new debt and expects to receive a stream of interest payments  $rB$  in all future periods. On the other hand, the individual's taxes fall in the initial period by  $B$  dollars but rise in subsequent periods by  $rB$  to finance the interest payments. Because every new inflow is matched by an equal outflow, the representative individual's net income and expenditure flows are unchanged; consequently, he perceives no change in his wealth. Because taxes are lump-sum, marginal rates of return are unchanged. The refinancing scheme therefore does not affect the representative individual's optimization and so has no important effects on the economy. The only effect it does have is to increase private saving. Recognizing that future taxes must rise to pay the interest on the debt, the individual uses his tax rebate to buy the new government bonds, whose interest earnings exactly enable him to meet the additional future tax obligations. Private demand for assets therefore moves one-to-one with the supply of public debt; so interest rates do not change and no "crowding out" occurs.

The restrictions required for Ricardian equivalence are many and unlikely to be met. The more important ones will be discussed here.

The preceding discussion tacitly assumed that people have infinite horizons. If they have finite horizons, Ricardian equivalence does not generally hold, because some of the future taxes arising from government debt will fall on future taxpayers. Thus, when debt is issued, the present value of taxes relevant to the representative

individual is less than the value of tax reductions (that reduction equals the market value of the debt) and wealth effects arise from a debt-for-tax refinancing. Ricardian equivalence still can hold if individuals treat the utility of their children as extensions of their own and the population is constant. Although current taxpayers do not pay all the future taxes associated with government debt, whatever they do not pay is borne by their descendants. Altruistic parents offset this extra burden on future generations by bequeathing enough extra wealth to their children to cancel the future taxes they and their descendants will bear. Such altruistic behavior by parents converts a finite-horizon model into an infinite-horizon one, restoring Ricardian equivalence. However, if the population is growing, parental altruism guarantees Ricardian equivalence only if parents actually make bequests. They will do so only if the economy is sufficiently inside its efficient growth region. In particular, in the inefficient case, where there is too much capital, parents want to confer liabilities on their children (reduce the capital stock). Government debt helps them do that and so is not neutral. Even in the efficient case, parents may not love their children "enough" to make bequests.

Empirical evidence suggests that many economies are inside the efficient region. For Canada, England, France, Germany, Italy, Japan, and the United States, the return to capital (measured as the cash flows generated by production less wages) considerably exceeds the amount of investment, suggesting that these economies are well inside the efficient region. For the United States, the marginal product of capital is about 10 percent, much more than the economy's growth rate, consistent with the U.S. economy being inside the efficient region. However, there is no way to tell from this evidence whether these economies are far enough inside the efficient region for bequests to be large enough to establish Ricardian equivalence.

Altruism is not the only reason for bequests; other possible motives generally do not imply Ricardian equivalence. One possibility is that bequests are used to control the behavior of designated recipients. For example, parents might use bequests to coax attention from their children, threatening to disinherit insufficiently attentive children. In such cases, a debt-for-tax swap alters the threat point of the parents or the children and therefore has real effects, negating Ricardian equivalence. Another possibility is

that families act as incomplete annuities markets, insuring against the risk of low consumption due to unexpectedly long lives. Even if individuals were completely selfish, intra-family transfers including bequests would occur as a way of buying insurance services from the recipients. Ricardian equivalence fails because of the individuals' selfishness, even though deliberate bequests are the rule. Still another possibility is that bequests are accidental, arising only because people have uncertain lifespans and often die sooner than anticipated, making unintended bequests to their children with no altruism intended. People would recognize that some future taxes would be borne by people whose utility does not matter to them and so would prefer debt to current taxes. The empirical evidence suggests that some bequests are non-altruistic; whether any bequests are altruistic is unclear.

Even if families with children behave altruistically, some families are childless—about a fifth of all families in the United States. Having little or no concern for taxes levied on future generations, childless families alter their behavior when debt is substituted for taxes, invalidating Ricardian equivalence. Families with children may recognize that the existence of childless families implies more taxes for their own children and so may increase bequests to offset that extra future tax burden. The offset, however, is incomplete, for parents will give way on two margins, accepting part of the additional tax burden themselves but imposing the remainder on their children.

Uncertainty also can invalidate Ricardian equivalence. For example, if an individual is uncertain of his future income, he also is uncertain of the bequests he will want to make. As a result, he prefers an additional dollar now to a future payment to his children with a present value of a dollar. Ricardian equivalence therefore fails.

However, two of the most frequent objections to Ricardian equivalence are of dubious validity. One is that many households are liquidity-constrained and so would like current taxes reduced and future taxes raised by a debt-for-taxes swap. The empirical evidence does suggest that some households are liquidity-constrained. But the magnitude of the effects those constraints have on aggregate behavior often appears small. Furthermore, Ricardian equivalence is invalidated by liquidity constraints only if the government has some capability in the

credit market that private agents lack. For example, if liquidity constraints arise because of transactions costs and if the government faces lower transactions costs than the private sector in lending to liquidity-constrained households, then issuing government debt relaxes the constraint and Ricardian equivalence fails. In contrast, if credit rationing occurs because all future incomes are uncertain (in which case the loan rate would be related to the size of the loan because of default risk), Ricardian equivalence continues to hold, because issuing government debt does not change the state of uncertainty and merely substitutes government loans for private loans. The little research done to date on the reasons for credit constraints does not illuminate whether they arise for reasons that would invalidate Ricardian equivalence.

The other dubious argument concerns marginal tax rates. Changes in government debt may be associated with changes in the path of marginal tax rates, leading to substitution effects and thus to violations of Ricardian equivalence. In fact, Ricardian equivalence does not fail, for the substitution effects and related behavioral changes arise from changes in the path of marginal tax rates, not from changes in the path of the debt. Although debt and marginal tax rates may change simultaneously, there is no necessity that they do so. A given change in the path of debt could be accompanied by a change in the path of tax revenue achieved by changing the path of marginal tax rates, which would have substitution effects, or by changing the path of the tax base (e.g., through lump-sum exemptions), which would have no substitution effects. It is the path of the marginal tax rate, not the debt, that determines whether real effects are present. Ricardian equivalence concerns only the effects of the path of the debt.

Finite horizons, nonaltruistic or insufficient bequest motives, childless families, liquidity constraints, and uncertainty can invalidate Ricardian equivalence. Although the evidence on the importance of these sources of non-equivalence is inconclusive, it seems improbable that all are absent, so that it appears unlikely that the world is strictly Ricardian. Nevertheless, Ricardian equivalence might provide a good approximation to reality. If so, it remains useful for empirical work and, because of its analytical simplicity, for theoretical work as well. We therefore turn to the evidence on Ricardian equivalence.

The early direct evidence on Ricardian equivalence was conflicting, but as time passed and researchers overcame problems of measurement, specification, differencing, simultaneity, and treatment of expectations, the results from a wide variety of tests converged on a conclusion. The most common tests examine the effect of government debt on consumption, usually in a life-cycle model, but sometimes in a permanent-income specification, in an Euler-equation framework, or with event studies. Perhaps the best consumption study is that of Kormendi (1983), because it nests essentially all other life-cycle studies and because it has elicited many comments and replies illuminating the important methodological issues involved (see Barth, Iden, and Russek 1986; Feldstein and Elmendorf 1990; Modigliani and Sterling 1986, 1990; and Kormendi and Meguire 1986, 1990). Most consumption tests have used U.S. data, but some have examined data from other countries. Besides consumption, researchers have tested the effect of government debt on current interest rates, steady-state interest rates, and holding-period yields, using data over long time spans and many countries; on international trade and finance variables, such as exchange rates and the trade balance; and on growth rates of various countries.

Almost all the tests that are not obviously methodologically unsound fail to reject Ricardian equivalence, with government debt having no significant effect on any of the dependent variables examined. The only rejections of Ricardian equivalence are occasional findings that government debt is negatively related to interest rates, a puzzling result inconsistent with any obvious theory of how government debt should affect economic activity. No tests support the traditional view that government debt stimulates the economy.

So do we conclude that Ricardian equivalence is true? Not necessarily. Another view of the effects of debt and deficits, based on less ideal assumptions than Ricardian equivalence, is consistent with the evidence and also is unaffected by such problems as large numbers of childless families or nonaltruistic bequests. Suppose that individuals can predict their own future tax liability reasonably well, but care little about the tax liability of future generations. Obviously, Ricardian equivalence does not hold. Nevertheless, at historical interest rates and average lifespans, most of the future tax

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implied by a current bond issue will be borne by people currently alive, and individuals will see little increase in their net wealth from bond-financed tax cuts. Near-Ricardian equivalence then obtains if the permanent-income and life-cycle hypotheses are even approximately true, for under those hypotheses, the effects of changes in wealth are spread over the remaining lifetime and are small in any one period. A small change in wealth combined with a small response leads to a negligible effect, as simulation studies have confirmed. Obviously, the effects would be even smaller if any altruistic concern for future generations existed. Thus, for many purposes, this "approximate equivalence" model essentially reproduces Ricardian equivalence, and the distinction between pure Ricardian equivalence and approximate equivalence is inconsequential.

Just what, then, should we conclude? Theoretically, we can be almost certain that Ricardian equivalence is not strictly true, requiring too many stringent conditions to be believable. Nevertheless, Ricardian equivalence seems to be a good approximation empirically and also is analytically simple. It therefore is a useful theory of the economic effects of government debt.

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See also CONSUMPTION EXPENDITURES; FISCAL POLICY; PIGOU-HABERLER EFFECT

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