

Is the Debate Between an Income Tax and a Consumption Tax A Debate About Risk? Does it Matter?

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I. INTRODUCTION

In recent years, a number of scholars have suggested replacing or supplementing the income tax with a tax on consumption.¹ A central argument offered by consumption tax proponents is that the income tax reduces the real, riskless return otherwise realized by savers. The reduction of this return is thought to be unfair because it discriminates against individuals with high preferences for deferred consumption, inefficient because it changes the relative prices of current and future consumption, and undesirable for paternalistic or altruistic reasons.

Criticisms of the income tax based on the assumption that the income tax reduces the real, riskless rate of return face a potentially serious problem. Over the past sixty years, the real, riskless rate of return has been near zero;² substantially all of the real return has been attributable to investment risk. The riskless rate of return is higher today than it has been in the past and may be higher still in future years. Nonetheless, it seems likely that the bulk of real return on investments such as common stock will continue to reflect compensation for risk, rather than deferral.

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¹ See, e.g., Henry J. Aaron & Harvey Galper, *Reforming the Tax System*, in *Economic Choices 1984* (Alice M. Rivlin ed., 1984); William D. Andrews, *A Consumption-Type or Cash Flow Personal Income Tax*, 87 *Harv. L. Rev.* 1113 (1974); David F. Bradford, *The Case for a Personal Consumption Tax*, in *What Should Be Taxed: Income or Expenditure?* 75 (Joseph A. Pechman ed., 1980); Richard L. Doernberg, *A Workable Flat Rate Consumption Tax*, 70 *Iowa L. Rev.* 425 (1985); Robert E. Hall & Alvin Rabushka, *Low Tax, Simple Tax, Flat Tax* (1983).

² See notes 29, 39, 38.

The debate between an income tax and a consumption tax may be restated, in large part, as a debate over the manner in which the two tax bases treat risky investments, or, to put the matter somewhat differently, a debate over the treatment of successful and unsuccessful wagers.

Does this restatement of the debate affect the analysis in a significant manner? We believe the answer to that question is "Yes." Taxation of risk premia affects taxpayer behavior differently than does taxation of riskless savings. For example, under certain assumptions, investors in risky assets are able to offset the effects of government taxation of the risk premium by changing their investment portfolios. If this is the case, then an income tax could not be said to discriminate against risk takers in the same way that it is said to discriminate against savers in riskless investments. Moreover, the paternalistic and altruistic concerns that might support a low tax rate on riskless savings do not necessarily support a low tax rate on the risk premium.

If, however, investors are not able to adjust their portfolios to offset the effects of taxation, then taxation of the risk premium raises the same sort of efficiency problems as taxation of the premium for deferral. It is not clear, however, whether taxation of risk premia would be unfair to risk takers in the same way that taxation of the deferral premia is said to be unfair to savers.

Our discussion of the effect of taxation on risk taking should be of interest even to those uninterested in the consumption tax debate. For the foreseeable future, this nation will continue to maintain an income tax, and it is important to know how that tax affects the willingness of taxpayers to make risky investments.

II. THE CURRENT DEBATE

A. Definitions

It is convenient to begin the discussion by defining three key terms: income tax, consumption tax and interest. Under the so-called Haig-Simons definition, income is defined as the sum of personal consumption and year-end accretion to wealth.³ Thus, under an income tax, an individual who begins the year with no savings, receives a salary of \$50,000, spends \$30,000 on personal consumption and invests \$20,000 is taxed on \$50,000—the sum of personal consumption and year-end accretion to wealth.

³ Robert M. Haig, *The Concept of Income—Economic and Legal Aspects*, in *The Federal Income Tax* 7 (Robert M. Haig, ed., 1921), reprinted in *Am. Econ. Ass'n, Readings in the Economics of Taxation* 54, 59 (Richard A. Musgrave & Carl S. Shoup eds., 1959); Henry C. Simons, *Personal Income Taxation* 50 (1938).

A consumption tax is a tax on personal consumption only, and may be administered in one of two ways.⁴ A cash flow income tax directly measures consumption. Under a cash flow consumption tax, tax liability is determined by subtracting savings from income. In the above example, the individual with a salary of \$50,000 and an investment of \$20,000 would be taxed only on the \$30,000 spent on personal consumption.

Under a yield exemption consumption tax, an individual does not receive a deduction for investments. Instead, the return from investments is tax-exempt. Thus, in the above example, an individual with a \$50,000 salary who used \$20,000 of that sum to purchase an investment would be taxed on \$50,000. The proceeds from the \$20,000 investment, however, would be tax-exempt. Under plausible assumptions, the value of exempting an investment's return is equivalent, in present value terms, to the value of deducting the investment from taxable income at the time it was made. Thus, the yield exemption and cash flow consumption taxes generally are thought equivalent.⁵ Most readers will find the yield exemption tax easier to understand and, for that reason, the examples in this article assume that the consumption tax takes that form.

The term "interest" may be defined in several ways. For example, interest may be used to refer to total investment return, total investment return on financial investments or investment return on riskless investments. In this article, we define interest somewhat narrowly as the real, or inflation-adjusted return on all riskless assets. Investment return that does not constitute interest is characterized as the premium for inflation or risk.

B. Argument that Taxation of Interest Is Unfair and Inefficient

Scholars have raised many arguments in opposition to an income tax and in favor of a consumption tax. Perhaps the most important revolves around the taxation of interest. As generally formulated, this argument assumes that there is a positive rate of interest in the no-tax world. An income tax reduces any such positive rate of return and thereby reduces the welfare of savers. Thus, an income tax is said to discriminate unfairly against those with relatively high preferences for deferred consumption.⁶

⁴ Most of the articles that discuss the merits of a consumption tax also summarize the manner in which such a tax would be implemented. Particularly good discussions of this topic are found in David F. Bradford, *Untangling the Income Tax* 75-99 (1986) [hereinafter *Income Tax*], and Michael I. Graetz, *Implementing a Progressive Consumption Tax*, 92 *Harv. L. Rev.* 1575 (1979).

⁵ See Bradford, *Income Tax*, note 4, at 68-69, 82-94; Andrews, note 1, at 1126; Alvin C. Warren, Jr., *Fairness and a Consumption-Type or Cash Flow Personal Income Tax*, 88 *Harv. L. Rev.* 931, 938-41 (1975) [hereinafter *Fairness*]. But see Graetz, note 4, at 1600-11 (assumptions required in order for equivalence conditions to hold).

⁶ See, e.g., Andrews, note 1, at 1167-69; Doernberg, note 1, at 429-30.

The reduction of any positive rate of return is also generally thought to reduce savings, and this reduction is thought to be inefficient.⁷

1. *Argument that Taxation of Interest Is Unfair*

The argument that taxation of interest is unfair may be illustrated by the following example. Assume that in the no-tax world the annual interest rate is 7%. Assume further that *Betty* and *Zeke* each have \$100 to either consume or invest for one year. *Betty* has a discount rate of 2%; she will save for one year so long as she is able to receive 2% interest, or \$2, on her investment. The interest rate is 7%, so *Betty* will save the \$100. She will receive \$7 interest and thus regard herself as \$5 better off. *Zeke* has a discount rate of 9%; he will save only if he is able to receive a 9%, or \$9, return on his investment. Since the market rate of interest is only 7%, *Zeke* will not save.⁸

Assume now that the government levies a 50% tax on interest, so that the after-tax rate of return falls to 3.5%. *Betty* will still save, since that return exceeds her 2% discount rate. However, *Betty* will regard herself as better off by only 1.5% of her \$100 investment, or \$1.50. *Betty's* welfare has been reduced by \$3.50; *Zeke's* welfare has not been reduced since he would not save even in the no-tax world.

The welfare loss to *Betty* and other savers may be described somewhat more realistically through the use of supply and demand curves and the concept of consumer or producer surplus. Figure I uses hypothetical supply and demand curves to depict this loss. The vertical axis represents the interest rate; the horizontal axis represents the quantity of savings. Line *D* represents the demand for savings; Line *D* also may be thought of as the available return on investments. Line *S* represents the supply of savings in the no-tax world. Each point on Line *S* represents a particular saver. Thus, point *B* represents saver *Betty*, who is willing to loan funds or invest at an interest rate of 2%; point *L* represents saver *Larry*, who is willing to loan funds or invest at 6%, and point *Z* represents saver *Zeke*,

⁷ See, e.g., Joseph A. Pechman, *Federal Tax Policy 77-78* (5th ed. 1987).

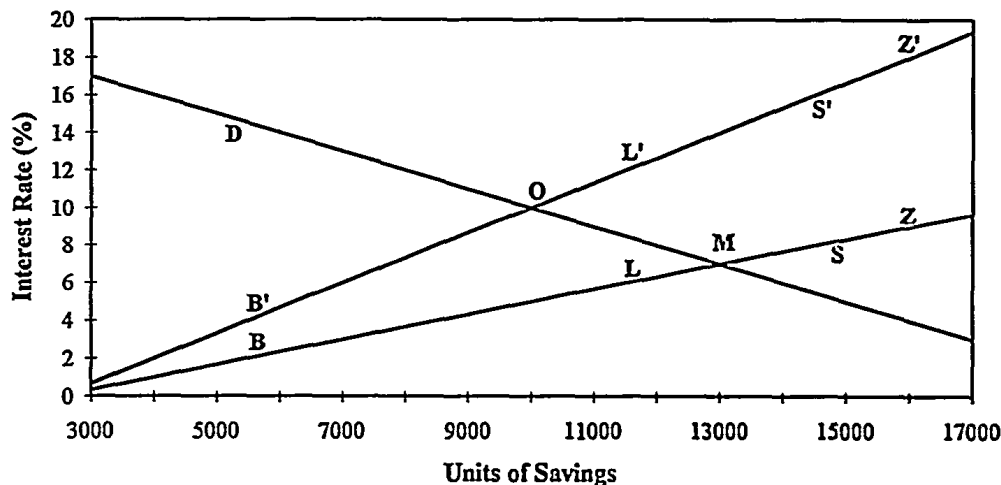
⁸ The example assumes that *Betty* and *Zeke* each have a constant discount rate with respect to future consumption. In fact, the interest rate necessary to induce each taxpayer to save a small percentage of wealth is likely to be much lower than the rate required to induce each taxpayer to save a high percentage of wealth. Under a more accurate model, the interest rate needed to induce an individual to save would rise as her level of savings increased. Each individual would continue to save until her discount rate on future consumption exceeded the market interest rate. Thus, for each individual, the discount rate on the marginal investment would be exactly equal to the interest rate. The adoption of a more complex model would not change our analysis, however, and the simple model presented here is useful for expositional purposes. The impact of an income tax on individuals with variable discount rates is considered in Section V.

who is willing to loan funds or invest at 9%.⁹ Supply and demand intersect at point *M*, yielding an interest rate of 7% and a quantity of about 13,000 units. The difference between 7% and each point on Line *S* that is below 7% represents surplus to the supplier. Thus, the surplus to *Betty* is 5%, and the surplus to *Larry* is 1%.

The reduction in interest due to a 50% tax will rotate the supply curve to the left: It will now take twice the pretax return to induce the same quantity of savings supplied in the no-tax world. Investors who formerly supplied about 13,000 units of savings at 7% will now require a 14% return to supply that amount of savings. This makes sense, since a pretax rate of 14% will provide savers with the same bottom-line return enjoyed in the no-tax world. The new supply curve is depicted as Line *S'*. Point *B'* indicates *Betty's* new discount rate of 4%; point *L'* indicates *Larry's* discount rate of 12%, and point *Z'* indicates *Zeke's* discount rate in the tax world.

Supply and demand now intersect at point *O*, yielding an interest rate of 10% and quantity of 10,000 units. The change in the interest rate is attributable to the fact that fewer individuals now choose to save. *Larry*, for example, is no longer a lender. The reduction in savings increases the price, or interest rate of funds to borrowers. This increase somewhat offsets the loss suffered by savers due to taxation. Nonetheless, savers as a group are worse off. In the no-tax world, *Betty* received a supplier surplus of 5%, equal to the difference between her discount rate and the market rate of interest. *Betty's* after-tax surplus is only 3% (the differ-

Figure I: Market for Loanable Funds



⁹ More accurately, each point represents one particular investment by an investor. For example, point *B* represents an investment in which the investor would accept a 3% interest rate. As stated in note 8, the discount rate for each investor on additional investments varies according to the amount already saved.

ence between the 10% market rate of interest and her 4% discount rate, less the 50% of that surplus taken by the government).¹⁰ *Larry's* surplus of 1% has been entirely eliminated since he no longer will save. Thus, examination of market response to taxation confirms the intuition expressed earlier: Taxation of interest reduces the welfare of individuals with relatively high preferences for saving. To some consumption tax proponents, this reduction of welfare is unfair.

Three observations may help illuminate (and perhaps weaken) the fairness argument based on reduction of consumer or producer surplus. First, any practical tax will reduce the surplus of some individuals. A tax on labor income, for example, reduces the producer surplus of individuals with high preferences for work over leisure; tariffs reduce the consumer surplus of individuals with high preferences for imported goods.

Second, government actions outside the tax sphere generally change the consumer or producer surplus of large numbers of individuals. A government decision to build interstate highways rather than improve mass transit, for example, will increase the consumer surplus of rural individuals who enjoy long drives, but will reduce the consumer surplus of urban dwellers who rely on subways and bus lines. It is unclear whether policies that change the relative well-being of savers and consumers are more unfair than the panoply of government programs that change the relative well-being of different interest groups.

Third, it seems odd to base a definition of fairness on consumer or producer surplus when few commentators have argued that such surplus should play an important role in the calculation of the tax base or in other areas of tax policy.¹¹ The reluctance to take consumer or producer surplus into account appears attributable both to practical problems of measurement and to serious philosophical and definitional difficulties.¹²

The unfairness argument described above is sometimes tied to the argument based on the assumed disutility of saving.¹³ Here, the interest

¹⁰ *Betty's* surplus alternatively can be determined as the difference between the after-tax return of 5% and her original discount rate of 2%.

¹¹ See generally Daniel Shavio, *The Man Who Lost Too Much: Zarin v. Commissioner and the Measurement of Taxable Consumption*, 45 *Tax L. Rev.* 215 (1990); Solicitor's Opinion 132, I-1 C.B. 92 (1922).

¹² Some idea of the the philosophical difficulties entailed in taking surplus into account can be gleaned from the following example. Suppose an individual who obtains a one-year loan for \$100 at 5% has a discount rate of 15%. The ability to borrow at a rate below her discount rate generates consumer surplus of \$10. In theory, a system that took surplus into account would treat the borrower as \$10 wealthier. All infra-marginal borrowers would be taxed, as would all infra-marginal theatregoers, automobile purchasers and the like. We suspect that few would find such a tax regime desirable, even if the obvious difficulty of measuring surplus were somehow overcome.

¹³ See Irving Fisher, *The Theory of Interest* 61-98 (1930); Treasury Dep't, *Blueprints for Basic Tax Reform* 136 (1977). This view is explicated in some detail in Mark Kelman, *Time Preference and Tax Equity*, 35 *Stan. L. Rev.* 649, 658-60 (1983).

rate is seen as compensation for the pain of deferred consumption. The return to a saver's marginal investment is offset almost entirely by the disutility of deferred consumption. The return on an infra-marginal investment is, on the other hand, greater than the pain of deferred consumption. However, if savers experience some pain of deferred consumption even on infra-marginal investments, the increase in utility to those savers will be less than suggested by the monetary return. Under this argument, only the net increase in utility realized through savings, or some arbitrary amount thought to represent the net increase in utility, should be subject to tax.

One obvious problem with this utility-based argument is that it applies with equal force to many other taxes. The return to the worker on her marginal labor, for example, will be offset almost entirely by the pain of labor and it seems reasonable to assume that most workers suffer some disutility even on infra-marginal labor. Nonetheless, it is seldom seriously argued that this disutility justifies exclusion of some or all of wage income from the tax base.¹⁴

The claim that taxation of interest is unfair because it discriminates against savers also sometimes is tied to an argument that taxation of interest is inconsistent with the Haig-Simons definition of income.¹⁵ As noted earlier, under the Haig-Simons definition, income is equal to the sum of personal consumption and accretion to wealth. Under the most common interpretation of that definition, interest is taxable as income since it represents an accretion to wealth. Thus, where \$100 is invested at 10%, the \$10 interest at the end of the year generally would be considered an accretion to wealth. If, however, accretion to wealth is measured in ex ante, present value terms, interest income would never represent accretion to wealth: Any gain attributable to the market rate of interest would be discounted back to present value at the same market rate of interest, and the net result would be zero. Thus, \$110 discounted to present value at 10% has a beginning period value of \$100. Under this interpretation of the Haig-Simons definition of income, investment of the \$100 at 10% does not increase present value wealth and should not be taxable.

2. *Argument that Taxation of Interest Is Inefficient*

The argument that taxation of interest is inefficient may be illustrated by again considering *Betty* and *Larry*, who each have \$100 to invest and

¹⁴ The argument that there should be no tax on the portion of interest or wages that is recompense for psychic disutility requires that we in effect give taxpayers a tax basis in such disutility. Our tax system has declined to do this.

¹⁵ See Jeff Strnad, *Taxation of Income from Capital: A Theoretical Reappraisal*, 37 *Stan. L. Rev.* 1023 (1985).

have discount rates of 2% and 6%, respectively. Since the interest rate in the no-tax world is 7%, both will invest. *Betty* will recognize consumer surplus of 5%, or \$5, on the \$100 investment; *Larry* will recognize consumer surplus of 1%, or \$1.

If a tax of 50% were levied on savings, *Betty* would be worse off, even if the pretax interest rate rises to 10%. In that case, *Betty's* consumer surplus would drop to \$3, as her after-tax return drops from \$7 to \$5. *Betty* would continue to save, however, and the government would receive \$5 tax revenue from her. Thus, the reduction in *Betty's* welfare may be offset by an increase in the welfare of other people due to government spending. A tax of 50% would also make *Larry* worse off; his consumer surplus would fall from \$1 to zero. Moreover, because the after-tax return to *Larry* of 5% is less than his discount rate of 6%, *Larry* no longer would save and generate tax revenue through interest. Thus, *Larry's* reduction of welfare would not be offset by any gain to the recipients of governmental spending. *Larry's* loss represents a net loss of welfare, or inefficiency, induced by the tax.

It should be noted that the argument that taxation of interest is inefficient, like the argument that taxation of interest is unfair, may be applied to other forms of taxation as well. For example, a tax on labor may cause an individual to reduce work effort, and therefore reduce the welfare of that individual without increasing governmental revenue. Some evidence suggests, however, that the welfare loss due to taxation of interest may be particularly great.¹⁶

C. *Argument that Taxation of Interest Is Inconsistent with Paternalistic or Altruistic Concerns*

In political, and to a lesser extent scholarly, discourse, support for a consumption tax is sometimes grounded on paternalistic or altruistic beliefs. Taxation of interest is thought to reduce savings, and a reduction in savings is thought to reduce the long-term welfare of present and future generations.

¹⁶ Most general equilibrium models have found that replacement of a tax on capital with an increased tax on labor or consumption would generate a considerable increase in efficiency. See generally John Whalley, *Lessons from General Equilibrium Models*, in *Uneasy Compromise* 15 (Henry J. Aaron, Harvey Galper & Joseph A. Pechman eds., 1988). But see Alan J. Auerbach, Laurence J. Kotlikoff & Jonathan Skinner, *The Efficiency Gains from Dynamic Tax Reform*, 24 *Int'l Econ. Rev.* 81 (1983) (majority of efficiency gains from elimination of capital tax lost in transition); Whalley et al., *supra* (technical difficulties with general equilibrium analysis).

1. *Paternalistic and Altruistic Reasons to Favor Saving*

The paternalistic justification for tax policies that increase savings generally rests on the belief that mistakes of fact or competency cause people to undersave.¹⁷ Government intervention is seen as a desirable way to correct this myopic behavior and thereby increase long-term individual welfare.¹⁸ A paternalistic concern for savings is deeply embedded in our culture. Manifestations of this concern range from the parable of the ant and the grasshopper to specific provisions in the tax law designed to encourage retirement savings.¹⁹

The altruistic justification for tax policies that increase saving appears to rest on the fear that individual savings behavior will not leave an adequate stock of wealth for future generations. Debates over the nation's saving rate often reflect concerns for the productivity and wealth of the world our descendants will inherit.²⁰

2. *Effect of Taxation of Interest on Savings*

The argument that taxation of interest reduces savings is not difficult to apprehend. Taxation of interest increases the relative cost of future consumption as compared to present consumption, and therefore causes persons to substitute present consumption for saving. An individual with a discount rate of 8% will save if the market interest rate is 10% and no tax is levied on the interest, but will not save if her discount rate and the market interest rate remain constant, but interest income is reduced by a 50% tax.

In the real world, of course, the effect of taxation of interest on savings behavior is considerably more complex. For example, taxation of interest reduces the amount of future period wealth produced by a fixed

¹⁷ The paternalistic argument for increased savings is discussed in Joseph Bankman, *Tax Policy and Retirement Income: Are Pension Plan Anti-Discrimination Provisions Desirable?*, 55 U. of Chi. L. Rev. 790 (1988), and Daniel Halperin, *Tax Policy and Retirement Income: A Rational Model for the 21st Century*, in *Search for a National Retirement Income Policy* 159 (Jack L. VanDerhei ed., 1987). Recent works on the moral theory of paternalism include Joel Feinberg, *Harm to Self* (1986), and Rolf Sartorius, *Paternalism* (1983).

¹⁸ See Bankman, note 17, at 814-21.

¹⁹ *Id.* at 792-95 (discussion of the ways in which the tax law encourages retirement savings).

²⁰ The low domestic savings rate is often thought to raise the cost of corporate capital and therefore reduce investment. The reduced investment is thought to reduce directly the future wealth of investors, and indirectly reduce future wealth of others through reduced employment opportunities. See Laurence J. Kotlikoff, *The Crisis in U.S. Saving and Proposals to Address The Crisis*, 43 Nat'l Tax J. 233 (1990); Andrew Tobias, *The Future You Save May be Your Own*, Time, Mar. 12, 1990, at 60; *How Capital Costs Cripple America*, Fortune, Aug. 14, 1989, at 50; *Lost Horizons*, The New Republic, June 26, 1989, at 11; Charles E. Walker & Mark A. Bloomfield, *The Case for the Restoration of a Capital Gains Tax Differential*, 43 Tax Notes 1019, 1020-21 (May 22, 1989); *Tax Incentives for Increasing Savings and Investment: Hearings Before the Senate Comm. on Finance, 101st Cong., 2d Sess. 40 (Mar. 28, 1990)* (statement of Michael J. Boskin, Chairman, President's Council of Economic Advisors).

amount of savings. Persons who wish to keep future period wealth constant might respond to taxation by increasing the amount of savings. This latter "wealth" effect of taxation may offset the substitution of consumption for saving described above. For this and other reasons, the net effect of taxation on savings is a matter of some dispute. It is possible that an increase in savings may be realized more directly through direct government programs than through adjustments in the tax rate. The government might require retirement savings, for example, or might use current tax revenues to build a public infrastructure that benefits future generations. But these are minor cavils. Most scholars believe that taxation of interest reduces savings.²¹ A shift away from an income tax to a consumption tax therefore is likely to increase savings and further paternalistic and altruistic goals that revolve around increased savings.

D. Other Arguments Against an Income Tax

We have thus far discussed, in a necessarily summary fashion, the arguments that taxation of interest under an income tax is unfair, inefficient or inconsistent with paternalistic or altruistic concerns. These arguments are often supplemented by other arguments in favor of a consumption tax. For example, a consumption tax is sometimes supported on what might be referred to as a "foundational" fairness argument.²² Under this argument, a tax levied in accordance with consumption is seen as an irreducible cornerstone of a fair tax. In a similar vein, a consumption tax has been supported on the argument that a just tax is levied in proportion to goods taken out of the "common pool," and goods are not taken out of the common pool until they are spent on personal consumption.²³ The consumption tax also has been supported on the grounds that it will be easier to administer.²⁴ But the arguments detailed earlier in this article are perhaps the central arguments raised in opposition to an income tax. While these arguments have been subject to a good deal of able criticism,²⁵ they are nonetheless regarded by most scholars as serious and strong arguments in favor of a consumption tax.

²¹ Pechman, note 7, at 77-78. There is wide disagreement, however, as to the magnitude of the response. Some scholars reject the general conclusion, finding that the interest elasticity of savings cannot be calculated with any degree of accuracy. See generally Anthony B. Atkinson & Joseph Stiglitz, *Lectures on Public Economics* 92-93 (1980); Kotlikoff, note 20.

²² See Andrews, note 1, at 1165-77.

²³ *Id.*

²⁴ *Id.* at 1148-50.

²⁵ The bulk of the criticism has been directed at the assertion that taxation of interest is unfair. See Warren, *Fairness*, note 5; Alvin C. Warren, Jr., *Would A Consumption Tax Be Fairer Than an Income Tax?*, 89 *Yale L.J.* 1081 (1980) [hereinafter *Consumption Tax*].

III. IS THERE A POSITIVE RATE OF INTEREST?

The argument that an income tax is undesirable because the taxation of interest is unfair, inefficient or inconsistent with paternalistic or altruistic objectives necessarily assumes that interest—which we have defined here as the real, riskless rate of return—represents a significant component of investment return. If this assumption is false, then the taxation of interest, undesirable or not, should be no more than a minor consideration in selecting a tax base.²⁶

A. Empirical Estimates of the Past Interest Rate

Not surprisingly, the components of investment return have been the subject of a large number of studies. These studies generally derive the interest rate by comparing the return offered on short-term treasury bills²⁷ with the same period inflation rate, and averaging the results obtained by the procedure over many years.²⁸

The most recent and widely cited study to use this methodology to determine the components of investment return found that during the years 1926-1989, the average riskless, real rate of return was just .5%.²⁹

²⁶ The fact that many consumption tax arguments assume a significant riskless interest rate is noted and thoughtfully discussed in Warren, *Consumption Tax*, note 25, at 1097-109.

²⁷ The use of short-term treasury bills, instead of, for example, long-term corporate obligations, as a surrogate for the riskless rate of return is not hard to understand. Long-term corporate obligations are subject to the risk of default, as well as the financial risk that the purchasing power of the return will be eroded by unexpected inflation. Long-term treasury bills are practically free of default risk, but still have financial risk.

²⁸ The use of data for many years is required to reduce the discrepancy between the ex post real, riskless rate of return, measured by the studies, and the ex ante real, riskless rate of return. Suppose, for example, that at the beginning of a particular year, inflation is expected to be 4%, and the return on a riskless treasury bill is 6%. Suppose further that inflation during the period turns out to be 10%. The deferral premium demanded by investors and obtained in the market is 2%, while the actual return on the riskless investment is negative 4%. The discrepancy between the two figures is caused by the unanticipated increase in the inflation rate. It seems reasonable to assume that over many years, unanticipated increases in the inflation rate will be offset by unanticipated decreases in the inflation rate, and that the ex post real, riskless rate of return will be approximately equal to the ex ante riskless rate of return demanded by investors.

Recent market behavior appears to support the thesis that investors both underestimate and overestimate inflation. During the period between 1975-1979, the ex post real, riskless rate of return was negative 1.46%. Ibbotson Associates, *Stocks Bonds Bills and Inflation: 1990 Yearbook 92* (1990). Inflation during these same years was an historically high figure of 8.15%. *Id.* Presumably, the negative rate of return was at least in part attributable to unexpectedly high inflation. During the years 1985-1989, on the other hand, the ex post real, riskless rate of return was 3.14%; inflation during this period fell to 3.67%. *Id.* Presumably, the high rate of return during these years was in part attributable to unexpected moderation of inflation.

²⁹ *Id.* at 87. The .5% return is the geometric mean of annual returns, that is, the figure that, compounded annually, would produce the net increase in wealth attributable to 60 annual investments in short-term treasury bills. The arithmetic mean of annual returns is slightly higher. The difference between geometric and arithmetic means can be illustrated by imagining an investment of \$100 that increased by 50% to \$150 during the first year and decreased by

This same study estimated the annual inflationary return, or premium, at 3.1% and the annual risk premium for an investment in Standard and Poor's composite index of common stocks at 6.5%.³⁰

Less recent studies have produced higher estimates of the real, riskless rate of return. Those studies, however, determined the real, riskless rate of return by subtracting the inflation rate from the rate on long-term corporate or government securities.³¹ As noted earlier, part of the return on long-term corporate or governmental securities represents premia for default and financial risk. The studies, therefore, do not accurately isolate the premium received for deferral alone. These earlier studies are perhaps responsible for the widespread belief that the long-term riskless rate of return has been significantly positive.

How important is a .5% real, riskless rate of return? The second column in Table 1 shows the approximate future value of \$100 invested at different interest rates; the third column shows that future value reduced by a 40% annual tax; and the fourth column shows the percentage reduction in future value caused by the tax.

TABLE 1
FUTURE VALUE OF \$100 INVESTED FOR TEN YEARS

<i>Interest Rate</i>	<i>Future Value</i>	<i>Future Value Reduced by 40% tax</i>	<i>% Reduction in Future Value</i>
8%	\$216	\$170	21%
5%	163	138	15%
2%	122	113	7%
0.5%	105	103	2%

Thus, \$100 invested at 5% will increase to a terminal wealth of approximately \$163 in ten years. If the annual interest is reduced to 3% by means of a 40% income tax, the amount available at the end of ten years

50% to \$75 during the second year. The arithmetic mean would be zero, while the more relevant geometric mean would be approximately negative 13%.

³⁰ Id. at 86. The risk premium is received in addition to the inflationary return and the riskless return. Thus, the total annual average return from investments in the common stock was about 10%.

³¹ In 1966, the Federal Reserve Bank of St. Louis began publishing studies that measured the real, riskless return as the difference between the lagged (past) inflation rate and the nominal return on long-term corporate bonds. This method produced a riskless return between 3% and 4%. See William P. Yohe & Denis S. Karnosky, *Interest Rates and Price Level Changes, 1952-1969*, 51 Fed. Reserve Bank of St. Louis Rev. 18, 34, 36 (1969). A more recent study measured the real, riskless rate as the difference between six-month to one-year treasury bills and the actual inflation rate; this study estimated the real, riskless return at .7%. Lawrence Fisher & James H. Lorie, *A Half Century of Returns on Stocks & Bonds* 138 (1977).

will be \$138. Here, the income tax reduces wealth by 15%. In contrast, \$100 invested at .5% will increase to only about \$105 in ten years. If an income tax reduces that return to .3%, the amount available at the end of ten years will be about \$103 and the tax will decrease terminal wealth by less than 2%. If the long-term real interest rate is 2% (almost a fourfold increase in the historical rate),³² a 40% annual tax on investment return will reduce the amount available after ten years by about 7%.

Virtually all taxes distort behavior and advantage some taxpayers over others. Relative to other taxes, at the low rate of interest suggested by empirical studies, taxation of interest would not appear to raise particularly serious fairness problems or to affect behavior materially.

C. Relationship Between Empirical Estimates and Theories of Interest in the Consumption Tax Debate

It is instructive to relate the empirical estimates of the interest rate with the theories of interest discussed in the consumption tax debate. A theory put forth by consumption tax proponent Irving Fisher argues that investors are naturally impatient, and that this impatience, together with the innate productivity of capital, is responsible for the phenomenon of interest.³³ A related theory attributes investor preference for current consumption to the risk of unexpected death or illness, which eliminates or reduces the investor's ability to enjoy future consumption.³⁴ A third theory attributes a positive rate of interest to the desire of individuals with rising wealth to smooth out consumption patterns by borrowing against future wealth.³⁵

Income tax proponents have argued, on the other hand, that at least some individuals would prefer deferred consumption to current consumption. Preference for future consumption may be attributable to a desire of individuals with current wealth to smooth out consumption patterns by saving,³⁶ a desire to avoid future feelings of regret caused by current consumption and a desire to ensure against poverty in the event

³² The possibility that the future riskless rate of return will be considerably higher than .5% is discussed in Section III.D.

³³ See Fisher, note 13, at 61-62. Theories of interest are discussed in detail in Kelman, note 13, at 658-75.

³⁴ See Kelman, note 13, at 660-69.

³⁵ As noted below, the desire to smooth out consumption by borrowing might well be balanced by the desire of individuals with high current income and low expected future income, such as soon-to-be retirees, to smooth out consumption by lending. See generally Atkinson & Stiglitz, note 21, at 62-95.

³⁶ See *id.*; see also Warren, Consumption Tax, note 25, at 1100.

of an unexpectedly long life.³⁷ Individuals who prefer future consumption would be willing to save even if interest rates were negative.³⁸

The relatively insignificant rate of market interest suggests either that the absolute investor preference for current consumption has been smaller than imagined, or, more likely, that reasons for preferring current consumption have been largely offset by reasons for preferring future consumption.

D. *The Future Interest Rate*

The fact that the interest rate has been near zero for the past 60 years does not mean that the interest rate will be near zero in future years. The interest rate, in any given year, is determined by the desires of the marginal savers and marginal borrowers; there is no particular reason why those desires should remain constant, or change in such a manner as to produce the same rate across time. In recent years, the interest rate, when measured in ex post terms as the difference between return and inflation, has been higher than the historical average.³⁹ Moreover, one recent article has suggested that the interest rate does not range around a particular historical mean, but instead takes a "random walk" around the interest rate in the previous year.⁴⁰ However, the historical presence of a near zero interest rate does indicate that, at least in the past, the debate between the income and consumption tax has overemphasized the differing treatment of interest. The major components of investment return have been inflation and risk and it seems likely that those will con-

³⁷ See Atkinson & Stiglitz, note 21, at 62-96.

³⁸ Even individuals who have a strong preference for current over future consumption are likely to save some portion of current income for retirement. This is because when retirement income is small, the marginal value of additional retirement income becomes large and is likely to offset the preference for immediate consumption. If retirement income were extremely small, the additional value of money at retirement would offset a negative interest rate.

³⁹ In years 1985-1989, the ex post real, riskless rate of return was above 3%. Ibbotson Yearbook, note 28, at 92. On the other hand, in the years 1975-1979, the ex post real, riskless rate of return was negative. *Id.* As stated in note 28, the most likely explanation for the wide shift is not that ex ante demand and supply curves shifted dramatically, but instead that ex ante expectations of future inflation were off the mark. The period between 1975 and 1979 was a period of high inflation. It seems likely that investors during that period expected to obtain a positive riskless rate of return, but that the interest rates bargained for in advance were insufficient to offset unexpectedly high inflation. Inflation fell to less than 4% during the years 1985-1989. *Id.* It seems likely that the return investors bargained for in advance assumed that the higher inflation rate of the previous decade would continue. The moderation of inflation produced an ex post return higher than investors and borrowers expected in their ex ante agreements. Thus, the fact that ex post interest rates deviated sharply (in different directions) from the historical average does not mean that ex ante rates demanded for and received by investors changed significantly. In the long run, ex post results should mirror ex ante projections. Indeed, an investor in both of the periods described above would receive an *average* real, riskless return of less than 1%.

⁴⁰ Andrew K. Rose, *Is the Real Interest Rate Stable?*, 43 J. Fin. 1095 (1988).

tinue to be the major components of investment return in the near future. In the next section of this article, we discuss the treatment of inflation under the two tax bases. We then discuss the tax treatment of risk under each tax base.

IV. THE TREATMENT OF INFLATION

Over the past 60 years, annual inflation, as measured by the rise in the consumer price index, has averaged 3.1%.⁴¹ For relatively safe investments, and for most investments in high inflation years, the return attributable to inflation has outstripped the return attributable to risk, and, in nearly all years, the return attributable to inflation has outstripped the real, riskless rate of return. As a practical matter, the treatment of inflationary returns is a major issue in tax policy.⁴²

As a theoretical matter, however, the treatment of inflationary gain is unproblematic: Virtually all scholars on both sides of the income and consumption tax debate believe that return attributable to inflation should not be taxed. Under a consumption tax, no tax is levied on any of the return to investment so the return attributable to inflation is necessarily untaxed. Modern proponents of the Haig-Simons tax base believe that accretion to wealth should be measured in inflation-adjusted, rather than nominal terms.⁴³ Adjusting the income tax to take inflation into account does not appear to pose insuperable difficulties.⁴⁴ In all probability, however, revenue needs and legislative inertia will preclude such an adjustment in the foreseeable future. However, those same factors should preclude adoption of a consumption tax, which would eliminate not only the taxation of inflation premia, but also taxation of all return to capital. The debate between an income and consumption tax is usually (and we believe properly) a debate over ideal forms of the two tax bases. Neither tax base is apt to be adopted in pure form in the near future; but the two bases, in their idealized forms, offer alternative goals for the tax system.

Some individuals may feel that the adoption of a consumption tax is more likely than a modification of the income tax to eliminate the taxa-

⁴¹ See Ibbotson Yearbook note 28, at 200.

⁴² See, e.g., Daniel Halperin & Eugene Steuerle, Indexing the Tax System for Inflation, in *Uneasy Compromise*, note 16, at 347.

⁴³ See Warren, *Consumption Tax*, note 25, at 1089 n.29. Henry Simons himself believed that measurement of accretion to wealth in real terms was desirable, but impractical. Simons, note 3, at 55-56, 155-57.

⁴⁴ Under the reform proposals suggested by the Treasury Department in 1984, the basis of property would be adjusted upwards and some fraction of interest payments and receipts would be excluded to reflect the fact that some portion of the nominal return represents an offset for inflation. See 2 Treasury Dep't, *Tax Reform for Fairness, Simplicity and Economic Growth* 178-200 (1984); see also Halperin & Steuerle, note 42, at 358-72.

tion of inflationary gain. Others may feel that, as a definitional matter, the income tax should be defined as the present day tax, with all its flaws, rather than the idealized alternative.⁴⁵ Individuals holding either set of beliefs may believe an income tax inferior to a consumption tax because the former taxes inflationary gain, while the latter does not. Because this nation is likely to maintain an income tax for the foreseeable future, such individuals should still find it important to know how an income tax affects noninflationary investment return.

Thus, an understanding of the effects of an income tax on investment return and behavior is important both for the purpose of resolving the consumption tax debate, as conventionally defined, and for its practical significance under our present-day tax system. In the following section of this article, we discuss the way in which an income tax affects the dominant historical component of real investment return—the premium received in return for risk.

V. IS THE TAXATION OF RISK PREMIA UNFAIR OR INEFFICIENT?

Taxation of interest has been criticized as unfair and inefficient. May the same objections be raised to taxation of risk premia? We begin our discussion of this issue by examining the consequences of taxation of risk premia under an income tax that treats gains and losses in symmetrical fashion. A tax system is symmetrical if losses can be used to offset gains, or otherwise deducted at the same marginal rate at which gains are taxed. Under a symmetrical system with a 30% tax rate, a gain of \$10 would trigger \$3 of tax, and a loss of \$10 would reduce tax liability by \$3, or result in a refund of \$3 if there were no tax liability. A tax system that is symmetrical will be referred to as a tax system with full loss offsets. Our analysis suggests that such an income tax is likely to have three principal effects. First, the after-tax position of many individual investors will be unchanged by the tax. Such investors will be able to adjust their investment portfolios to offset the tax, while maintaining a certain level of personal risk. Second, the tax may lead to an increase in the total investment in risky assets because the tax-induced portfolio changes will increase investment in risky assets. Third, the increase in societal risk initially will be borne by the government, and the subsequent incidence of the increased risk will depend on the actions of the government. We conclude that the fairness and efficiency arguments that are used to oppose taxation of interest cannot be used to oppose taxation of risk premia. However, the desirability of taxing risk premia cannot be deter-

⁴⁵ Such individuals would presumably see the relevant debate as between the present income tax, a "pure" income tax that takes inflation into account and a consumption tax.

mined without a more adequate theory of how government spreads its risk back among its citizens.

B. Taxation Under an Income Tax with Loss Offset

Some sense of the effect of taxation of risk premia under an income tax with full loss offsets may be gained by first examining the effect of risk on investment behavior in the no-tax world.⁴⁶ Assume that two investments are available: a safe investment with a zero rate of return and a risky investment with an uncertain return. If an investor has an initial wealth of A and invests an amount a in the risky asset and an amount m in the safe asset, then her budget constraint is $A = m + a$. If the rate of return on the risky asset is x , then the individual's terminal wealth, Y , can be expressed as $Y = A + ax$. The amount that each individual invests in the risky asset will vary according to her level of risk aversion.

To illustrate this latter point, assume that money invested in the risky asset is equally likely to increase in value by 100% or be reduced in value by 50%. An investment portfolio, then, will be worth $A + a$ ⁴⁷ if the risky investment succeeds, or $A - .5a$ ⁴⁸ if the risky investment fails. Assume two investors, *Scaredycat* and *Gambler*, who each have \$100 to invest. *Scaredycat* is so risk-averse that he will invest only in the safe asset. *Gambler*, on the other hand, will accept some risk of loss in exchange for a higher expected return. For example, *Gambler* might choose to invest half of her wealth, or \$50, in the risky investment. This would be the optimal choice if *Gambler's* utility were equal to the logarithm of her income, so that her utility function could be expressed as $U = \log Y$. (There is no reason to think this utility function is particularly common; it is adopted solely for heuristic purposes.⁴⁹) In such case, *Gambler* would choose a value for a to maximize the function $U = \log(A - .5a) + \log(A + a)$. *Gambler* can maximize her expected utility by

⁴⁶ The effects of taxation on risk also are described in Atkinson & Stiglitz, note 21, at 97-127. See also Warren, Consumption Tax, note 25, at 1102-07.

⁴⁷ The amount invested in the safe asset is $A - a$ and will remain unchanged at the conclusion of the investment. The value of the amount invested in the risky asset will double in value to $2a$ if the investment is successful. Terminal wealth, then, is $A - a + 2a$ which is equal to $A + a$.

⁴⁸ The amount invested in the safe asset is $A - a$ and will remain unchanged at the conclusion of the investment. The value of the amount invested in the risky asset will be cut in half to $.5a$ if the investment fails. Terminal wealth, then, is $A - a + .5a$ which is equal to $A - .5a$.

⁴⁹ A logarithm is the power to which a base must be taken to equal a given integer. Here, *Gambler's* utility is equal to the power to which 10 must be taken in order to equal the amount of her income. So if *Gambler* has \$100 of income, her utility is 2, since 10 to the second power equals 100. If she has \$1,000 of income, her utility equals 3. A logarithmic function is consistent with the generally accepted premise that income has a declining marginal utility to individuals; it is also mathematically tractable. Perhaps for these reasons, this function is commonly used to model economic behavior.

investing half of her wealth of \$100 in the risky asset.⁵⁰ *Gambler's* terminal wealth thus will be \$150 if the risky investment succeeds (\$50 from the safe investment plus \$100 ($2 \times \50) from the risky investment) and \$75 if the risky investment fails (\$50 from the safe investment plus \$25 ($.5 \times \50) from the risky investment). *Scaredycat's* terminal wealth, of course, will be \$100 in all cases.

Now consider the imposition of a proportional income tax, t , which has full loss offsets so that investors will receive a payment from the government if they lose money on the investment. Such a tax will have no impact on investments in riskless assets because such assets earn no return. However, the tax will reduce gains and losses on risky investments by an amount equal to the tax rate. Thus, the terminal wealth from risky investments will be $ax(1 - t)$ and government revenues from the tax on risky investment will be axt . Essentially, the government becomes a partner in the investment, sharing in both its profits and losses.

Consider, for example, the imposition of a 30% tax in the example. The tax would leave *Scaredycat's* terminal wealth unchanged at \$100. *Gambler*, however, would pay a \$15 tax on the \$50 profit on a successful risky investment ($\$50 \times 30\%$), reducing her terminal income from \$150 to \$135. If the risky investment were unsuccessful, *Gambler* would receive a \$7.50 payment from the government to offset in part her \$25 loss ($\$25 \text{ loss} \times 30\%$), thus increasing her terminal wealth of \$75 to \$82.50. Such a tax reduces both the expected return of a risky investment and the investor's exposure to losses. In fact, *Gambler* is placed in the same position as she would have been in a no-tax world if she had invested only \$35 in the risky asset rather than \$50.

Gambler's new position will be less desirable to her than the one she enjoyed in the no-tax world.⁵¹ She can, however, return to the exact position she occupied in the no-tax world by increasing her investment in the risky asset by $1/1 - t$ (and correspondingly decreasing her investment in the riskless asset). The intuition behind this result is that, again, the government is a partner in her investments. *Gambler* can offset the effects of this forced partnership by increasing her gross investment in the risky asset so that, after taking into account the government's share, she has the same net investment as in the no-tax world. In the above example, this would require *Gambler* to increase her investment in the risky asset from \$50 to \$71.43.⁵² Such an increase would give her the

⁵⁰ $U = \log(A - .5a) + \log(A + a) = \log(A^2 + .5Aa - .5a^2)$. Taking the derivative dU/da and setting it to zero yields $0 = .5A - a$ or $a = .5A$. If $A = \$100$, then $a = \$50$.

⁵¹ In a no-tax world, *Gambler's* expected utility is $U = .5 \log 150 + .5 \log 75 = .5(2.1761) + .5(1.8751) = 2.0256$. After the imposition of a 30% tax with full loss offsets, *Gambler's* expected utility is $U = .5 \log 135 + .5 \log 82.50 = .5(2.1303) + .5(1.9165) = 2.0234$. Thus, if *Gambler* does not change her portfolio, the imposition of a tax reduces her utility by .0022.

⁵² In the no-tax world $a = \$50$. The tax is 30%, so $a/1 - t = \$50/1 - .3 = \71.43 .

same terminal wealth she enjoyed in the no-tax world—\$150, in the case of a successful investment, and \$75, in the case of an unsuccessful one.⁵³ The position of the government, however, would be changed substantially. Government revenues would increase to \$21.43 in the case of a successful investment and government losses would increase to \$10.72 in the case of an unsuccessful one.

Gambler's precise response to the tax is, of course, a function of her utility schedule, and there is no reason to think others would share that particular schedule. Consistent with the above example and intuition, the imposition of an income tax, however, will always increase the riskiness of the desired portfolio, provided only that the investor's utility schedule follows the conventional assumption that the marginal utility of income declines as income increases.

Similar portfolio adjustments will be made by individuals who invested all their wealth in risky assets in the no-tax world if borrowing and lending rates are equal: Such investors simply will borrow money to increase their investments by the necessary $1/1 - t$. If, for example, *Thrillseeker* would invest her entire wealth of \$100 in the risky asset in the no-tax world to receive a terminal wealth of \$200 if the investment succeeds and \$50 if it fails, then if a 30% tax is enacted, she will increase her investment in the risky asset to \$142.86⁵⁴ by borrowing \$42.86 at the riskless rate of zero. If the risky investment succeeds, *Thrillseeker* will earn a profit of \$142.86 and pay a tax of \$42.86 (30% of \$142.86), leaving her with a net profit of \$100 and the same terminal wealth of \$200 she would enjoy in a no-tax world. Similarly, if the investment fails, *Thrillseeker* will suffer a pretax loss of \$71.43 and receive a \$21.43 payment from the government ($\$71.43 \times 30\%$), resulting in the same net loss of \$50 she suffered in the no-tax world.

C. Fairness and Efficiency of a Income Tax with Full Loss Offsets

To evaluate the fairness and efficiency of an income tax with full loss offsets, it is necessary to examine both the effect of the tax on individual investors and its impact on society in general. The conclusion is easy with respect to the individual investor: No unfairness is caused by the tax because the investor can adjust her portfolio to return to the precise

⁵³ The successful investment yields a profit of \$71.43 (100% return on \$71.43 invested), upon which a tax of \$21.43 (30% of \$71.43) is paid. The \$50 after-tax profit added to the investor's \$100 initial capital yields a terminal wealth of \$150. The unsuccessful investment yields a loss of \$35.72 (a negative 50% return on \$71.43 invested) which generates a government refund of \$10.72 (30% of \$35.72). The \$25 after-refund loss added to the investor's initial capital of \$100 yields a terminal wealth of \$75.

⁵⁴ $\$100 \times 1/1 - t = \$100 \times 1/.7 = \$142.86$.

position he enjoyed in the no-tax world.⁵⁵ The common complaint against the income tax that it discriminates against savers thus is untrue in the case of a tax with full loss offsets.

The tax also does not discourage savings. Because the investor who properly adjusts her mix of safe and risky investments will have the same after-tax return on her investments as in a no-tax world, the tax will have no effect on an individual's decision to save.

From the social standpoint, however, the impact of the tax is more difficult to assess. By enacting the tax, the government, in effect, has acquired an asset with a positive expected return and a significant level of risk. The consequences of this acquisition will depend on the tax and expenditure policies of the government. One alternative for the government would be to eliminate its exposure to risk by selling its rights to the tax revenues for a fixed sum. Such a sale would face obvious practical difficulties. More significantly, the sale would raise no revenue. This is because the fair market value of the prospective tax revenues is zero—the positive expected return from the tax revenues is precisely balanced by the premium the marginal buyer would exact for assuming the risk of loss.⁵⁶ This is not surprising. If the prospective revenues could be sold for a positive amount, a money machine would exist because the government could generate taxes without altering the after-tax position of any taxpayer.⁵⁷

If the government decides to keep the risky tax revenues, the incidence of the risk depends on the government's tax and expenditure policies. If, for example, the level of government support for elderly health care depended on such revenues, then the risk would be borne primarily by older people in poor health. If revenue shortfall attributable to risky in-

⁵⁵ The following is a partial equilibrium analysis. Changes in the demand for risky assets and safe assets and shifts in government spending decisions may have secondary effects that could alter these conclusions.

⁵⁶ Recall that where the riskless rate is zero, an individual may borrow money on an interest-free basis and use that money to purchase risky assets with a positive expected return. See text accompanying note 54. In the market, the positive expected return will be set at a point where savers are indifferent, at the margin, between holding a riskless asset with a zero rate of return and holding a risky asset with a positive return.

⁵⁷ Note that the risk the government bears from the tax will not be reduced through diversification, even though the government taxes many investors with quite different investments. This is because the risk premium on investment is entirely due to nondiversifiable market risk. This makes sense because investors would not require any additional return to purchase an investment with a unique risk that they could eliminate by diversifying their own portfolio.

An exception might exist if practical impediments to diversification exist. The risk inherent in investment in human capital, for example, may be difficult to eliminate through diversification and diversification of certain investments in physical capital may be prohibited by high transaction costs. If the government is able to acquire a share of many such investments by taxation, their unique risk would be eliminated by diversification in the hands of the government. In such cases, the right to governmental revenues might have a positive fair market value.

vestments were offset by a cut in defense expenditures, the risk might fall most heavily on military contractors and their employees. If the government is viewed as simply wasting all of its income on projects for the benefit of the government legislators and administrators, then the risk would be borne entirely by the government itself.

The incidence of the tax in each of these cases also would depend on the actions of individuals in response to risk assumed from the government. Suppose, for example, that the risk of uncertain revenues is borne by government suppliers. People who hold stock in such suppliers, but wish to keep their risk constant might decide to sell their supplier stock. The stock might be purchased by people such as *Gambler* and *Thrill-seeker*, who wish to increase their pretax risk and expected return in order to offset the effects of taxation. These secondary effects make the fairness and efficiency effects of the tax very difficult to determine.

D. Underlying Assumptions

1. Ability of Investors to Shift Portfolios and Other Assumptions

Our analysis showed that if the riskless rate is zero, the implementation of an income tax with full loss offsets will leave an investor's risk and return levels unchanged because she can adjust her portfolio to offset the tax. This analysis was based on a number of simplifying assumptions. For example, we assumed that the interest rate and the inflation rate were each zero, that investors were able to make costless portfolio adjustments and that investors received full loss offsets.

The validity of the first two assumptions has been discussed earlier.⁵⁸ In most years, there is a positive real, riskless interest rate and this rate cannot be offset by portfolio adjustments. However, this rate historically has been near zero.⁵⁹ The assumption that the rate of inflation is zero is appropriate for the purposes of the consumption tax debate, as usually defined, because that debate involves the choice of two competing idealized tax bases, and under the idealized income tax, inflationary gain is not taxed. In reality, of course, inflationary gain is taxed, and the burden of taxation on that portion of the return that represents inflation cannot be offset through portfolio adjustment.

The assumption that portfolio adjustments are costless (or near costless) will be true for some investors and not others. Investors in publicly traded assets such as common stocks and bonds will find it easy and cheap to alter the risk composition of their portfolios; investors in closely held corporations and real estate may find it nearly impossible to alter their investment portfolios. Even investors in publicly traded securities

⁵⁸ See Sections II and III.

⁵⁹ See Section III.A.

may find it impossible to eliminate the impact of an income tax through increased purchases of risky assets if the tax leads to an increase in their price. A price increase is plausible because the tax would increase demand for risky assets. Such an increase in price would lower the assets' pretax return and make it impossible for investors to return to their position in the no-tax world by increasing the fraction of risky assets in their investment portfolios. The ability of investors to adjust their portfolios also may be limited by the gap between the amount an investor must pay to borrow money and the rate that the investor can earn from loaning money.

2. *Deductibility of Losses*

A taxpayer will not be able to offset the effects of a tax on risk through portfolio adjustment unless the tax treatment of gain and loss is symmetrical: A person who experiences a tax cost on a given amount of income should experience an identical tax saving on the same amount of loss. In the model discussed earlier, the fact that the government absorbed some portion of potential losses allowed the taxpayer to increase the riskiness of her portfolio in response to the tax. The ability of some investors to realize a tax benefit from unsuccessful investments, however, is sharply limited.

Corporations are responsible for the majority of direct domestic business investments. Tax return data for recent years, for example, show that corporations own the majority of depreciable business property and are responsible for the major portion of investment in non-real estate-related tangible business property.⁶⁰ The major limitation on the ability of corporations to realize a tax benefit from investment losses is that such losses do not produce a direct benefit, in the form of an automatic tax refund. Instead, investment losses may be used to offset other sources of current income, and thus reduce the tax due on that income. Investment losses also may be used to offset income recognized during a limited number of prior and subsequent taxable years, and thus reduce tax owed on that income.⁶¹ A corporation with no past or current income may benefit from an investment loss only if and when it earns income in the future.

It will be heuristically useful to examine the effect of the loss limitations on a small investment made by hypothetical company, *Loss, Inc.*,

⁶⁰ In 1983, for example, corporations deducted depreciation of approximately \$242 billion. I.R.S., Selected Statistical Series, 1970-1986, Stat. Income Bull., Spring 1986, at 108. In that same year, partnerships and sole proprietorships deducted depreciation of approximately \$59 billion. *Id.* at 104. Other years for which data are available show a similar ratio of corporate to noncorporate depreciation deductions. *Id.* at 104, 108.

⁶¹ IRC §§ 165, 172.

which has no source of current income and an infinite amount of net operating losses from prior years that may be used to offset future income. It may at first appear that the tax treatment of *Loss, Inc.* is not symmetrical, because it will receive no tax benefit if the investment is unsuccessful. *Loss, Inc.*, however, will also pay no tax if the investment is successful because it can offset its income with its unlimited prior losses. *Loss, Inc.* effectively operates in the no-tax world and, with respect to its current investment, is quite obviously not disadvantaged by an income tax.

In fact, no company has infinite prior losses and even the most unsuccessful company has some probability of recognizing sufficient future income so as to make use of an additional loss. In the above example, a loss recognized on the current investment would give *Loss, Inc.* an additional "tax shield" which could be used to offset future income.⁶² On the other hand, a gain recognized on the current investment would use up some existing "tax shield" and thus raise the possibility that future income will be subject to tax.

The important point for our purposes is that for small investments, the tax treatment remains symmetrical. For such companies, a dollar of income is partially taxed (there is no current tax, but some tax shields are used up) and a dollar of loss is partially deductible (there is no current deduction, but the company's tax shield is increased). Provided that the other assumptions described above are met, the company should be able to offset the effects of the tax by adjusting the riskiness of its investments.

The tax treatment would not be symmetrical, however, for companies that effectively make only a single investment, or that make particular investments that are much larger than past or future investments. Consider, for example, a start-up computer company. The company will be taxed on gain if the product succeeds, but if the product fails, the company is likely to go out of business and so get no benefit from the tax loss. While there is no hard data on point, it seems likely that this sort of asymmetry occurs with respect to only a small portion of corporate investment.

As noted above, individuals account for only a small share of direct business investment.⁶³ However, individuals are indirectly responsible

⁶² One recent study estimated the tax savings realized from current losses suffered by companies with no current income and no income in the prior year. The nominal marginal tax rate during the years examined was 46%. A company with \$100 of current income and \$100 of loss and no past or future income would be able to use the loss to offset the income and save \$46. The present value of the tax loss would thus be \$46. The study found that the average present value of a current loss for companies with no income in the current or prior year was about \$20. Rosanne Altshuler & Alan J. Auerbach, *The Significance of Tax Law Asymmetries: An Empirical Investigation*, CV Q.J. Econ. 61, at 79-80 tbl. v (1990).

⁶³ See note 60.

for a significant portion of corporate investment, through purchase of corporate debt and original issue stock. Individuals are subject to approximately the same limitation on refundability as corporations are. In addition, individuals are subject to a host of other limitations. For example, individuals face stringent restrictions on their ability to deduct losses on investments in businesses in which they do not actively participate,⁶⁴ on businesses that they have purchased with borrowed funds,⁶⁵ or losses due to interest used to purchase or carry stock or securities.⁶⁶ Individuals also bear the brunt of a provision that virtually disallows deduction of net losses on investments in capital assets such as stock or securities.⁶⁷ Because individuals are less well-capitalized than most companies and have a shorter life span as investors, they are likely to make fewer investments and therefore find themselves with losses and no offsetting gains. Thus, the tax treatment for individuals is apt to be less symmetrical than for corporations. A tax law that treats gain and loss asymmetrically will result in tax liability that does not accurately reflect changes in year-end wealth. Such a tax is inconsistent with the Haig-Simons tax base, which, as noted earlier, defines income as the sum of consumption plus the change in year-end wealth. If full loss offsets are allowed under both the consumption and income tax ideals, then, in examining the implications of the ideals, it may be appropriate to assume an income tax that allows full loss offsets, in much the same way that it may be appropriate to assume that the income tax is adjusted to prevent taxation of inflationary gains.

It is possible, however, that loss restrictions may be necessary under an income tax to prevent tax shelter activity; if that is the case, loss restrictions may be seen as a permanent part of the income tax. In any event, loss restrictions exist and it is important to examine the effect of those restrictions on risk.⁶⁸

⁶⁴ IRC § 469 (limitation on losses on investments in trade or business in which the taxpayer does not actively participate).

⁶⁵ IRC § 465 (limitation on losses on investments purchased with nonrecourse debt).

⁶⁶ IRC § 163(d) (limitation on deduction of investment interest). These provisions are buttressed with other provisions that limit the ability of individuals to sell otherwise unusable losses to other taxpayers. See, e.g., IRC § 704(b) (restrictions on the use of partnerships to shift income and loss).

⁶⁷ IRC § 1211(b) limits individuals to an annual deduction of \$3,000 for net losses realized on the sale or exchange of capital assets. Amounts not deductible in any year carry forward indefinitely. IRC § 1212(b). Corporations cannot deduct net capital losses, IRC § 1211(a), but the losses can be carried back or carried forward for a limited time to other taxable years, IRC § 1212(a); however, a much smaller percentage of corporate assets than individual assets falls into the capital asset category.

⁶⁸ The impact of restrictions on loss offsets has been previously explored (and deplored) in Mark Campisano & Roberta Romano, *Recouping Losses: The Case for Full Loss Offsets*, 76 *Nw. U. L. Rev.* 709 (1981).

E. Effect of Loss Restrictions on Risk

An income tax without loss offsets will reduce investors' gains from successful risky investments, but will not reduce their losses from unsuccessful investments. In certain cases, the combination of taxable gains and nonrefundable losses will reduce the expected return of risky assets below the return of safe assets, causing all investors to purchase riskless assets. In other cases, where the expected return from risky assets remains above that of the riskless assets, the tax simply will make risky investments less attractive. Such investors, moreover, will be unable to eliminate the burden of the tax through shifts in their portfolios.

Consider, for example, the impact of a 30% income tax with no loss offsets on the position of *Gambler*, who in the no-tax world invested \$50 of her \$100 wealth in risky assets for a terminal wealth of either \$150 or \$75, depending on the success of the risky investment. If *Gambler* maintained the same investment portfolio after the imposition of the tax, her wealth in the case of a successful risky investment would be reduced to \$135, while in the case of an unsuccessful investment, her wealth would remain \$75. In effect, the tax has changed her risky investment from one with an equal probability of a 100% gain and a 50% loss to one with an equal probability of a 70% gain and 50% loss.

Such a change, obviously, reduces *Gambler's* expected welfare. If, for example, we retain the assumption that *Gambler's* wellbeing is equal to the logarithm of her terminal wealth and she does not change her investment portfolio, *Gambler* will have expected welfare after the tax of 2.0027, equal to a certain return of \$100.62. This is .0229 units lower than *Gambler's* no-tax utility of 2.0256, which was equal to a certain return of \$106.07. Thus, if welfare is measured on an ex ante basis, *Gambler* will be \$5.45 poorer than she was prior to the introduction of the tax.⁶⁹

As in the case of an income tax with full loss offsets, *Gambler* can attempt to adjust her investment portfolio to minimize her welfare loss from the tax. It turns out that *Gambler's* utility maximizing choice is to invest only \$28.57 in the risky asset⁷⁰ and \$71.43 in the safe asset. This portfolio yields a terminal wealth of \$120 if the risky investment is suc-

⁶⁹ In a no-tax world, *Gambler's* expected utility is $.5 \log 150 + .5 \log 75 = (.5 \times 2.1761) + (.5 \times 1.8751) = 2.0256$. $\log 106.07 = 2.0256$, so *Gambler's* investment is equal to a certain wealth of \$106.07. With the same portfolio in a world with a 30% tax and no loss offsets, *Gambler's* expected utility is $.5 \log 135 + .5 \log 75 = (.5 \times 2.1303) + (.5 \times 1.8751) = 2.0027$. $\log 100.62 = 2.0027$, so *Gambler's* investment is equal to a certain wealth of \$100.62.

⁷⁰ $U = .5 \log (A + .7a) + .5 \log (A - .5a) = .5 \log (A + .7a) (A - .5a) = .5 \log (A^2 + .2aA - .35a^2)$. $dU/da = 0 = .2A - .7a$. $a = 2A/7$. $A = \$100$ so $a = \$200/7 = \28.57 .

cessful⁷¹ and a terminal wealth of \$85.72 if the risky investment is unsuccessful.⁷² The change in portfolio mix leaves *Gambler* with expected utility of 2.0061, which is equal to a certain wealth of \$101.42. This is \$.80 greater than the level produced by her prior portfolio mix, but \$4.65 less than the level of expected utility available in the no-tax world.⁷³

As noted earlier, *Gambler's* response to the tax is dependent upon her utility function, which was chosen solely for heuristic purposes. There is no reason to believe that other individuals would adopt *Gambler's* post-tax portfolio mix. The lack of offsets reduces the expected return of risky investments. People who invest in risky assets to reach a certain goal may respond to the reduced return by increasing the riskiness of their investment portfolios in order to reach their goal.⁷⁴ Thus, while the asymmetrical taxation of gain and loss will in all cases reduce utility, the effect on portfolio mix is ambiguous.

F. Fairness and Efficiency of Taxation in a World Without Loss Offsets or Feasible Portfolio Adjustments

Our analysis shows that an income tax without symmetrical treatment of gains and losses, or a tax applied to those who are unable to adjust their investment portfolios, reduces the utility, or surplus, of risk-takers in much the same way that taxation of interest reduces the utility or surplus of savers. In this respect, taxation of risk raises the same fairness issue as taxation of interest.

In other respects, however, taxation of risk does not seem as troublesome as taxation of interest. As noted earlier, the argument that taxation

⁷¹ *Gambler* would have a profit of \$28.57 and pay a tax of \$8.57 ($\$28.57 \times 30\%$) on her initial capital of \$100.

⁷² *Gambler* would suffer a \$14.28 loss on her initial capital of \$100 for which there would be no offset.

⁷³ *Gambler's* expected utility is $.5 \log 120 + .5 \log 85.72 = (.5 \times 2.07918) + (.5 \times 1.93308) = 2.0062$. $\log 101.42 = 2.0061$. $\$101.42 - \$100.62 = \$.80$. If *Gambler* continues to invest \$50 in risky assets, despite the tax, she will have a terminal wealth of either \$135 or \$75 with an expected utility of 2.0027. See note 69.

⁷⁴ This so-called "wealth effect" may be illustrated by the following example: *Sam*, who is in the 40% tax bracket, has \$400,000, but needs \$472,000 to retire. Assume losses are deductible, and that there are an infinite number of investment opportunities. Each investment costs \$20,000 and has an even chance of providing a before-tax profit of \$50,000 or a before-tax loss of \$20,000. The tax reduces the profit to \$30,000 and (due to deductibility) reduces the loss to \$12,000. The expected after-tax return is \$9,000. If *Sam's* luck is average, and one-half of the investments turn out to be successful, *Sam* will need to make eight risky investments to reach his goal. *Sam* is otherwise risk-averse and will make no risky investments except as required to meet his goal. *Sam's* portfolio would therefore contain \$160,000 in risky investments.

Assume, now, that losses are not deductible. As before, each investment offers a 50% chance of providing an after-tax profit of \$30,000. However, since losses are not deductible, each investment now offers a 50% chance of providing a before- and after-tax loss of \$20,000. The expected after-tax return has dropped to \$5,000. *Sam* now needs to make 15 investments to reach his goal. *Sam's* portfolio would therefore contain \$300,000 in risky investments.

of interest is unfair is sometimes tied to an argument based on the assumed disutility of savings.⁷⁵ Under this argument, interest is seen as compensation for the pain of deferred gratification. Taxation of interest ignores this form of disutility suffered by savers, and is therefore thought to be unfair. Taxation of risk does not seem to be open to objections of this type, at least when the effects of taxation are measured on an ex post basis. The tax applies only to individuals whose investments have turned out successfully, and those individuals have not suffered any pain, except, perhaps, some anxiety as to the investment outcome.⁷⁶

An income tax without full loss offsets also reduces efficiency in a manner similar to that of a tax on a real, riskless rate of return or a tax on wages.⁷⁷ In our example, an income tax without loss offsets causes *Gambler* to reject some risky investments that would improve her wellbeing in a no-tax world. *Gambler's* loss of welfare from those forgone risky investments is not offset by additional tax revenues because the government cannot tax the return from investments that are not made.

VI. IS TAXATION OF RISK PREMIA INCONSISTENT WITH PATERNALISTIC OR ALTRUISTIC CONCERNS?

We have earlier noted that paternalistic or altruistic concerns might favor increased saving, and the exclusion of interest from the tax base under a consumption tax might be viewed as a way to increase saving.⁷⁸ In this section we discuss whether paternalistic or altruistic concerns favor increased (or decreased) risk taking, and whether the nontaxation of risk under a consumption tax might be a sensible way to achieve the desired result.

⁷⁵ See text accompanying notes 13-14.

⁷⁶ Taxation of successful outcomes would be open to objections of ex post fairness were the risk premium compensation for anxiety. In our model, however, the risk premium reflects the declining marginal utility of income to the investor. Under a logarithmic utility function, or any other utility function that reflects declining marginal utility of income, the increase in utility from an additional dollar of income is less than the decrease in utility from losing a dollar of existing income. The risk premium compensates investors for the ex ante possibility of an unsuccessful outcome and the resultant decrease in utility. Individuals whose investments are successful do not suffer this decrease in utility and so there is no ex post rationale for exempting the risk premium from taxation.

The effects of taxation are much less clear when measured on an ex ante basis. The risk premium is designed to compensate investors for the loss of utility suffered in the event of an unsuccessful investment. Taxation without loss offset or portfolio adjustment treats the entire risk positive return or risk premium as a windfall, ignoring the disutility inherent in holding a risky asset.

⁷⁷ The efficiency costs of an income tax on risky investments made by people who are unable to adjust their portfolio mix is less certain, principally because such individuals, by assumption, are constrained in their behavioral response to the tax.

⁷⁸ See Section II.C.1.

A. Paternalistic or Altruistic Argument for Increased Risk Taking

A paternalistic argument for increased risk taking also might be based on an individual's misperception of her utility schedule. Suppose, for example, an individual believes that her marginal utility of wealth declines dramatically beyond a certain point. Based on the perceived decline, the individual turns down an otherwise attractive gamble. Suppose, however, that the marginal utility of additional wealth does not decline so steeply for that individual. A fixed amount of additional wealth turns out to be nearly as valuable to the individual when she is rich as it is when she is poor. An individual with this sort of misperception will reject some gambles that would increase her expected welfare.

A paternalistic argument for increased risk taking also might be based on perceived regret associated with unsuccessful gambles. Suppose that an individual's risk aversion is caused not by declining marginal utility of income, but by her perception that she will be filled with regret if she decides to gamble and the gamble turns out unsuccessfully. If, in fact, the individual will not experience the imagined regret, then this individual, too, will turn down gambles that would increase her expected welfare.

The difficulty with both of the paternalistic arguments described above is that there is no reason to think that individuals would systematically misperceive the effects of risk taking in a way that makes gambles seem less attractive. The possibility that an individual would overestimate the rate at which the marginal utility of additional wealth declines appears balanced by the possibility that an individual would underestimate the rate of decline. For example, an individual may feel additional wealth would contribute greatly to her happiness, when in fact its contribution would be quite modest. In a similar vein, an individual may feel that the potential loss of wealth due to an unsuccessful gamble will produce little regret when, in fact, such a loss would produce overwhelming regret.

An examination of the relationship between expected welfare and actual welfare obviously is beyond the scope of this paper. Our intuition, however, is that most individuals select a risk portfolio based on an accurate assessment of their reaction to favorable and unfavorable outcomes, and that individuals who do not accurately gauge their reaction to such outcomes are as likely to select a portfolio with too much risk as too little risk. We have no sense that the long-term welfare of our friends and colleagues would be increased if the riskiness of their investment portfolios were increased.

Support for increased risk taking might be based on altruistic, rather than paternalistic concerns. Increased risk taking may be seen as a way to increase the expected wealth and welfare of future generations. Unfortunately, this justification for increased risk taking faces the same diffi-

culty as the paternalistic justification discussed above: There is no reason to believe that future generations will be better off if they inherit risky portfolios, or the variance in wealth produced by risky portfolios. Suppose, for example, that an elderly individual is deciding how much of her portfolio should consist of risky assets, and that the return on the portfolio will accrue to her beneficiaries. The expected welfare produced by the risky assets will depend on the utility functions of the beneficiaries. There does not appear to be any reason to believe the investor will misperceive the beneficiaries' preferences so as to purchase an overly safe, as opposed to overly risky portfolio.

B. Relationship Between Taxation of Risk and Risk Taking

In the preceding section, we conclude that paternalistic and altruistic concerns do not justify government policies designed to favor (or disfavor) risky investments. Others may reach a different conclusion, and wish to adopt a tax base that encourages (or discourages) risky investments.

Unfortunately, adjusting the tax base to affect risk is a difficult task. As noted earlier, the adoption of an income tax will cause individuals who are able to vary their portfolios and receive full loss offsets to increase their investments in risky assets.⁷⁹ This effect may be moderated, however, by the manner in which the risk absorbed by the government is spread back through the economy. It is unclear whether an income tax without full loss offsets will increase or decrease the amount of risky assets. In general, the adoption of an income or consumption tax seems an indirect and inefficient means of affecting the quantity of risky investments.

C. Impact of Taxation of Risk on Saving Behavior

Before closing this section, we should note that while there do not appear to be any paternalistic or altruistic reasons to favor risk, taxation of risk premia may conflict with paternalistic or altruistic reasons to favor savings. We stated earlier that taxation of risk premia should not affect savings, provided that investors receive loss offsets and are able to vary their portfolios. If these conditions are not met, then, under certain conditions, taxation of risk premia may reduce savings.⁸⁰

⁷⁹ See text accompanying notes 51-53.

⁸⁰ The intuition behind this result may be grasped by imagining, somewhat unrealistically, a nonrisk averse investor with a constant discount rate of 5%. Suppose that the introduction of an income tax with no loss offsets reduces the return on a risky investment from 12% to 4%, but leaves the riskless return of zero unchanged. Neither investment will offer a return equal to the investor's discount rate, and the investor will consume rather than save. The introduc-

VII. CONCLUSION

The debate between an income tax and a consumption tax has often centered on the different manner in which the two tax bases treat interest. Consumption tax proponents have argued that interest represents compensation for the disutility suffered from deferral, and that taxation of interest is unfair, inefficient and inconsistent with paternalistic and altruistic goals. These charges have been ably, but for the most part, inconclusively, rebutted by defenders of the income tax.

Review of historical data reveals that substantially all of the real return realized on investments during the past 60 years has been attributable to investment risk. It seems appropriate, therefore, to center the consumption tax debate on the way in which the two tax bases treat risky investments, rather than the way the two tax bases treat interest.

Our analysis suggests that, in general, taxation of risk premia is much less troublesome than taxation of interest. Many taxpayers will be able to offset the effects of taxation of risk premia by increasing the proportion of risky assets in their portfolios. Such taxpayers will not be disadvantaged by an income tax. In addition, the altruistic and paternalistic concerns that support nontaxation of interest do not necessarily support nontaxation of risk premia. In other respects, however, taxation of risk premia raises issues quite similar to taxation of interest. Taxation of risk premia without loss offsets will disfavor investors in risky assets and raise efficiency concerns.

In still other respects, the effects of taxation of risk premia are uncertain, even under the simplifying assumptions used in our models. For example, an income tax with loss offsets will increase governmental risk; the desirability of such a tax cannot be determined without knowing how the government spreads that risk among its citizens. With respect to this and other issues, our analysis may be more useful for the questions it raises than for the answers it provides.

tion of declining marginal utility of income or other factors that cause risk aversion would substantially increase the complexity of the analysis, but would not change the result.