Income Taxation and Risk-Taking

David Hasen

Abstract

The literature on income taxation and risk-taking has tended toward the view that a true, or "normative," income tax is ineffective at taxing the returns to risk-taking. The theory is that investors increase the size of their portfolios in response to the tax, because the government both absorbs a portion of the gains realized from risk-based investment and subsidizes any losses sustained in analogous fashion. When the investment makes money, the larger return covers the associated tax liability, and when it loses money, the deduction for the loss compensates for the excess over what would have been realized in the pre-tax world. At the end of the day, the investor is mostly returned to his pre-tax position.

The ramifications of this theory are far-reaching. If a normative income tax does not reach returns to risk-taking, we should probably abandon the effort to tax them under the real income tax. Further, if a normative income tax only lightly burdens capital income, the differences between it and consumption taxation seem to be negligible, and it may make sense to switch to a consumption tax base if it is superior according to other criteria, such as maximizing efficiency or minimizing administrative and compliance costs.

This paper argues that the generally accepted view is mistaken. The no-tax-to-risk result is an artifact of the unrelated assumption that the government operates under a fixed budget constraint. That constraint has nothing to do with the nature of an income tax, which reaches all returns to risk-taking as long as the government is willing to bear associated risk in tax revenues. There is no *a priori* reason to assume the government would not be so willing, especially in light of the high expected returns to doing so, the correlation between the demand for tax-financed goods and services and per capita GDP, and the fact that every government already receives risk-based returns through its ownership of various real assets. The implications for tax policy are profound in the context of the ongoing, intensive debate over the merits of taxing risky returns to capital and of the emerging consensus that consumption taxation may be superior to income taxation on efficiency and administrative grounds.

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INTRODUCTION

It has become conventional wisdom among tax scholars that a true, or "normative," income tax does not reach the returns to risk-taking.[1] The conclusion

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[1] Theodore S. Sims, *Capital Income, Risky Investments, and Income and Cash Flow Taxation*, 67 TAX L. REV. 3, 4 & 4 n.7 (2013). Among the literally dozens of papers that address some version of this claim, of particular note in the legal literature are John R. Brooks II, *Taxation, Risk, and Portfolio Choice: The Treatment of Returns to Risk Under a Normative Income Tax*, 66 TAX L. REV. 255 (2013) (accepting the basic analysis but qualifying it in light of risk aversion); Louis Kaplow, *Taxation and Risk: A General Equilibrium Perspective*, 47 NAT'L TAX J. 789 (1994) (showing how the tax on risk is canceled under certain assumptions); Deborah H. Schenk, *Saving the Income Tax with a Wealth Tax*, 53 TAX L. REV. 423 (2000) (arguing that scaling up would not occur only because of unrelated problems such as investor myopia, transaction costs and lumpiness of returns); Sims, *supra*, (arguing the result is substantially qualified by the wealth effect of the tax on riskless returns); Alvin Warren, *Would a Consumption Tax Be Fairer Than an Income Tax?*, 89 YALE L.J. 1081 (1980); David A. Weisbach, *The (Non)Taxation of Risk*, 58 TAX L. REV. 1 (2004) (arguing that a normative income tax does not reach returns to risk-taking) [hereinafter Weisbach, *(Non)Taxation*]; Lawrence Zelenak, *The Sometimes Taxation of Risk-Bearing Under a Progressive Income Tax*, 59 SMU L. REV. 879 (2006) (generally arguing that taxation of risky returns will occur under certain circumstances if rates are progressive). In the economics literature, among the more widely cited papers are Jeremy I. Bulow & Lawrence H. Summers, *The Taxation of Risky Assets*, 92 J. POL. ECON. 20 (1984) (examining the effects of cost recovery on taxation of the returns to risk-taking); Martin S. Feldstein, *The Effects of Taxation on Risk-Taking*, 77 J. POL. ECON. 755 (1969)

often is said to hold under standard if somewhat idealized assumptions about taxpayer risk-bearing, and nearly to hold under more realistic assumptions.[2] A normative income tax is one that applies to all income at the same rate and, consequently, provides for government payments – so-called negative taxes or "full loss offsets" – to taxpayers who sustain losses overall during the taxable period. The basic analysis is straightforward. Under the tax, the government takes a share of all gains but subsidizes all losses to the same extent. The symmetry in tax treatment of gains and losses implies that the investor experiences no expected change in either risk borne or expected return from increasing her investment to compensate for the tax, assuming the opportunity to increase the investment on the same terms is available. Expressed in mathematical terms, under a fixed tax rate, t, the investor can get to nearly the same pre-tax position simply by increasing, or "scaling up," the initial investment by $t/(1-t)$ times the investment. If the investment makes money, the investor reaps a greater return, the tax on which just equals the excess over what she would have received in the absence of the tax. If the investment loses money, the taxpayer realizes a greater loss, but the government pays the investor the excess over what she would have lost in the absence of the tax. In either case, apart from the tax on the risk-free rate of return (which, it is asserted, cannot be avoided[3]), she is in the same position that she would have occupied if the tax had not been adopted.

Although no country employs a normative income tax, the reasons have mostly to do with problems of compliance and administration, not with any principled objection to the concept of subsidizing real losses.[4] Rather, a true income tax by definition would subsidize such losses because they constitute negative income. If the investor invests $100 of after-tax income and loses $50 of it, he is $50 poorer and ought to have a return of the taxes paid in respect of the

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(questioning whether and to what extent scaling up will occur under an expected utility framework); Joseph E. Stiglitz, *The Effects of Income, Wealth, and Capital Gains Taxation on Risk-Taking*, 83 Q. J. ECON. 263 (1969) (arguing that scaling up is dependent on the extent to which risk aversion (relative and absolute) increases or declines with income). For a recent review of the literature, see Wolfgang Buchholz & Kai A. Konrad, *Taxes on Risky Returns – an Update*, Max Planck Institute for Taxation and Public Finance, Working Paper 2014-10 (July 2014).

[2] *See, e.g.*, Schenk, at [434]; Weisbach, *(Non)Taxation*, at __.

[3] The resulting tax on the risk-free rate is explained in more detail in Part II.A., below.

[4] *See, e.g.*, Schenk, at __; Weisbach, *(Non)Taxation*, at __. The compliance and administrative burdens derive mostly from the realization rule, which generally defers tax on gains (and deduction of losses) that economically have accrued on property until the taxpayer disposes of the property. *See* IRC § 1001(a). Taxpayer control over the timing of realization means that permitting loss offsets would exacerbate the problem of selective loss realization, which occurs when taxpayers continue to hold gain positions or decline to hold loss positions, in both cases purely for tax reasons.

income prior to having become poorer; otherwise he is taxed on phantom income. In short, a "true" income tax provides full loss offsets.[5] In recognition of this principle, income tax systems generally contain provisions that approximate the effects of full loss offsets while avoiding some of the problems that would arise if they were adopted.[6] Although these mechanisms are not perfect substitutes, they often are reasonably close.[7]

It would be an understatement to suggest that the idea that a normative income tax does not reach returns to risk-taking has had a profound effect on tax policy.[8] At the extreme, it has led to the claim that net positive returns from risky investments are not themselves income, since a normative income tax seems by definition to tax income itself but, for the reasons stated, not to reach risky returns.[9] Somewhat less sweepingly, it has led to the view that even if returns from risky investments are income in some conceptual sense, a true income tax does not pick them up.[10]

More practically, if there is no point to taxing returns to risk-taking, why not abandon the effort and, as respects capital income, simply impose a tax on risk-free returns? Such a reform would dramatically simplify the income tax – apparently at no revenue, efficiency or distributional cost. Indeed the

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[5] The availability of full loss offsets is implied in the standard or, "Haig-Simons," definition of income as overall change in wealth during the tax period. HENRY SIMONS, THE CONCEPT OF INCOME 50 (1938). Since the change can be negative, taxes on the change should be negative as well.

[6] *See, e.g.*, United States, 26 U.S.C. § 172 (net operating loss deduction); Fed. Rep. Ger., Einkommensteuergesetz § 10(d) (Verlustabzug, permitting one-year carryback and limited carryforward) (available at: http://www.gesetze-im-internet.de/bundesrecht/estg/gesamt.pdf).

[7] The main drawbacks of the net operating provision are that the loss often may not be taken for some number of years, § 172(b), thereby reducing its real economic value because of the time value of money, or, more dramatically, that the loss may never be available because the taxpayer never has positive taxable income to which the NOL will apply. *See id.*, §§ 172(b)(1)(A) (generally limiting application of the NOL to the period beginning two years prior to the loss year and extending twenty years after the loss year); 382 (limiting the extent to which a successor of the taxpayer may apply the taxpayer's NOL to the successor's income).

[8] See, for example, Bankman & Weisbach (arguing for the unambiguous superiority of a pure consumption tax over a pure income tax); Schenk (arguing that the attempt to tax risk under any actual income tax is normatively indefensible in light of the asserted non-taxation of risk under a pure income tax); Weisbach, *(Non)Taxation* (arguing that in light of the failure of an income tax to reach returns to risk-taking there are almost no differences among pure versions of income taxes, consumption taxes and wealth taxes).

[9] *See, e.g.*, Weisbach, *(Non)Taxation*, note 1, at 36.

[10] Schenk.

simplification would unambiguously yield gains in the latter two areas inasmuch as the absence of full loss offsets under the actual tax represents a distortionary departure from the norm. Taking the analysis one step further, since, under this view, the only difference between a pure income tax and a pure consumption tax is that the former taxes capital income whereas the latter does not, the differences between the two bases would seem to be small indeed, given that the real risk-free rate of return historically has been on the order of less than one percent.[11] Where revenue consequences are negligible, it would seem that other considerations, including especially efficiency properties but also administrative and compliance costs, ought to control the decision of which base to adopt.[12]

This Article argues that the general view is mistaken and consequently that the received wisdom both on the properties of income taxation and on the optimal base needs to be re-examined. A normative income tax does reach the returns to risk-taking, unless the government decides that its revenues must satisfy a fixed budget constraint. That assumption, however, is neither intrinsic to an income tax nor warranted in any practical application; indeed it does not correspond to any existing or historical budget constraint, nor is it consonant with the theoretical literature to the extent that literature does not rule out the government's ownership of a portfolio containing risky assets (and every government does own such a portfolio[13]). In fact, as I argue in Part II, the assumption of fixed revenues (and not the nature of an income tax) renders the idea that a normative income tax does not reach returns to risk-taking a tautology, because it requires that the government take on no risk in adopting a taxation scheme. That requirement, in turn, means the government cannot rely at all on taxation of risky assets for revenue, because the revenues from risky investments fluctuate. Taxation of risk thereby is washed out of the system definitionally, not by any construction or derivation. In short, it is not surprising that an income tax operating under a fixed budget constraint does not actually tax the returns to risk-taking, even if it imposes a nominal tax on those returns. If you have decided not to tax the returns to risk, then of course the tax on them is zero.

The mechanism by which the zero tax on returns to risk arises under positive nominal taxation of them is offsetting portfolio adjustments, which show up in the system through "scaling up." All that the portfolio adjustments accomplish, however, is enforcement of the budget constraint, not any necessary implementation of a normative income tax. To bring the point home, I show in Part II that a parallel result of non-taxation of the risk-free rate can be derived just as easily under the assumption that the government adopts a normative "income

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[11] *See* Part III.B.

[12] Weisbach, *(Non)Taxation*, at 2, 38; Bankman & Weisbach, at __.

[13] These assets include, among other things, government-owned land, infrastructure, service providers and innumerable other assets in addition, in many cases, to explicit investment portfolios.

tax" but with a budget constraint that revenue from capital taxation be strictly proportional to the risky return on all capital. Then there will be offsetting portfolio adjustments that cause scaling up in the riskless asset in the same fashion as occurs to risky assets where the budget is fixed; the effect just runs in the opposite direction: The returns to risk-taking are taxed under the income tax, but the risk-free rate is not taxed, even though nominal tax revenue from those returns increases under the tax. In either case, it is not the nature of a tax on income – on accessions to wealth – that drives the result, but the conceptually distinct decision about the budget.[14]

Importantly, and, it seems, one reason the literature has not identified the relationship between the incidence of capital taxation and budgetary assumptions, is that in general there are not one but three possible sources of scaling up that may result from the adoption of a tax, only one of which reflects real taxpayer response. The other two result either from the just-described interaction of the tax with an inconsistent budget parameter, or from the simple identity between governmental ownership of a portfolio on one hand, and taxation of the returns to the portfolio when it is held by investors on the other. Scaling up under the last occurs if the government exchanges its portfolio for a tax on the returns to the same portfolio, and it has no real economic effects. Since 100-percent ownership of the returns on *X* percent of total assets is the same as ownership of an *X*-percent return on 100 percent of the same assets, the scaling involved here is a mere change in form by which the government assesses the tax. Of interest for present purposes, however, is the fact that this identity runs both ways: The tax is equivalent to the government's simply claiming the relevant portion of market capital *ex ante*. In other words, if the government holds a portfolio, it is in effect levying a tax to the extent the portfolio represents a portion of total market capital that otherwise would be subject to tax.[15]

Only the third way in which scaling up may occur would reflect portfolio adjustments resulting purely from adoption of the tax. It is possible to isolate this effect by assuming (initially) that the government makes no adjustment at all to its portfolio when it introduces the tax.[16] In this setting, the imposition of the tax causes real (pre-tax) changes in position as investors react to the effects of the tax on their after-tax incomes. As I argue in Part III, the extent of this effect under a

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[14] *See* Part III.B.

[15] Kaplow, at [792]. This observation by itself refutes the notion that the government operates under a fixed budget constraint, since all governments own assets of various sorts. *See* Weisbach*, (Non)Taxation*, at 52. See Part III.B for a discussion of the issue.

[16] Isolating the effect does not require the assumption of no governmental portfolio adjustment, but the assumption is the easiest way to see the effect. The government also could reduce taxes in other areas, adjust its holdings in a broader set of portfolio investments or adjust outlays.

normative income tax is minimal. It falls far short of the full (or near-full) scaling that most commentators think would arise under a normative income tax.[17] In fact, in the pure case, where the imposition of an income tax is assumed to have no wealth effects, there will be zero scaling up, the exact opposite of the result said to hold there. More importantly, whatever scaling up does occur (because of wealth effects or other deviations from the pure case) leaves taxation of the real returns to risk-taking entirely in effect, regardless of whether the incidence of the tax is shifted among risk cohorts.

The argument that income taxation ordinarily does tax returns to risk-taking has several important ramifications. First, an income tax that does not expressly exempt returns to risk-taking may be an attractive means by which to raise revenue, because it taxes real returns to capital. Conversely, failure to tax those returns requires higher rates on income in other sectors, resulting in large efficiency losses. Second, where returns to risk-taking are high, there may be large distributional gains under the income tax from shifting the tax towards risk-taking and away from fixed investments and labor. A third ramification is that income and consumption taxation may differ significantly, and not just in their revenue implications for any given tax rate; depending upon the form of the consumption tax, the point becomes especially important if significant quantities of labor income systematically register in the system as capital income,[18] or if total consumption systematically lags total income (or both).[19] Finally, and more formally, a lesson is that a general specification of the implications of adopting a tax scheme must include identification of not only the base but also the budget constraint. The incidence of the tax is simply unspecified absent some rule about budget policy.

Most treatments of the problem of taxing returns to risk-taking suppose that some opportunity for portfolio adjustment exists for investors subject to a normative income tax, and therefore that the question is how extensive the adjustment will be when the tax is adopted.[20] Commentators taking this approach generally assume that obstacles to scaling up derive mostly from various real-

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[17] *See* Part II.

[18] The problem of disentangling labor income from capital income is a perennial one for the income tax, as the recent debate on the taxation of "carry" in the private equity fund context and such familiar examples as that of Bill Gates' gains on sales of his Microsoft stock demonstrate. *See* Victor Fleischer, *Two and Twenty: Taxing Partnership Profits in Private Equity Funds*, 38 NYU L. REV. 1 (2008); David A. Weisbach, *The Taxation of Carried Interests in Private Equity*, 94 VA. L. REV. 715, 743 n.70 (2008). Capital treatment of gains to labor in both areas derives from the fact that returns to labor show up in increased equity valuations. *Id.*

[19] There is substantial evidence that over the medium term and perhaps even the long term, more wealth is produced than is consumed. *See* Part IV.

[20] *See* authorities cited in note 1.

world characteristics of investors, such that while full scaling up would apply in a simple world, it is somewhat qualified in the actual world (assuming a normative income tax were in effect). Among the limitations may be the non-constancy of investor risk toleration as absolute wealth declines (due to the tax on the risk-free rate),[21] the fact that the prospect of larger pre-tax losses may be more psychologically chastening to investors than the offsetting prospect of larger pre-tax gains is encouraging to them,[22] and the effects that depreciation and other available adjustments are likely to have on scaling up.[23] Alternatively, some models suppose that scaling up already has taken place (to the extent the actual income tax mimics a normative one) and then show how it would be unwound if the tax were removed.[24] In the former case, the analysis assumes that investment opportunities that would negate the effect of the tax are "out there" or available to some extent and, consequently, that some effective scaling up will take place through portfolio selection. In the latter case, the analysis purports to show how scaling up already has happened and how it would be reversed if the tax were repealed.

The point of departure for the argument here, and in a sense a key to the analysis, is a reformulation of the mechanism by which risk allocation takes place. Rather than model risk allocation as a process of explicit portfolio adjustment, I analyze it as a set of side payments among investor cohorts defined by their levels of risk tolerance. When analyzed in this way, it becomes apparent that risk-based returns consist of both a fee paid by risk-averse investors to risk-tolerant investors in exchange for less volatile returns, and a separate, typically positive real return to investment not captured in the riskless rate. The significance of this result is two-fold: It shows why opportunities for scaling up that eliminate the tax will be limited in the absence of governmental budget policy that affirmatively unwinds the tax; and it shows that scaling up when the government does not unwind the tax in no way prevents the tax from reaching the real returns to risk-taking.

Part I provides background to the problem and explains the basis for the standard result that a normative income tax does not tax risky returns. It also notes caveats that economists and tax scholars have identified to the standard result that arise from various factors. Part II turns to two general equilibrium discussions that suggest that taxing returns to risk-taking is pointless under a normative income tax. The argument offered in response is that what drives the result is the assumed budget constraint, not anything about the nature of an income tax. What follows is that one cannot determine the effects solely of the tax on risk unless one isolates the effect of the tax, which requires that government portfolio adjustments be

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[21] Sims, at __.

[22] Brooks, at __.

[23] Bulow & Summers.

[24] *See, e.g.*, Kaplow (1994).

disregarded. Part III then evaluates the effect of income taxation under that assumption. In order to do so, it develops the side-payment model of risk allocation and then examines the effects of the introduction of a normative income tax in that model, showing that scaling up will be very limited. Part IV briefly demonstrates why the assumption that government revenues from capital taxation may fluctuate is a reasonable, indeed the correct, assumption. Part V discusses some implications of the analysis.

I. TREATMENT OF TAXATION AND RISK IN THE LITERATURE

A normative income tax takes a fixed percentage of all income earned in every period, without regard to "realization" and without any special exemptions.[25] To the extent the taxpayer experiences losses overall during the period, the government provides payments to the taxpayer at the same rate as the tax on positive income. The provision of such "full loss offsets" is appropriate because losses incurred with respect to after-tax investments represent negative income.

The idea that a normative income tax does not reach the returns to risk-taking grows out of a seminal paper by Evsey Domar and Robert Musgrave (DM), published seventy years ago.[26] Although DM did not argue that full scaling up will occur under a normative income tax, they observed that one consequence of adopting such a tax is to create an incentive for taxpayers to increase investment in assets generating risky returns, because the government effectively becomes a partner with the taxpayer, both taking a share of gains and cushioning the effect of any losses. Governmental partnership means that the impact of the tax on both the risk and the return of increasing investment is muted or even nullified. If the government takes X percent of all gains and pays X percent on all losses, it appears that the taxpayer can move towards his pre-tax position simply by increasing the amount of capital subject to gain or loss. Subsequent work has extended and refined the DM analysis, reaching the conclusion that in principle taxpayers can and should (and would if a normative income tax were in effect) scale up to negate the effect of the tax on capital entirely, except for the tax on the risk-free rate of return, and assuming that risk aversion is essentially a constant function of wealth.[27]

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[25] Schenk, at 426.

[26] Evsey D. Domar & Richard A. Musgrave, *Proportional Income Taxation and Risk-Taking*, 58 Q. J. ECON. 388 (1944).

[27] *See, e.g.*, Kaplow, 1994; Sims, at __; Weisbach*, (Non)Taxation*, at __. The reason the tax on the risk-free return cannot be avoided, it is suggested, is that scaling up unambiguously increases the tax, as there is no prospect of losses. *See, e.g.*, Sims, at __. As will be shown, this claim is not true. Under appropriate budget assumptions, it will be possible to scale up to avoid the tax on the riskless return. *See* Part III.A.

As an illustration, suppose that in a non-tax world, the taxpayer makes an investment of 100 that will yield either a gain of 30 or a loss of 10 in each period with equal probability, for an expected return of 10. The imposition of a 30-percent normative income tax narrows the returns to either 21 of gain or 7 of loss, for an expected return of 7, prior to any investor response to the tax. The investor's rational response, however, is to increase investment, assuming it is possible to do so at little or no cost. In particular, an increase of $t/(1-t)$ times the initial investment, where t is the tax rate, would put the taxpayer in the same position she occupied prior to adoption of the tax. In this example, the taxpayer's investment would increase from 100 to (100 + 100*0.3/0.7), or to 142.86 in total. On an investment of this size, the taxpayer would realize either a pre-tax gain of 42.86 (equal to 30 percent of the initial investment) or a pre-tax loss of 14.29 (equal to 10 percent of the initial investment), corresponding to after-tax amounts of 30 gain and 10 loss, respectively. In short, by scaling up, the taxpayer replicates the position occupied before any tax was imposed, regardless of the outcome of the investment.

Commentators following DM generally have taken the position that full scaling up will occur if certain not-terribly restrictive conditions are satisfied and, perhaps more importantly, that the extent to which these conditions would not be satisfied under any workable normative income tax is comparatively insignificant, depending for the most part on the fact that investor risk profiles are sensitive to absolute tax liabilities and on other real-world features of any tax.[28] Because these factors are thought to be relatively inconsequential, it seems reasonable to assume that scaling up would mostly eliminate the tax on returns to capital investment in excess of the riskless rate on the investor's entire portfolio.[29]

Theodore Sims's recent treatment of the problem demonstrates the basic analysis as it has been developed in the subsequent literature, even though he argues that scaling up would not necessarily be as extensive as other commentators have suggested.[30] One of the problematic features of the previous example is its assumption that the taxpayer will be able to obtain additional capital in order to scale up, and it is not obvious that the taxpayer would be able to finance the increase. But Sims shows that essentially the same analysis can be applied where the taxpayer merely reshuffles her portfolio, without enlarging it. In his illustrative example (itself an elaboration on earlier treatments[31]), an investor has $100 to invest in a pre-tax world in which there are two possible investments: a riskless asset yielding a return of 2 percent per period, and a risky asset yielding

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[28] See authorities cited in notes [19-21].

[29] *See, e.g.*, Kaplow; Weisbach, *(Non)Taxation*. *See generally* Buchholz & Konrad, (summarizing the literature).

[30] Sims.

[31] *See* Warren, note 1, at 1105-07, (discussed in Sims, *passim*).

a return of 12 percent with a 75 percent probability and negative 4 percent with a 25 percent probability per period, for an expected return of 8 percent per period.[32] The investor's risk preferences are such that she allocates $50 to each investment, generating an expected return on the portfolio of $5, composed of a certain $1 on the fixed asset and, on average, $4 on the risky asset.

Sims shows that if the government adopts a normative income tax, then assuming full scaling up is possible and assuming certain characteristics of the investor's risk profile, the investor will reallocate her investments so that the total after-tax amount equals simply the rate of tax times the risk-free return times the entire portfolio.[33] In other words, where scaling up takes place, the after-tax return in dollars is the same as the case where no tax had been adopted (and, of course, no portfolio adjustment occurred), apart from the tax that would have applied had the entire investment been made in the risk-free asset. Therefore, it seems that the tax fails to capture the returns in excess of that rate even where the taxpayer is unable to increase the total amount of capital invested. For instance, in the case of a 30 percent normative income tax, the investor with constant risk tolerance will reallocate $21.43 of the capital formerly invested in the riskless asset (equal to $\$50*(t/(1-t))$), to the risky one, thereby increasing the expected pre-tax return on it from $4 to $5.71 and reducing the pre-tax return on the riskless investment from $1 to $0.57. After applying the tax, these amounts reduce to $4.00 and $0.40, for $4.40 total, which is just $0.60 less than the amount received prior to both the tax and the portfolio adjustment. That $0.60 just equals the 30 percent tax on the riskless rate of return (2 percent) multiplied by the entire $100 invested.[34]

Sims goes on to that one must make a number of assumptions about taxpayer wealth and risk tolerance in order for this result to hold, and he questions whether the assumptions are reasonable; he does not question whether – but rather assumes that – the opportunity to scale up will present itself.[35] For present

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[32] Sims, at 7-8.

[33] *Id.*, at __.

[34] In point of fact, in any possible state, the total after-tax return in each period will be the same as it would have been in the absence of the tax, apart from the tax on the risk-free rate as applied to the entire portfolio and, of course, without any behavioral adjustment. In particular, if the tax-adjusted risky investment comes out positive, pre-tax income on it will be $8.57 and after-tax income $6, while pre-tax income on the riskless investment will be $0.57 and after-tax on it will be $0.40 in all states, for $6.40 total. This compares to $7 net return in the no-tax world with $50 invested in each type of asset (yielding $1 on the riskless asset and $6 on the risky). Similarly, if the risky asset comes out negative, pre-tax loss on it will be $2.86. This offsets the $0.57 of income on the riskless investment, for a pre-tax loss of $2.29 and after-tax loss of $1.60. This amount compares to a net $1 loss in the absence of both the tax and the accompanying portfolio adjustment. As in the gain case, the only difference is the tax paid on the riskless return as applied to the entire portfolio, or $0.60.

[35] Sims, at 25. *See also* Brooks, at 256.

purposes, however, it is this assumption that is of interest. By way of preliminary, note that what is preserved in scaling up as described by Sims is the after-tax return to the investor, *not* the amount of tax collected. In fact, where average returns to risky investments are positive, the way that portfolio adjustments preserve the return that arose in the absence of the tax is through an increase in the taxpayer's pre-tax income, resulting as well in larger tax revenue, at least nominally.[36] This phenomenon naturally invites the question, what is the source of this greater return? That is, the portfolio adjustment consists in allocating a larger percentage of total economic capital to the higher-returning risky asset, resulting in greater total (private) income economy-wide. The portfolio adjustment is said to be possible because the government shares in the risk. But if the pre-tax world is assumed to have been efficient, it seems that no additional income is available in the economy as a whole to be created through portfolio adjustments or, indeed, through any other mechanism. Even if the tax imposed zero efficiency losses, the most that could be hoped for is that introduction of the tax would not reduce total economic income, not that the tax would cause total economic income to increase.[37] And if scaling up causes taxpayer income to increase, it seems that the only candidate for a net loser must be the government, which would be on the losing side of the scaling transaction, inasmuch as it is selling an asset priced as though it generated the riskless rate on average even though it generates the risky rate in the taxpayer's hands.

But this way of looking at things, I suggest, is simply not correct. In the face of the observation that scaling up requires the government's participation, the task becomes either to explain how that happens merely from adoption of the tax, given that it seems to require the government voluntarily to assume a loss, or to suppose the government will not assume the loss and then to examine what options are available to taxpayers as they adjust to the tax in light of the government's unwillingness to supply additional capital for scaling up. The next Part pursues the latter inquiry, showing that scaling up is largely ineffective in eliminating the tax on risky returns and entirely ineffective in eliminating the real tax on risk system-wide. Part III pursues the former inquiry, showing that what drives the result suggesting the government does provide the required capital for scaling up is a budget constraint that is conceptually unrelated to the adoption of

[36] *See, e.g.*, Sims, at __, for a suggestion that the larger tax revenue is merely nominal.

[37] Efficiency losses, or "deadweight loss" (DWL), generally are those resulting from taxpayer substitution effects rather than from, for example, compliance or monitoring. ROSEN & GAYER, __. A substitution effect takes place when the tax causes the taxed person to do something different from what he would have done in the absence of the tax. *Id*.

the tax and is also inconsistent with how any government operates (or should operate).[38]

II. GENERAL EQUILIBRIUM CONSIDERATIONS

A number of models purport to show that the adoption of an income tax on risk-taking is pointless because scaling up will negate the effects of the tax to the extent of gains or losses in excess of (or under) the risk-free rate.[39] DM presented a partial equilibrium model that did not attempt to model the government's response to the taxpayer's portfolio adjustment following introduction of the tax.[40] A number of subsequent papers, however, have extended the analysis to include this response in order to provide a more complete picture of the consequences of the adoption of the tax.[41] In this Part, I consider two simpler discussions of general equilibrium considerations developed in the tax literature, Louis Kaplow's general equilibrium model[42] and David Weisbach's review of the scaling-up problem.[43] These discussions generally demonstrate the equivalence between the government's taking a direct position in risky investments and the government's explicitly adopting a tax on risk. What they do not demonstrate, I argue, is that the equivalence between those two positions means that a normative income tax fails to reach the return to risk-taking or that its incidence is no different from that of a tax solely on the riskless return as applied to all capital.

A. Kaplow's General Equilibrium Model

Kaplow develops an intuitive general equilibrium model. It does not account for some of the factors that may bear on the extent of scaling up that more advanced models do, but it has the benefit of isolating the basic logic of the

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[38] *See* Part III.B. In particular, every government holds a portfolio that consists in part of assets that yield risk-based returns, including land, infrastructure and, often, various explicit holdings in risky securities. *See* Weisbach, *(Non)Taxation*, at 52. As commentators adopting the non-taxation of risk position themselves argue, the government's holding a portfolio is equivalent to its selling the assets in the portfolio and assessing a tax on them. *See* Kaplow, at 792; Weisbach, *Non(Taxation)*, at 11.

[39] *See* Buchholz & Konrad, note 1, at 2 ("The claim of this general equilibrium literature is that a tax on risk-taking is perfectly neutral: it is ineffective but mostly harmless, and to the extent that this is the case, the tax revenue that is generated by taxing the pure returns has a positive expected value, but is worthless – it has a market value of zero.").

[40] Kaplow, at 789.

[41] *See generally* Buchholz & Konrad (discussing the literature).

[42] Kaplow, at __.

[43] Weisbach, *Non(Taxation)*.

scaling problem.[44] Moreover, because Kaplow adopts an exceedingly stringent definition of "equivalence" for the purpose of evaluating alternative tax systems, any demonstration that two systems are equivalent implies that the equivalence holds under a wide array of assumptions, such that, for example, identity of investor risk preferences, of the nature and timing of government outlays, and other matters need not be assumed in order for the equivalence to hold. He then proceeds to show that a normative income tax on returns to risk is equivalent in this strong sense to no such tax together with a governmental portfolio adjustment.

1. Kaplow's Definition of Equivalence

Kaplow calls two tax regimes equivalent if, for a given tax rate and government portfolio under one of them, a tax rate and portfolio under the other can be constructed such that:

> (1) for any return that might be realized on the risky asset, investors have the same after-tax wealth in period 1 under both regimes; (2) for any return that might be realized on the risky asset, the government has the same revenue in period 1 under both regimes; and (3) total investment in each asset in period 0 is the same under both regimes.[45]

Kaplow notes that these requirements mean that investors come out the same in both regimes, that government revenue is the same in both regimes, and that total investment in each asset is the same under both regimes, such that the returns on each type of asset will be constant.[46] Importantly, since everyone has the same risk profile and return under both regimes, no assumptions need be made about such matters as wealth effects of the tax, the nature of government outlays, or the economy-wide effects of different allocations of capital (or labor) under the two regimes.

2. Equivalence Between Tax on Risk and a Portfolio Adjustment

Kaplow then asks the question whether a capital tax on risky returns is equivalent in this sense to the absence of a tax, but with a proper portfolio adjustment. Unlike Sims and most of those writing in the tax literature, however, Kaplow takes as the base case the presence of a normative income tax that nominally reaches returns on risky returns and then asks whether it can be reformulated in terms of an equivalent, as he defines it, without the tax. In the initial regime, taxpayers are assumed to have some fixed amount to invest and to allocate it between two assets, one generating a riskless rate of return and the other a risky rate of return. Total government tax revenue accordingly is the sum

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[44] These factors can include the incompleteness of markets, the availability of various tax offsets such as depreciation, the fact of limited liability for certain kinds of risks, and other complicating factors. Buchholz & Konrad, at 1-2.

[45] Kaplow, at 791.

[46] *Id.*, at 791-92.

of the tax on each of labor, the riskless investment and the risky investment, the last of which will be negative when the risky investment has a negative return.[47]

Kaplow then observes that tax revenue from capital – the second and third quantities above – may be reformulated as a tax applied to the riskless rate on the taxpayer's entire portfolio, plus (or minus when risk-based returns are less than the risk-free rate) a tax on the difference between the risky return and riskless return applied to the portion of the taxpayer's portfolio that is invested in the risky asset.[48] This decomposition, in turn, makes possible the demonstration that a tax on risky investments can be equated to government portfolio investment without the tax.

The first step is to show that the tax on the riskless rate is equivalent to an *ex ante* wealth tax – that is, to a wealth tax levied in the prior period. The equivalence derives from the fact that the wealth tax could be used to fund a purchase of the asset generating the riskless return equal to the amount of tax revenue that would be returned if all capital were invested at the riskless rate. In particular, if there is quantity y of capital in the economy and the riskless return is some rate, r, subject to tax, t, then the government realizes ytr from the tax in period 1. The government could generate the same revenue by dispensing with the tax on the riskless return and, instead, investing $ytr/(1 + r)$ in the riskless asset in period 0, because this amount would grow to ytr in the present period. Accordingly, a wealth tax that raised $ytr/(1 + r)$ in the prior period would provide the same government revenue as the explicit tax on the riskless return.[49] For their part, investors owning the asset generating the riskless return would maintain their exact return and risk profile by selling precisely that amount of capital to the government in period 0, because the net reduction in wealth would be exactly offset by the absence of the tax on the riskless return.[50]

Turning to the return to risky assets, under the decomposition described above, the tax on them can be expressed as the tax rate times the amount of prior period capital invested in the risky asset times the difference between the risky and riskless returns on that capital. That is, it is just taxes actually collected on risky investments less taxes that would have been collected on those investments if they had been made in the riskless asset (since this latter quantity has been

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[47] *Id.*, at 791.

[48] *Id.*, at 792.

[49] For example, if y is 100, r is 0.05 (i.e., 5 percent) and t is .3 (i.e., 30 percent), then tax revenue is 1.5. This amount is equivalent to an investment of 1.43 in the prior period at the risk-free rate, which amount will grow to 1.5 in one period.

[50] This conclusion follows intuitively if one bears in mind that government ownership of t percent of all the capital in the economy and no tax on the capital is the same as a tax at t on all the capital: Ownership of t percent of 100 percent of capital is the same as ownership of a right to t percent of the return on 100 percent of the capital.

included in the first step). Kaplow then shows that the government could have collected the same amount in revenue on this excess return without the tax by buying an amount of the risky asset in the prior period and selling an amount of the riskless asset equal to the proportion of capital invested in the risky asset under the tax. The sale of the latter would just finance the purchase of the former, with the result that "a pure portfolio adjustment gives the government the same period 1 position as under the tax on excess returns."[51] Investors likewise end up with the same after-tax income if, on repeal of the tax, they scale down the portion of their investment in the risky asset and increase it in the riskless asset by the same amount.[52] Viewed from this perspective, to the extent an actual income tax mimics a normative income tax, scaling up already seems to have occurred: If the tax on excess returns were repealed, investors would increase the proportion of their investments in the riskless return asset and finance the purchase with a sale of the equivalent (dollar amount) of the risky asset. The adjustment would have no price effects because both the purchase and the sale would be exactly offset by the government's sale and purchase.

Going in the opposite direction, adoption of the tax simply leads to reverse adjustments: more private investment in the risky asset and less in the risky asset, and less government investment in the risky asset and more in the riskless asset to precisely the same extent. In other words, adoption of the tax leads to and makes possible the exact amount of scaling up necessary to eliminate the tax on the excess[53] of the risky return over the riskless return. Yet another way to formulate the point is to observe that the government could get to the same result as under a tax on the excess returns simply by selling, in the prior period, some of its portfolio in the riskless asset and purchasing some of the risky asset.

A numerical example may help to make this procedure concrete. Returning to an earlier example, suppose the tax rate is 30 percent and there are two investment opportunities: a risky asset returning either 30 or -10 with equal probabilities, and a riskless asset returning 5. Suppose the investor has 100 to invest and puts 50 into each asset. Her pre-tax return on average will be 7.5 (equal to 5 percent on 50 and, on average, 10 percent on 50), and her average tax will be 2.25. Her average after-tax income is 5.25.

To see how scaling up already has occurred, observe that the 2.25 of tax can be reformulated as a tax of 30 percent on the risk-free return applied to the entire portfolio, or 1.5,[54] plus the excess of the tax on the risky return (1.5) over

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[51] *Id.*, at 793.

[52] *Id.*

[53] Kaplow notes that the "excess" will be negative in periods when the risky return is less than the riskless return. *Id.*, at 793. This possibility does not affect the analysis, which does not rely on the sign of the "excess" amount. *Id.*

[54] Equal to 100*0.3*0.05.

the tax on the risk-free return on the risky asset (0.75), or 0.75. Since the tax on the riskless return can be reformulated as a wealth tax levied in the prior period, we can consider the overall tax on capital as equivalent to a wealth tax in the prior period plus a tax on the excess of the risky return over the riskless return in the current period as applied to the risky portion of the portfolio. The wealth tax is just the product of the portfolio (100), the tax rate (0.3) and the return (0.05), divided by 1 plus the return (1.05), or 1.43, which is simply the value at the end of period 0 of 1.5 at the end of period 1, when invested in the riskless asset. Focusing on the tax from the excess of risky over fixed returns, or 0.75, the government could have obtained that revenue by eliminating the tax on risky returns entirely and, instead, buying some of the risky asset and selling the same amount of the riskless asset to fund the purchase in the prior period. The quantity would be simply the product of the amount the investor (under the tax) has invested in the risky asset (50) and the tax rate (0.3), or 15. The net effect of this portfolio adjustment on government revenue would be to gain 1.5 (the risky return on 15 of the risky asset) and to lose 0.75 (the riskless return on 15 of the riskless asset), for 0.75 net. Investors would sell the same amount of the risky return and purchase the same amount of the risky return in order to preserve their same risk profiles as when the tax was in effect.

Turning the clock backwards, what this means is that the presence of the tax has caused the government to react by selling some of its risky asset into the market and buying the same amount of the riskless asset. This is just scaling up; it precisely matches the sale of riskless and purchase of risky assets that investors make once the tax is adopted in order to scale up.

3. Scaling up Re-examined: Two Possible Sources for Scaling Up

Having said all of this, it is critical to recognize what Kaplow's model establishes and what it does not establish. Kaplow shows that there is an equivalence (in his strong sense) between a normative income tax on one hand, and a tax on the riskless return together with a portfolio investment by the government in the risky asset on the other. The government can equally tax excess returns explicitly or purchase the underlying risky investment and dispense with the tax on the excess return. Establishing this equivalence, however, is very far from establishing that an income tax does not reach excess returns. Rather it simply formalizes an observation that has long been known about income taxation: An income tax makes the government like a passive partner with the investor in the underlying asset.[55] But just as passive partners receive a return when their investment yields a positive return, so does the government under the income tax. It would only follow that there is no point in investing in risky assets if either *all* of the excess return were a fee for risk-bearing, or the government is assumed to operate under a fixed revenue constraint. In the former case, there is no return overall to risk and so no point in taxing it (because the government will

[55] DM, at 389.

be invested in both all the winning and all the losing investments); in the latter case, the government cannot tax excess returns because doing so is inconsistent with the requirement of realizing fixed revenues, itself a product of its budget parameter. By definition excess returns are not fixed, and the budget cannot accommodate fluctuating returns if it is assumed fixed. Therefore any tax nominally imposed on excess returns must be returned to taxpayers. The mechanism for this return is portfolio adjustments. The following observations demonstrate the point.

Begin with observation that taxing risk and a fixed budget constraint are incompatible. A fixed budget constraint means that tax revenue cannot be stochastic. Thus, suppose that in the initial regime the government imposes a tax t on the risk-free return to all capital and on labor only and has no explicit portfolio, either in the riskless asset or in the risky one. (It cannot have a portfolio in the risky asset given the budget constraint.) Now suppose the government decides, instead, to finance the same revenue target with a tax of t on all capital income rather than just on the risk-free asset (the labor income tax remaining in effect). Under Kaplow's decomposition, the capital income tax is the same as simply adding a tax of t on the excess return actually earned.[56] Since a tax on that return is equivalent to no such tax but with the government's sale of the appropriate quantity of the riskless asset and purchase of the risky asset, the adoption of the tax where before there was none is equivalent to the reverse: The government purchases some of the riskless asset, financing the purchase by selling the same amount of the risky asset into the market. This procedure is simply the other side of the scaling transactions that investors engage in. But if, as here, the government has no investment in the risky asset to start with, it must sell the risky asset short to make the second regime equivalent. When it does so, the overall effect of the tax on risky returns is a nothing: The government pays out the excess return on the short sale in amount that is just financed by the additional revenues from the tax on the risky return and on the riskless asset it has purchased (net, on the latter, of the forgone tax revenue resulting from its having purchased the riskless asset from private investors). What is left is simply the original tax on the riskless asset (plus the tax on labor). In short, where the government maintains a fixed revenue target, a nominal tax on risky returns drops out and the income tax only reaches fixed returns. Investor scaling up in the risky asset (purchasing in the short sale from the government) achieves this result. It is apparent, however, that the fixed budget parameter is what drives the portfolio adjustment and therefore the non-taxation of excess returns, since that parameter is what requires the government to sell the risky asset short.

[56] That is, it is the tax on the difference between the risky rate and the riskless rate (which difference can be negative) as applied to the actual investment in the risky asset. *Kaplow*, at 792-93.

Note, however, that this is also something we could have deduced without a mathematical proof. Kaplow's basic result is that one can formulate a tax on excess returns as equivalent to no such tax together with a position in the underlying risky asset. That is what it means to say that a pure portfolio adjustment gets to the same place as would adoption of the tax. But if equivalence demands that the starting point and the end point be the same, and if the starting point had no position in the risky asset, then any nominal tax on risky returns must be washed out of the system at the end point, because the end point must not have such a position either.[57] In other words, when the government adopts a tax on risky returns where before it had none, the equivalence between that new tax regime and the prior one depends upon the constraint that the tax has no effect on total government revenues. It is this constraint, and not the nature of an income tax, that drives the result that an income tax does not reach the returns to risk-taking, a result whose mechanism is "scaling up." If, by contrast, the government merely adopted the tax on excess returns as an add-on (or, equivalently, if the government decided it wanted a portfolio that included the risky asset), thereby accepting as a consequence that there would be expected fluctuating revenues, then the equivalence would disappear. That is the case described in Part III.

The point can be brought home by examining what in a sense is the risk-based revenue analog to Kaplow's own example. In this case, the government likewise adopts an income tax, but does so under a budget constraint that total government revenue from capital taxation be strictly proportional to some fraction, X, of the returns on the risky asset as applied to all capital rather than to a fraction of the returns on the riskless asset as applied to all capital. The starting point then is not a tax on labor plus the riskless rate as applied to all capital, but a tax on labor plus the risky rate as applied to all capital. Carrying the analogy further, as in Kaplow's example, the tax on the risky return can be expressed as government ownership of a percentage of total system capital, all of which it invests in the risky asset. Thus, the government owns a portfolio consisting solely of the risky asset, amounting to X percent of all capital (publicly-held and privately-held combined); it also levies a labor income tax. The question is how the government achieves an equivalent (in Kaplow's sense) tax regime when it adopts a tax on all capital.

It is apparent that if the government simply sold the portfolio and adopted a tax on the risky asset only, an equivalent tax regime would result, because ownership of 100 percent of the return a given portion of the asset is equal to ownership of that same portion of returns on 100 percent of the asset. The difficulty is that if the government sells its portfolio and adopts an income tax on all capital, rather than just on the risky asset, tax will be levied on assets generating the riskless return as well as on those generating the risky return and equivalence will not result. Consequently the government will need to make an

[57] Brooks makes a similar point. Brooks, at 266-68.

offsetting portfolio adjustment to negate the aspect of the tax that reaches the riskless return. This is the feature of the equivalence requirement that drives scaling up. But, as contrasted with Kaplow's example, here the adjustment moves in the opposite direction, causing scaling up in the riskless asset.

Begin with the fact that the tax on capital can be decomposed in a fashion analogous to Kaplow's method, but in terms of a residual tax on riskless returns rather than on excess returns.[58] In this formulation, a normative income tax levied at rate *t* on all capital is equal to a tax at rate *t* on:

1. the risky return as applied to all capital, plus
2. the riskless return as applied to the portion of capital actually invested in the riskless asset, less
3. the risky return as applied to that same portion.

If the government's explicit portfolio becomes zero once the tax is adopted – that is, if the government has sold its entire portfolio and adopted the capital tax, as assumed here – then government revenue is just actual tax revenues and, in order to satisfy the budget constraint, actual tax revenues would have to equal quantity 1. This requirement in turn implies that quantities 2. and 3. are equal. In the ordinary course, however, quantities 2. and 3. will be unequal (and indeed in expected value terms quantity 3. must exceed quantity 2., since it reflects a real return without any fee paid to shed risk[59]). Therefore, if the government merely adopts the tax but does nothing further, it will not satisfy its budget constraint. But, just as in the case Kaplow describes, the government can use portfolio adjustments to reach the budget target (quantity 1.). Here, the government sells the riskless asset short and purchases the risky asset with the proceeds of the short sale (the opposite of what occurs in Kaplow's model). Although doing so will cause the disparity between quantities 2. and 3. to increase (assuming the risky return exceeds the fixed) and consequently tax revenues to fall, that disparity will increase more slowly than overall government revenue moves in the opposite direction. The disparity between quantities 2. and 3. increases only as the rate of tax, whereas the net revenue from ownership of the risky asset less the cost of selling the riskless asset short increases with no such discount.[60] The result is that total government revenue equals quantity 1.[61] On the

[58] Kaplow, at 792. The reason for this decomposition rather than Kaplow's is that the computations are easier where the residual amount corresponds to the portion of the nominal tax that generates revenues inconsistent with the government's budget parameter.

[59] Note, however, that the result derived here in no way requires the risky rate to exceed the riskless rate. The analysis does not depend on what the rates are.

[60] That is, if the risky rate exceeds the risky rate by some amount, increasing the amount of the riskless asset in the market increases the extent to which quantity 3. exceeds quantity 2., but that increase is only in proportion to the tax rate. Meanwhile, the returns on the government's direct ownership of the risky asset offset its obligations under the short sale similarly, but without the discount of the tax rate.

investor side, taxpayers who purchase the riskless asset in the short sale both receive an additional return and pay a tax on it that, when combined with their remaining portfolio, yields a total portfolio equivalent to paying tax solely on the risky asset.

Thus, and perhaps counterintuitively, the introduction of a nominal tax on the riskless asset results in an *increase* in investment, or scaling up, in that asset, exactly parallel to the increase in investment in the risky asset in the standard DM case that Kaplow analyzes, except that the combined effect is to zero out the tax on the riskless asset. What Kaplow in that setting referred to as "musical shares," or the adoption of a tax on excess returns that is precisely offset via scaling up, arises here as well, except that what is negated is the tax on the riskless return, even though nominal tax revenues from that return go up. (The government adopts a tax on the riskless return but pays the risky return (via the short sale) in an amount that just offsets the tax.) What this analysis demonstrates is that it is the government's budget policy, not simply the nature of the tax, that drives both the incidence of the tax and the type of scaling up that occurs.

One point of this exercise, of course, is to show that an income tax no more inherently fails to reach returns to riskless investment than it fails to reach returns to risky investment as illustrated in the usual example. Rather, the extent to which a tax burdens returns to risk or to fixed returns is a function of revenue assumptions. In fact, the government's adoption of an income tax where there was none before is likely to have revenue consequences somewhere between the polar cases just discussed: The government would neither zero out the tax on returns to risk-taking by maintaining a fixed revenue target (there would be no point in nominally taxing the risky return in the first place), nor zero out the tax on fixed returns by insisting that government revenues from capital be proportional to the returns to risk (again, there being no point in nominally taxing the riskless return). Rather, one would expect that additional revenues from a capital tax would introduce some fluctuation in overall government revenues but, also, would be somewhat offset by adjustments to taxes from other sources.

A second point of the exercise is to demonstrate the impact of budget assumptions on scaling behavior, and to note their very different effects. Where the government shifts the form of the "tax" from direct ownership of a portfolio to a tax solely on its returns, scaling up results from the equivalence between ownership of an asset producing a return on one hand and selling the asset but taxing its return at the appropriate rate on the other. The effect overall is a nothing. It is immaterial whether the government owns *X* percent of the asset that produces a given return or, instead, owns none of it but taxes the return to private investors at the same rate. By contrast, where the government adopts a tax that produces revenue inconsistent with the government's budget policy, scaling will occur in order to bring revenues into line with the budget. Here the effect of

[61] A proof of the result is set out in the Appendix.

scaling is not to reflect the equivalence, but to unwind a tax (or, equivalently, ownership in a portfolio) to the extent that imposing the tax (holding some portfolio) conflicts with the budget assumption. Where, however, the objective is to identify the effect solely of the tax, without regard to budget parameters, one must set aside any portfolio adjustments that those parameters drive. Only by abstracting from such considerations is it possible to isolate the extent to which mere adoption of the tax will result in scaling up (or down). Part III focuses on this question.

B. Weisbach's *(Non)Taxation of Risk*

To a limited extent, Weisbach proceeds along lines similar to those I have argued above. After reviewing the general equilibrium result that Kaplow (among others) derives, Weisbach notes that the government could choose not to adjust its portfolio because it "might like its chances on the taxes it will receive from the [risky investment]."[62] For the reasons just discussed, when the government takes its chances, the equivalence will not hold between income taxation of risky returns on one hand and non-taxation of them together with offsetting portfolio adjustments on the other, because the government does not make the adjustments. Instead, it adopts the tax and stands pat on the portfolio it held prior to the tax (including, possibly, no portfolio). Weisbach then observes, however, that the net effect is that the government accomplishes indirectly, and with a great deal of added complexity, what it could have accomplished directly through simple investment in the risky portfolio.[63]

This observation, without more, might be thought to prove too much. It applies to almost any tax, certainly to any capital tax: The government could choose to substitute a direct investment for the tax itself, as the previous two examples (and Kaplow's own argument) illustrate. On the other hand, differences between a tax on returns to risk and other taxes include the cost and difficulty of implementing a system in which payments to investors (when returns are negative) are sometimes necessary, and perhaps it is these problems that Weisbach mainly has in mind. But there equally are good reasons why one might not want the government to have its own investment portfolio, a point Weisbach later notes.[64] They include principally problems of favoritism or bias in investment choice, lack of investment expertise, and the fact that the government may not be able to invest in every asset. If the benefits of taxing risky returns are large enough, they may be worth the price of a complicated system that must deal with

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[62] Weisbach, *Non(Taxation)*, at 11. Weisbach's risky investment in this example is a coin flip.

[63] *Id.*

[64] *Id.*, at 52.

losses, the realization rule, and indexing for inflation, to name a few of the problems associated with the actual income tax.[65]

Weisbach's case against taxation of risky returns, however, is not confined to the objection that it is a cumbersome equivalent to the government's direct investment in risky assets. Rather he argues that there is no point in making the direct investment anyway, because, in his view, the return to risk is simply a bet that has zero market value.[66] Consequently, taxing it will produce zero tax revenue on the whole. Weisbach reaches this conclusion by assuming that the excess of the expected risky return over the riskless represents payment for risk-bearing.[67]

The following of Weisbach's examples illustrates his approach.[68] Assume that taxpayer *T* can bet $100 on a coin flip. If the flip comes up heads, *T* receives $120, and if it comes up tails, he pays $100, so that the bet has an expected return of $10.[69] Weisbach notes that it may appear that if the government taxes the bet, it has real expected tax revenues, since there is an expected return to the investment. But he goes on to argue that the return is illusory: "The $10 expected return is the compensation for bearing risk and has no market value."[70] The reason it has no market value, according to Weisbach, is that it cost *T* nothing to take the bet and, before any tax was adopted, the government could have done the same, also at no cost. Underlying the analysis is that the $10 return consists of a payment by

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[65] For a discussion of some of the problems with taxing capital under the actual income tax, see Edward A. Zelinsky, *For Realization: Income Taxation, Sectoral Accretionism and the Virtue of Attainable Virtues*, 19 CARDOZO L. REV. 861, 879-904 (1997) (discussing the benefits of the realization rule).

[66] *Id.*, at 11. Weisbach does not go so far as to state that there is no real return to risk-taking. However, the claim that the bet has zero market value would seem to imply this conclusion, and it is consistent with his more general claim "that the models correctly establish that a perfect Haig-Simons system is pretty much the same as a consumption tax, a wealth tax, or similar reforms." *Id.*, at 6. He also states: "[I]n a Haig-Simons system, returns to risk-bearing are not taxed." *Id.*, at 36. The assertion seems to presuppose that returns overall to risk-bearing are not income. At a later point, however, he notes that inframarginal returns (returns to special and limited opportunities) are real and can be taxed under certain forms of consumption taxation (e.g., a cash-flow or spending tax). *Id.* at __. Since these returns are often risky – one does not know *ex ante* whether the investment will pay off – it seems there is some positive return to risk-taking. The best reading of Weisbach's argument, to my mind, is that he views these returns to constitute a relatively small proportion of overall economic income.

[67] *Id.*, at 11.

[68] *Id.*, at 11-12.

[69] Equal to 0.5*$120 + 0.5*(-$100).

[70] Weisbach, *Non(Taxation)*, at 12.

someone else to bear risk. It has no market value because it is a zero-sum game. *T*'s gain is precisely offset by the counter-party's loss.

Weisbach also discusses inframarginal returns, or returns to special and limited opportunities.[71] Noting that scaling up for them ought not be possible, he concludes that a capital income tax reaches them. However, because inframarginal returns are not returns to risk in the sense of a fee for bearing risk, the fact that the capital income tax reaches them does not defeat the larger point that risk-based returns are not, in Weisbach's view, subject to income taxation.

Here it seems necessary to part company with Weisbach's analysis, for two reasons. First, note that under Kaplow's equivalence model, there would be scaling up even for inframarginal investments. The reason is that the requirement of identity in government revenues under the two tax regimes (the requirement that the government's budget parameter remain the same with the tax on one hand, and without it but with the offsetting portfolio adjustment on the other) implies that to the extent the return to those investments is not part of the government's original portfolio, it cannot be part of the return to the tax-equivalent regime, either. This is easiest to see in the case previously discussed,[72] where the initial regime features no government portfolio in the risky asset, and the equivalent regime is that the government substitutes a capital income tax for the wealth tax and makes offsetting portfolio adjustments. It was observed in that setting that because the capital income tax draws tax revenues from risky investments, equivalence requires the government to make portfolio adjustments that return those revenues to investors. It was further observed that because the government has no portfolio in the risky asset to start with, the offsetting portfolio adjustment under the tax regime required selling the risky asset short. In similar fashion, in order to ensure that revenues from inframarginal investments wash out of the system (which, again, would be necessary to satisfy Kaplow's standard for equivalence), the government would sell these assets short, too. Consequently, scaling up in the inframarginal asset would occur.

Second, if one assumes that all returns to risk-taking are zero-sum bets (or, equivalently, that inframarginal returns have a risk component but that the argument about the extent to which an income tax reaches returns to risk is solely about the fee for risk-bearing and not about the stochastic nature of inframarginal returns), then one doesn't need a complicated argument to determine the government nets no tax revenue from taxing risk. It follows from the fact that risk-bearing (or, non-inframarginal risk-bearing) is a zero-sum game. All that would be at stake in the question of scaling up is the volatility on the return to an investment that has a zero expected value for each of them and, necessarily on an economy-wide basis, has a zero value.

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[71] *id.*, at 19-21.

[72] Part II.A.2.

The claim, however, that returns to risk-taking have a zero value (or, equivalently, that the risk portion of inframarginal returns are negligible) does not seem to be correct as either a conceptual or a historical matter. As developed in Part III, it appears that the risk-free rate itself reflects risk-shifting from some underlying, typically positive but fluctuating (i.e., risky) real rate of return. It would not reflect a real return only if there were no relative risk aversion among investors.[73] Because the risk-free return reflects risk-shifting, real underlying returns to risk must be positive if the risk-free rate is not negative.

History likewise does not support the assumption that all returns to risk have zero market value. Over time, real GDP growth per capita consistently has exceeded the risk-free rate substantially. For instance, from 1993 to 2013, U.S. GDP increased on average at just over two percent per capita annually,[74] while the risk-free rate of return was closer to one percent.[75] Over the much longer period from 1900 to 2013, real GDP growth per capita appears to have been just under two percent annually,[76] while evidence suggests the risk-free rate over roughly that period has hovered at about 0.6 percent.[77] Theoretically growth in GDP per capita may be due to increases in any of capital, capital productivity and labor productivity, with recent estimates finding about one-half attributable to labor productivity, and one quarter to each of growth in capital stock and increases in capital productivity.[78] To the extent it is due to the latter two factors, there is a real return to risk-taking.

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[73] Recall that risk aversion makes the riskless asset more desirable than the risky asset, other things equal. Risk-averse investors therefore pay more for the riskless asset, driving up its price and driving down its yield.

[74] U.S. World Bank, "Real Historical Gross Domestic Product (GDP) and Growth Rates of GDP for Baseline Countries/Regions (in billions of 2005 dollars) 1969-2013," (available at: http://www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1#reqid=9&step=1&isuri=1).

Change in GDP per capita is the relevant basis for comparison, because GDP growth overall may be due as well to population growth.

[75] U.S. Department of the Treasury, "Historical Treasury Rates" (available at: http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/Historic-LongTerm-Rate-Data-Visualization.aspx).

[76] Samuel H. Williamson, "What Was the U.S. GDP Then?," MeasuringWorth, 2014 (available at: http://www.measuringworth.com/usgdp/) (author's computations from data provided on the Web site).

[77] Noël B. Cunningham. *The Taxation of Capital Income and the Choice of Tax Base*, 52 TAX. L. REV. 17, 21 (1996). *See also* Weisbach, *Non(Taxation)*, at 2 ("[T]he risk-free return is historically close to zero.").

[78] *See, e.g.*, U.S. Dep't of Labor, Bureau of Labor Statistics, "Sources of Growth in Real Output in the Private Business Sector, 1987-2013" (available at: http://www.bls.gov/mfp/outputpb.pdf) (reporting that approximately 58 percent of the

III. RISK ALLOCATION AS PAYMENTS AMONG INVESTOR COHORTS

It is frequently observed that a risk premium is a payment made in exchange for bearing risk.[79] Investors who have a low tolerance for uncertainty in returns will pay a fee to others who have a higher tolerance in exchange for certainty in their returns. This allocation of risk typically is modeled in terms of portfolio choice: The model generally assumes that more- and less-risky assets are available as potential investments, and that investors with a greater risk tolerance will purchase higher-risk assets and investors with lower tolerance, lower-risk assets.[80] Because risk-bearing is costly, identically-priced lower-risk investments will have lower yields, with those bearing the risk-free rate having the lowest of all.[81]

Without loss of generality, one can model risk allocation not through portfolio selection but instead as direct payments between or among various cohorts of investors that are defined by their levels of risk tolerance. This approach works as long as all assets are owned by someone – as long as markets are complete.[82] Under that assumption, if risk-bearing is a fee that risk-averse investors pay to risk-tolerant investors, one does not need to describe the allocation of risks as taking place through the medium of portfolio selection. Portfolio pricing already reflects the allocation of risks among investors, since investments having the same expected (absolute) return will be differently priced

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growth in real private-sector output over the period was due to growth in the amount of capital and capital productivity, with approximately one-half of that total attributable to each).

[79] *See, e.g.*, __, Weisbach, *Non(Taxation)*.

[80] CITE. The standard model used in price theory is the capital asset pricing model (CAPM). CAPM generally treats asset pricing as a function, in part, of volatility in returns. [CITE.]

[81] To say that lower-risk assets have lower yields is equivalent to observing that they are more expensive. Because investors will pay more for an asset that generates a certain return, the ratio of the yield in absolute dollars to the price of the asset will decline as the asset gets bid up.

[82] A market is complete if there is a market for every good, which implies that every asset is owned. Mark D. Flood, "An Introduction to Complete Markets," *Fed. Reserve Bank of St. Louis Review*, 1991 March/April 1991, at 32. Portfolio theory routinely makes this assumption, at least in the sorts of stylized settings under consideration here. *See, e.g.*, Philip H. Dybvig & Jonathan E. Ingersoll, Jr., *Mean-Variance Theory in Capital Markets*, 55 J. BUS. 233, 233 (1982) (describing the complete market assumption as a "paradigm[] of risky asset markets").

depending on how variable the return is.[83] Instead, one can model the payments by decomposing each investment into underlying ownership in a generalized pool of assets bearing an overall return and level of volatility, and a series of side payments between cohorts of more and less risk-tolerant investors; the side payments allocate volatility among the cohorts in exchange for adjustments to returns. Indeed, this way of characterizing risk allocation must be correct if one assumes that the value of each asset can be expressed in terms of the values of other assets (or more conveniently in terms of money). In that case, prices must account for the features of each asset's risk profile as compared to every other.[84] It also follows that some investors will pay others to bear risk.

More specifically, begin with the idea that assets economy-wide constitute a pool that can be considered owned in ratable portions (though not necessarily identical size) by individuals having complete risk tolerance. The pool produces a blended overall expected rate of return, which I term *u*, that has some overall volatility. Investors may differ in the extent of their ownership of a portion of the pool (that is, one need not assume initial equality of resources), but because they have identical risk tolerance, the model assumes they each own a ratable share of all the assets that compose the pool.[85]

Now introduce distinctions in levels of risk tolerance. Initially, assume that only two groups exist – those who would prefer a riskless return, and those who are willing to tolerate enough risk to furnish a riskless return to the first group at a price the first group is willing to pay. One consequence of this development is that both the absolute and the relative wealth of risk-tolerant and risk-averse investors changes. Those who turn out to be risk-averse are poorer as a result of that preference, while those who are risk-tolerant are wealthier. This change in wealth ordinarily is modeled in terms of portfolio choice (risk-averse investors choose assets that provide a lower expected return per dollar invested), but the point of the exercise is to show that it equally can be modeled as payments between the two cohorts of risk tolerance.

If we assume that the blended underlying return on all assets is *u*, then two-class heterogeneity of risk tolerance leads to a riskless rate, *u*-, and a higher

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[83] If 100-acre Farm A produces either 40 bushels or 0 bushels of wheat in the year, while otherwise identical Farm B produces a steady 20 bushels, Farm B will have a higher price than Farm A if investors are at all risk-averse.

[84] This is a central assumption of CAPM. *See* Eugene F. Fama & Kenneth R. French, *The Capital Asset Pricing Model: Theory and Evidence*, 18 J. ECON. PERSP. 25, 26-29 (2004) (describing CAPM), 26 (noting that the model assumes "complete agreement" among investors about the risk and price profiles of each asset relative to every other).

[85] The use of a two-asset model consisting of a riskless return and a risky return composed of a blended economy-wide portfolio is common in the literature. *See, e.g.*, Buchholz & Konrad, at 6 & 6 n.3.

rate, $u+$, that reflects the premium that risk-tolerant investors receive in exchange for guaranteeing risk-averse investors $u-$ in every period. The riskless rate has zero volatility, while the risky rate has larger volatility than u but, of course, exceeds u (and therefore $u-$) on an expected return basis. Thus, in periods when the blended return exceeds $u-$ (which, on average, will be the case), risk-averse investors notionally pay the difference between the blended return and $u-$; in periods when the blended return is less than $u-$, risk-tolerant investors notionally pay risk-averse investors the difference between $u-$ and that actual return. On balance, the positive expected delta between u and $u-$ is shifted from the risk-averse to the risk-tolerant as their fee for bearing risk.

Suppose, for example, that in any given period, the return on the general portfolio will be either 7 or -1 with equal probability, for an expected return, u, of 3. Suppose further that the risk-averse are willing to settle for a 2 percent fixed return. That is, their preferences and those of the risk-tolerant are such that the market-clearing price to obtain the riskless rate is 1 percent (equal to u of 3 less the riskless rate of 2).[86] Expressed in terms of payments between cohorts, in periods when u is 7, risk-averse investors notionally pay 5 to risk-tolerant investors, while in periods when u is -1, risk-tolerant investors notionally pay risk-averse investors 3. Therefore, the expected value of $u+$ is 4, reflecting the fee of 1 they receive from the risk-averse to bear risk.[87]

Now assume that a normative income tax at some constant rate t is introduced. In order to isolate the effect simply of the tax, no assumptions are made about what the government does with the tax revenue. The effects of the tax, before any behavioral adjustment takes place, solely on risk-shifting are to reduce its cost (on average) to risk-averse investors and to reduce the fee (on average) to risk-tolerant investors. Both the reduction in cost and the reduction in fee are just t times the fee (with opposite signs). Therefore, as regards solely the fee (rather than u), the government nets 0 from the tax. In our example, on an expected basis, before the tax, risk-averse investors reduce their pre-tax income by the fee of 1 and risk-tolerant investors increase it by the same 1. After the tax is introduced but before any behavioral adjustment, the fee received and fee paid are each reduced by the same amount, while the government collects a real tax on u: Risk-averse

[86] Note that it is possible that no riskless return might arise, depending upon preferences. Lest this seem anomalous, it already is the case that even the "riskless" return is not truly riskless. It is possible, for example, that the U.S. Treasury will default on its obligations. Where preferences do not converge on a riskless rate, a market-clearing price should exist for a partial but not full off-loading of risk.

[87] That is, in positive years, the risk-tolerant receive 7 on the underlying portfolio and a payment of 5 from the risk-averse, for 12 total. In negative years, the risk-tolerant lose 1 on the portfolio and pay 3 to the risk-averse, for -4 total. The expected return is just the sum of these times their respective likelihoods (here, 0.5 for each), or: $0.5*12 + 0.5*(-4) = 4$.

investors pay a tax on *u* minus the smoothing fee, and risk-tolerant investors pay a tax on *u* plus the smoothing fee.

Now consider scaling up. By inspection, it is evident that in the absence of government participation in the market, opportunities for it will be quite limited. It will only be available to the extent that members of the risk-averse cohort are willing, after the tax is adopted, to pay more than (1-*t*) times the pre-tax cost of the fee (i.e., the after-tax fee for a smooth return prior to taxpayer response). There is little reason to think the amount more, if any, will be very large. The main reason is that in addition to the reduction in the cost/fee resulting from the tax, there are concomitant reductions in the benefits of smoothing and in their cost. Risk-averse investors face an avoided cost of is just (1-*t*) of what it was before the tax (because the tax reduces the volatility of *u* by that amount). Analogously, risk-tolerant investors assume just (1-*t*) of the fluctuation in returns that they assumed under the tax, meaning the cost to them of providing the riskless returns is also reduced, and by the same proportion. When the dust settles, there is no difference between the pre- and post-tax worlds with respect to the relative costs paid and benefits derived, except to the extent, if any, that wealth effects operate differently on the two risk cohorts. In the absence of any wealth effects, there will be zero scaling.

That said, it also seems evident that there will be wealth effects. Indeed the very framing of the problem suggests there will, since wealth effects are what drive the demand for a riskless return in the first place.[88] Members of the risk-averse cohort find more to lose from the prospect of lower returns than they do to gain from the associated prospect of higher returns. Assuming the same principle holds when *u* under the tax is just (1-*t*) times *u* without the tax, it seems there would be some net value to them of paying more than (1-*t*) times the fee to get the benefit of a riskless return that is discounted by (1-*t*). That said, it seems almost inconceivable that the amount more they would pay would fully make up for, much less exceed, the discount they get on the fee by reason of the tax. In other words, the wealth effect would have to be extreme indeed for the value of a discounted riskless return with concomitantly discounted volatility to be equal to what it was before the tax. If they paid *x* for the riskless return, pre-tax, they are unlikely to pay *x* for a riskless return after-tax given that the riskless return is now just (1-*t*)**x* and the volatility avoided has been reduced by the same factor.

More important than this observation, however, is that whatever scaling does take place, regardless of its magnitude or direction, will merely shift the burden of the tax on risk between taxpayer cohorts; the government still collects the full tax on *u*, and the net tax on the fee remains zero. Continuing with the previous example, suppose that *t* is 30 percent. After-tax expected returns, prior to

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[88] *See* RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW, 445-49 (6th ed. 2003) [Get newer cite.]

any adjustment, become 2.8 (rather than 4) for $u+$, and 1.4 (rather than 2) for $u-$. Expected average after-tax returns are 2.1, which is just the after-tax amount on the expected return, u, of 3. Decomposing each investor's return into the underlying return and the fee, prior to the tax, every investor has, on an expected basis, income of 3. The risk-averse then have, on average, a deduction of 1 and the risk-tolerant a corresponding average inclusion of 1 for the fee paid to shift risk. The effect of the tax is to reduce the cost of the fee by 0.3 to 0.7 and to reduce the income from it by the same 0.3, to 0.7.

Now consider the case in which risk aversion of the risk-averse group is so extreme that the fee for scaling up remains 1. On a pre-tax basis, the fee would jump to $1/(1 - t)$, or 1.43, for an after-tax amount on the fee of 1, just as prior to the adoption of the tax. Correlatively, the risk-averse would have a deduction of 1.43, resulting in an after-tax cost of the fee of 1, again just as prior to the tax. The effect overall of this scaling is to shift the tax on the fee entirely back to the risk-averse, but the government still collects the same tax revenue. Moreover, even if the after-tax cost of the fee to shift risk somehow exceeded its pretax cost, the government would collect the tax on u. In particular, any additional payments from the risk-averse to the risk-tolerant would simply increase their income at the expense of the risk-averse.

These observations indicate that there would be no private source for scaling up beyond the limited amount resulting from the effects of providing a deduction for the fee of smoothing returns to the risk-averse and the required inclusion in taxable income of the fee to the risk-tolerant. They also indicate that this amount is nothing more than a shift in taxable income from one group to the other; it does not change income overall or the total tax collected, which remains the tax rate as applied to capital invested multiplied by u.[89] These results follow from the equivalence between explicit portfolio selection on one hand and notional payments between different risk cohorts on the other. This equivalence must hold as long as all assets are owned prior to the introduction of the tax and the tax does not induce the government to enter (or leave) the market. Under these conditions, any portfolio adjustment can be modeled as composed of the receipt of returns on a generalized portfolio coupled with payments to adjust risk-bearing. In that case, scaling up must involve the sale of assets optimally allocated prior to the tax to individuals who have become optimal owners by reason of the tax.

[89] Changes to total social wealth are likely to arise from the tax because of the substitution effect associated with any income tax, but this effect is conceptually distinct from the issues under consideration here and arises from the fact that leisure is not taxed under an income tax. Bankman & Weisbach, at __. The incentive effects of an income tax on capital allocation decisions are complex, since they depend on the extent to which the tax-induced reduction in labor supply results in a reduction in subsequent-period capital as well as on the wealth effect of the tax on how that capital is allocated.

The analysis does not change if investors are permitted to vary more widely in their levels of risk tolerance. The example that Sims discusses involves an intermediate case that in principle can be extended along a spectrum of risk tolerance levels. Recall that in that example, the investor has $100 to invest. There are two assets, a riskless one returning 2, and a risky one returning 12 with a 75 percent probability and -4 with a 25 percent probability, for an expected return of 8. Prior to adoption of the tax, the investor invests $50 in each asset, so that in any given period she will receive either 7 (equal to 1 riskless plus 6 risky) with a 75 percent probability, or -1 (equal to 1 riskless plus -2 risky) with a 25 percent probability, for an expected return of 5 percent.[90]

In the side-payment model, the riskless and risky returns are themselves the result of the combination of an initial, economy-wide expected return, *u*, of some amount between 2 percent and 8 percent and a separate payment to bear or shed risk. What that economy-wide return is cannot be deduced from the 2 and 8 percent rates, because the two rates depend upon the characteristics of the risk cohorts. (For example, among a range of possibilities, *u* could be 5, with risk averse willing to pay 3 to shed risk, or it could be 4, with risk-averse paying 2 as a group, resulting in receipt of 4 to the risk-tolerant (because the latter group is proportionately smaller as measured by total capital owned)). However, because there is a riskless rate, it follows that the 8 percent rate reflects some payment for risk-bearing, which means the upper bound on the unadjusted rate is below 8 percent. Similarly, because even a risk-averse investor would take a fluctuating return with a floor of 2 over a certain return of 2, the lower bound of the unadjusted expected rate must exceed 2 percent.[91] Investors who own both the risky and riskless assets therefore can be modeled as investors who own the unadjusted asset and then either shed some of the risk associated with it or take on additional risk, depending upon whether their expected returns overall fall below or exceed the unadjusted rate, *u*.

One possible rate for *u* in Sims's example is an expected return of 5, consisting of a 75 percent chance of 7 and a 25 percent chance of -1.[92] That is, in each period, the economy as a whole will return 7 with a 75 percent chance and -1 with a 25 percent chance. Then, in light of investors' risk profiles, the expected cost of purchasing a fixed return turns out to be 3 (equal to the difference between the underlying return and the riskless return).[93] For every 100 invested, in periods

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[90] Sims, at __.

[91] The parameters of the expected rate should not be confused with the bounds of what might be returned in any given period on *u*, which could exceed 8 or fall below 2.

[92] 0.75*(7) + 0.25*(-1) = 5.

[93] For ease of calculation, the example supposes that the quantity of capital hedged economy-wide is the same as the quantity accepting additional risk. The equivalence need not hold however, in which case the fee paid investor would differ from the fee received because what must balance is the total amount paid and the total

when *u* is 7, risk-averse investors pay 5 to risk-tolerant investors, and in periods when *u* is -1, risk-tolerant investors pay 3 to risk-averse investors. In the example, the investor's return can be reformulated as a combination of some proportion of the underlying, economy-wide return, *u*, and either risk-assuming or risk-shedding with respect to the balance, depending upon, respectively, whether her expected return overall is greater than or less than *u*. In Sims's example, the investor's expected return was 5, composed of 1 on the riskless asset and a 75 percent chance of 6 and a 25 percent chance of -2 on the risky asset. Thus, the return on the investor's portfolio in the example exactly equals the return on a hypothetical portfolio of the underlying return, *u*. This implies that one triangulates to the underlying return through the 50-50 combination.

Suppose the investor in Sims's example had purchased 60 of the riskless asset and 40 of the risky one instead of 50 of each. Then her expected return would have been 1.2 (riskless) plus a 75 percent chance of 4.8 and a 25 percent chance of -1.6, for an expected return on the risky portion of 3.2 and an overall expected return of 4.4. In periods when *u* was positive, she would receive 6 (= 1.2 + 4.8), and in periods when *u* was negative she would receive -0.4 (= 1.2 + (-1.6)). Because the expected return is less than *u*, it can be reformulated in terms of hedging, through the side-payment mechanism described above, some portion of the 100 invested in *u*. On these assumptions, ownership of 60 riskless and 40 risky is the same as hedging 20 of the underlying 100.[94]

The fact that one may derive the spectrum of real returns as a combination of ownership of the underlying return and some amount of hedging or additional risk assumption indicates that the same conclusions about the consequences of scaling up should result no matter the composition of an investor's portfolio. The result should not be surprising, because it is driven by the limited source of capital for reallocation, not the number or variety of different risk cohorts. The basic case analyzed the complete separation of risk-bearing from capital ownership and showed that scaling up is limited in scope. Intermediate cases involve nothing more than a more limited application of the same principle.

IV. Steady-State Budget Considerations

A conclusion of the analysis to this point is that to be effective, taxation of risky returns must operate within a framework of non-constancy in government revenues. If government revenue must be fixed or nearly so, then it seems a tax on

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received. What is required is that the total (economy-wide) fee paid equal the total fee received.

[94] In positive return years, the investor receives 7 on the 100 and pays 20 percent of the risk-shedding payment of 5, or 1, for a total return of 6. In negative return years, the investor receives -1 on the 100 and receives 20 percent of the risk insurance of 3, or 0.6, for a total return of -0.4. These numbers are the same as achieved through explicit purchases of 60 of the riskless asset and 40 of the risky asset.

risk will necessarily wash out of the system for the sorts of general equilibrium considerations that Kaplow and Weisbach both discuss. Moreover, even if government revenues need not be fixed in the short-term, any long-term requirement of generally constant (per capita) revenues would seem to undercut substantially the effectiveness of taxing returns to risk-taking.[95]

It is easy to misunderstand the weight of the requirement that the budget be fixed. The accounting identity driving budget considerations over the long term is not fixity in government revenues but balance, or equality in revenues and outlays.[96] Over the long term, the government must take in an amount equal to what it spends. There is literally no inconsistency between taxation of returns to risky investments and this requirement. Taxation of risky returns generally will result in short-term variations in revenues but, over the longer term, will result in revenues that, to the extent they derive from taxation of risk-based returns, increase roughly at the pace of the real return to risk, or growth in GDP per capita other than gains from labor productivity. Therefore, one way in which the accounting identity would support taxation of returns to risk-taking is if the demand for tax revenues roughly parallels growth in GDP per capita, or even if, on the whole, demand for tax revenues increases over time, though at a lesser rate. Another way it would support taxation of returns to risk-taking is if the government adjusted taxes on other sectors, including the labor sector. Even under a fixed (over time) dollar budget constraint, nothing rules out taxing the returns to risk-taking if the government compensates by adjusting taxes on other activities.

At all events, the notion that the government cannot have a budget constraint that incorporates some risk in returns is largely indefensible. It is tantamount to saying the government cannot hold a portfolio, which of course it does.[97] In exchange for bearing risk, the government enjoys a much greater return on its investment overall than it would if it bore no risk in revenues. And the government is more able than any other investor to bear the cost of that return (namely short-term fluctuations), since it can borrow at the risk-free rate, can bank returns in prior years to cover anticipated shortfalls and can make short-term adjustments in spending to the extent the prior mechanisms are unavailing. That

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[95] See Weisbach, *Non(Taxation)*, at 52-56, for a discussion of the issue.

[96] *See, e.g.*, Laurence J. Kotlikoff, *Fiscal Policy and the Future of the Euro* 24 CATO J. 51, 51 (2004) (noting that the government's intertemporal budget constraint is that taxes must equal the sum of government spending, government transfer payments and additional money it plans to print).

[97] Among the many assets in the government's explicit portfolio are land, broadcast spectrum (which it may rent or sell), infrastructure, and defense. *See* Weisbach, *Non(Taxation)*, at 51 ("The federal government has vast positions in land, indirect positions in the housing market through government guarantees, in the labor market through unemployment insurance, in the medical market through Medicare, and (short positions) in the debt market through its borrowing.").

the government stands to benefit from assuming risk follows from the fact that its return to holding the risky asset, or, equivalently, to taxing the returns to risk, will be u,[98] and, as previously indicated, over time u has greatly exceeded the risk-free rate over the past 113 years.

Finally, as a factual matter, the assumption that demand for tax revenues is correlated with GDP is very far from unrealistic. Indeed, it is much more realistic than is the assumption of a fixed (constant-dollar) demand for tax revenues. The statistics on tax revenue as a percentage of GDP per capita bear this out. Total federal tax revenue as a fraction of GDP has remained relatively constant over the past 60 years, at about 17 percent, with an annual standard deviation of about 0.66 percent of GDP.[99] Over this time, GDP per capita has more than tripled,[100] meaning that tax revenue in real dollars has dramatically increased over time as well and indeed well beyond what can be attributed just to population growth.[101] Moreover, the demand for tax revenues has, if anything, outstripped the supply, with extensive government borrowing used to fill the gap.[102] To put it mildly, the government has not moved into surplus since 1954. In short, absent major policy changes on the spending side, tax revenues need to increase on a steady-state basis to meet the demand for government spending. From this perspective, a tax on risk-taking is much better suited to financing budget commitments than is a capital tax that reaches solely the risk-free rate.

V. IMPLICATIONS

As suggested in the Introduction, the consequences of the argument presented here are significant. Here I discuss two of the most important issues it

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[98] *See* Part II.

[99] Tax Policy Center, "Historical Source of Revenue as Share of Gross Domestic Product: 1934-2019" (available at: http://www.taxpolicycenter.org/taxfacts/Content/PDF/hist_receipt_source_GDP.pdf). Calculations in the text performed using Microsoft Excel.

[100] Williamson.

[101] Over the same period, the U.S. population has roughly doubled. *See* U.S. Census Bureau, "Historical National Population Estimates, July 1, 1900[,] to July 1, 1999" (available at: http://www.census.gov/popest/data/national/totals/pre-1980/tables/popclockest.txt) (estimating U.S. population on July 1, 1954, at 163,025,854) *and* U.S. Census Bureau, "Monthly Population Estimates for the United States: April 1, 2010 to December 1, 2014," (available at: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk) (estimating U.S. population on July 1, 2014, at 313,151,980).

[102] Total government borrowing as of Sept. 30, 2012, exceeded $16 trillion. U.S. Dep't of the Treasury, "Historical Debt Outstanding – Annual 2000 – 2012" (available at: http://www.treasurydirect.gov/govt/reports/pd/histdebt/histdebt_histo5.htm). That figure represents an approximately threefold increase (in nominal dollars) since 2000. *Id.*

raises: distributional and efficiency effects under an income tax, and comparison of a normative income tax to a consumption tax.

A. Distributional and Efficiency Effects

Given that the real returns to risk-taking are substantial, the disparities between an income tax that expressly exempts returns to risk-taking and one that expressly taxes them are likely to be large. Here I examine the disparities, holding revenue constant.

Risky returns are overwhelmingly received by high-income taxpayers.[103] The substitution of a real tax on risky returns for almost any other feature of the tax system (assuming the starting point is no such tax) is likely to shift the overall incidence of the tax to higher-income cohorts, unless they can shift the tax burden elsewhere through behavioral adjustments. It is not obvious how this would happen in a closed system. (In an open system the problem is much more difficult to solve, but this problem persists under almost any tax where capital is highly mobile or individuals change residence easily.) The tax on risky returns can only be shifted as described in Part II, which likely will be a shift on part of the fee paid for risk-shifting and not more.

Efficiency effects when compared to an income tax that does not reach risky returns are likely to be dramatic as well. If the real returns to risk are income (in the Haig-Simons sense), the failure to tax them (by, for example, explicitly exempting returns to risk from tax and instead taxing all capital as though it earned the risk-free rate) creates an incentive to over-invest in risky assets. The extent of the welfare losses is likely to be high. A rule of thumb is that the deadweight loss (DWL) from taxation increases as the square of the disparity between the pre-tax and after-tax cost of the taxed item.[104] Thus, if X represents the DWL of a tax levied at rate t on some good, the DWL of a tax on the same good levied at $2t$ will be approximately $4X$.

Suppose that in a non-tax world, one-half of total economic returns would consist in the real returns to capital, and one-half would consist in the returns to labor. Because of portfolio selection, some portion of the real return to capital will show up in the riskless return and the rest will show up in the risky return. Let us assume that these amounts are, likewise, equally divided between these two sub-sectors of the capital sector. If the income tax reaches only the risk-free rate and labor, then, prior to any behavioral adjustments, one-quarter of national income is not subject to tax, and labor and the riskless return are overburdened by one-third

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[103] The Tax Policy Center reports that in 2011 more than two-thirds of net capital gains were received by taxpaying units with AGIs at or above $500,000, a group that accounted for about 17,700 out of more than 1.7 million returns. Tax Policy Center, "2011 Individual Income Tax, All Returns: Capital Income, by Size of Adjusted Gross Income," (available at: http://www.taxpolicycenter.org/taxfacts/Content/PDF/source_capital.pdf).

[104] *See, e.g.*, ROSEN & GAYER, PUBLIC FINANCE (__), __.

more tax than under a uniform income tax.[105] This means that each taxed sector faces an overall tax burden equal to four-thirds of the burden it would face under a uniform tax. Under the squaring principle, the increase in DWL that results from the increase in taxes on each sector is approximately 16/9 times what it would be if the tax were uniform. Against this loss is the efficiency gain that results from non-taxation of the risky return sector, but the squaring rule for DWL ensures that DWL increases overall.[106] Removing the disparity in tax across sectors accordingly is likely to have substantial positive welfare effects.

B. Comparison to Consumption Taxation

1. Current Status of the Comparison

Broadly stated, a consumption tax differs from an income tax in that an income tax reaches capital income, whereas a consumption tax does not.[107] The difference potentially can affect revenues, distribution of the tax burden and DWL arising from the tax. (I leave aside other possible differences, such as compliance and enforcement costs and opportunities for avoidance and evasion, all of which generally concern actual rather than ideal forms of the taxes.) As previously discussed, the DM-inspired view is that the only capital income that an income tax reaches is that on the risk-free rate as applied to all capital in the system. Since the riskless rate historically has hovered below one percent, the revenue difference between the two bases levied at the same nominal rate seems to be small. For any economic system, the same revenue could be raised by taxing only income, or by taxing only consumption at, apparently, a slightly higher rate in order to make up for the forgone revenue on capital income.

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[105] Under the facts assumed, prior to any behavioral adjustments, the labor sector represents one-half the economy, and the riskless sector represents one-quarter of the economy. Since the tax is imposed uniformly on income, each of these sectors bears the tax on its own sector and on the untaxed sector in proportion to the ratio of its own size to the total size of the taxed sector, or two-thirds for the labor sector and one-third for the riskless sector (assuming the budget is balanced). So the labor sector bears one-half of the tax plus two-thirds of the one-quarter that the risky capital sector represents, and the riskless sector bears one-quarter of the tax plus one-third of the one-quarter that the risky capital sector represents. These amounts come to two-thirds and one-third, respectively, of total taxes.

[106] For example, suppose total DWL under an income tax levied at rate t in all sectors is x percent in each sector. (It need not be the same in each sector, but equality is a reasonable working assumption.) If economy-wide income is 100, total DWL is x, consisting of $.5x$ in the labor sector and $.25x$ in each of the riskless and risky return sectors. If, however, the risky return sector goes untaxed, the tax rate in the other sectors must increase by one-third, to $4t/3$. *See* note [92]. DWL in the untaxed sector drops from $.25x$ to 0, but under the squaring rule, DWL in the other sectors increases by the square of the increase in taxes, or 16/9. Thus, total DWL goes from x to $1.33x$ (equal to $(16/9)*(.5x + .25x) + 0$).

[107] *See, e.g.*, Bankman & Weisbach, __.

The distributive properties of the two bases also seem to be similar. If all income is eventually consumed, such that in a steady state the total quantity of capital per person is roughly constant, then it should not matter much whether accessions to wealth are taxed as earned, or only later when they are drawn down for consumption. On this view, fears about concentrations of capital under a consumption tax are largely overstated and may be an artifact of transition issues rather than result from an analysis of steady-state properties.[108]

The efficiency properties of the two bases have also received extensive scholarly attention.[109] In the older literature, commentators generally viewed the question of which base imposes higher efficiency costs as an empirical one; it seems to depend on how the different distortions under each tax sum.[110] An income tax distorts both the labor-leisure decision and the savings-consumption decision; a consumption tax distorts only the first of these decisions, but presumably at a higher rate because the tax must be higher to meet the same revenue target. Bearing in mind the rule of thumb that DWL tends to increase as the square of the tax, it is unclear whether the two smaller distortions under the income tax add up to an amount greater than the single, larger one under a consumption tax.

More recent analysis of this question suggests, however, that this way of formulating the problem is not correct. The newer view is based on the so-called "double distortion" argument,[111] which, roughly, states that for any tax system, less deadweight loss results if the same distortion overall applies to one decision than if it is spread across two or more decisions.[112] The key to the double distortion argument, developed in the economics literature by Atkinson and Stiglitz[113] and later expanded on in the legal literature by Joseph Bankman and

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[108] See, e.g., Daniel N. Shaviro, *When Rules Change* (2000) 171-97, for a discussion of wealth and other effects that may arise under the transition from an income tax to a consumption tax.

[109] *See, e.g.*, __.

[110] *See, e.g.*, Congressional Budget Office (CBO), "Taxing Capital Income: Effective Rates and Approaches to Reform," at 4 (2005) *available at*: http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/67xx/doc6792/10-18-tax.pdf) ("[T]he desirability of not taxing capital income would hinge on the relative responsiveness to changes in the tax rate of the two taxed endeavors: labor and saving.").

[111] *See, e.g.*, Bankman & Weisbach. *But see* Chris William Sanchirico, *A Critical Look at the Economic Argument for Taxing Only Labor Income*, 63 TAX L. REV. 867 (2010) (disagreeing with Bankman & Weisbach); David Gamage, __ (arguing that the double distortion argument fails to account for distinctive methods of evasion and avoidance that may be differentially addressed by taxes on the two bases).

[112] [CITE.]

[113] Anthony B. Atkinson & Joseph E. Stiglitz, *The Design of Tax Structure: Direct Versus Indirect Taxation*, 6 J. PUB. ECON. 55 (1976).

Weisbach, is that under an income tax, both distortions affect the labor-leisure decision, because labor income is earned in the shadow of both the tax on earnings and any future tax that would apply to amounts saved; therefore it is the same distortion that applies under a consumption tax. However, once income has been earned, the savings-spending decision again looms, and the fact of the tax on savings under the income tax again affects the decision whether to save or to spend. Therefore an income tax creates greater distortion overall than does a consumption tax that meets the same revenue target, and total distortion must be greater as well. While this conclusion is not without controversy,[114] it seems reasonable as a working assumption in the context of a debate about the relative merits of simple and in a sense pure versions of the two bases.

2. Consequences of Taxing Real Returns to Risk

What, if anything, changes if the income tax in fact reaches the real returns to risk-taking? Most obviously, in nominal terms, the rate disparity between income and consumption taxation is likely to be much larger for any given budget target. As noted, the real riskless return appears to hover below one percent, while the real return to capital generally is perhaps two to three times that. The difference between taxing the full real return to capital and just fixed returns to it amounts to roughly a doubling of revenue from taxes on capital.

The import of this observation in a comparison of income and consumption taxation is not obvious. If the government has the choice between bases and can set rates appropriately to meet a revenue target in either case, it may not matter very much in revenue terms which base it adopts. However, this observation is at odds with the idea that the government taxes risk (or, equivalently, that it holds a portfolio in risky assets), which implies a revenue target determined in part by the size of GDP. In part III I suggested that there may be very good reasons for the government's tax revenue roughly to track GDP, which means that taxing risk (or holding a portfolio of risk-based assets) may be optimal from a revenue perspective if, as seems to be the case, less than all wealth is consumed on a steady-state basis.[115] If, for example, steady-state consumption represents a fixed percentage of the sum of labor income and the risk-free return, then tax revenues under a cash-flow consumption tax will systematically lag revenue needs – a phenomenon, it is worth noting, that seems endemic to the current system, which notoriously fails to tax capital income effectively.[116] If the

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[114] *See, e.g.*, Chris William Sanchirico, ___; and David Weisbach, __ (debating the validity of the double distortion argument); David Gamage, ___ (suggesting that administrative and other considerations may weigh in favor of an income tax or a combination of tax instruments that includes both income and consumption taxation).

[115] CBO, note __, at 4 ("[B]oth total consumption and total wages are smaller than total income.").

[116] Average effective tax rates on business income in recent years have hovered around 24 percent. "Taxing Capital Income: Effective Rates and Approaches to Reform,"

consumption tax took the form of a tax on labor, the problem would arise if either or both of two conditions hold. First, it would arise if a portion of GDP is irreducibly traceable to capital rather than to labor. Whether that is true or not is a hotly contested question in some circles,[117] but given the empirical uncertainty, it seems clear that one cannot dismiss it given the current state of knowledge. If some income derives exclusively from capital, a labor income tax will not reach it, and an explicit consumption tax also will not if some wealth is literally never consumed. The second sufficient condition would be that some real returns to labor systematically appear in the tax system as capital income; there is strong evidence that the phenomenon is widespread.[118] In this case, returns to labor would not show up in a wage tax base.

The distributional properties of the two bases are similarly affected if an income tax reaches real returns to risk. Here the point is similar to that made in the previous subpart. If there is a systematic, positive disparity between income levels and consumption levels, such that total social wealth increases over time, then the failure to tax real returns to risk in excess of the risk-free rate shifts the incidence of taxation to those who earn labor income and those who receive the risk-free rate. The high correlation between risky returns and income indicates that the effect is regressive overall.

The efficiency analysis is slightly less clear, but it seems the double distortion argument no longer carries the weight that it did if: 1. not all income ultimately represents returns to labor, 2. there is a difference between total wealth created and total wealth consumed, and 3. the difference is attributable to real returns to risk in excess of the risk-free rate. (Technically the double distortion analysis generally depends on the assumption that all income is consumed on a steady-state basis, and a disparity between the two quantities need not be attributable to the excess of real returns over risk-free returns.[119]) Under these conditions, in order to raise the same revenue, a consumption tax will have to be imposed at a higher rate than an income tax, even when the tax that applies to the risk-free return is (conceptually) added to the tax on labor income, as the double distortion argument in effect does. Moreover, the rate on consumption would need

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Congressional Budget Office (Oct. 2005), Table 1, at 8. Note, however, that the CBO study did not include foreign income of controlled foreign affiliates. Evidence suggests that the effective rate on such income is well below that on capital income that is included in the U.S. tax base.

[117] *See, e.g.*, Paul A. Samuelson, *Marxian Economics as Economics* 57 AM. ECON. REV. 616, 619 (1967) (rejecting the labor theory of value); . . . .

[118] One can deduce the finding from the disparity between increases in labor productivity and real wages. Over the last 40 years, the former has dramatically outstripped the latter. EDWARD D. KLEINBARD, WE ARE BETTER THAN THIS (2014), Table __.

[119] *See* Bankman & Weisbach, at __.

to increase systematically over time, as the difference between wealth and consumption grows. These considerations, however, must be weighed against the double distortion of taxing both earnings and capital, which remains valid as far as it goes: Since there is less distortion under a consumption tax than under an income tax where rates can be set comparably, whether there is more distortion under a consumption tax when rates must be somewhat higher depends on how much higher. Nevertheless, it does seem that over the long term, assuming revenue needs consistently track GDP, a consumption tax eventually would create more distortion than an income tax if capital income is literally never subject to tax.

CONCLUSION

The literature on the effects of income taxation on risk-taking and on the ability of a true income tax to reach the returns to risk has overstated the consequences of investor response to the tax. To the extent the government does not negate the effect of the tax by holding revenues constant, the income tax is equivalent to the government's direct ownership of capital. If capital on average produces real returns in excess of the riskless rate, and not just excess returns attributable to risk-bearing, the income tax collects real taxes on risk because there is real income on it.

The implications of these observations would seem to be significant. First, the government fails to tax real economic income if the only return to capital it taxes is the riskless return. Second, income taxation is not as close to consumption taxation as ordinarily assumed, since the differences between the bases include not only the tax on the riskless rate, but also taxes on real returns to investment; the disparity will be meaningful if the consumption tax takes the form of a wage tax and some income derives purely from capital or some labor income is siphoned off as rents to of capital or otherwise shows up as a return to capital, or if it takes the form of a cash-flow tax but consumption systematically lags income. Third, the incidence of an income tax on risk may differ dramatically from the incidence of an income tax confined to the risk-free rate and labor, to say nothing of the incidence of a consumption tax. Returns to risk-taking are highly correlated with income and wealth, so that a tax on risk-taking is likely to affect those with greater wealth more heavily than is an equivalent (in revenue terms) tax either on labor and the risk-free rate only or on consumption only. Fourth, to the extent, if any, that income systematically outstrips consumption, a tax on risk-taking offers the prospect of a dramatic welfare improvement when compared even to a consumption tax. Finally, a lesson of the analysis is that the specification of the incidence of the base also requires a specification of government budgetary policy.