

**SHOULD CAPITAL INCOME BE SUBJECT TO  
CONSUMPTION-BASED TAXATION?**

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## I. INTRODUCTION

Fundamental tax reform is once again high on the policy agenda in the United States, highlighted by the forthcoming report of the President's Advisory Panel on Federal Tax Reform. Recent discussions have focused on two familiar alternative routes for reform. The first is incremental improvements in the existing income tax (Gale, 2005); these often involve integration of the individual and business income taxes along the lines discussed in Treasury (1992), including the proposal for a "Comprehensive Business Income Tax" (CBIT) which would tax deductions for interest expense at the business level while largely eliminating individual level taxation of capital income. The second approach reflects a conviction that such reforms, like the celebrated Tax Reform Act of 1986, are not sufficiently "fundamental," and advocates replacement of the income tax system with a consumption-based alternative; alternative approaches to achieving this goal include an expenditure tax system, the Hall-Rabushka Flat Tax, the Bradford X-Tax, a national retail sales tax, and a value-added tax.<sup>1</sup> The

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<sup>1</sup> See the articles in Boskin (1996) for a discussion of the details of the various consumption tax options, which are also analyzed in Zodrow and McLure (1991) and Gillis, Mieszkowski and Zodrow (1996); recent discussions of the many issues raised by consumption tax reforms are found in the articles in Aaron and Gale (1996), Zodrow and Mieszkowski (2002a) and Auerbach and Hassett (2005a). A brief characterization of some of the most popular generic approaches is as follows. An expenditure tax, such as that proposed by Aaron and Galper (1985), would allow unlimited deductions for all savings and full taxation of all withdrawals, with loans treated on a cash flow basis (proceeds taxable and repayments of principal and interest deductible); it would be accompanied by a consumption-based business tax that would allow expensing of all business-related purchases, including capital equipment and inventories, and cash flow treatment of loans. The Flat Tax, designed by Hall and Rabushka (1983, 1995) would ignore all financial transactions, taxing businesses on their real transactions on a cash flow basis with a deduction for labor compensation, which would then be taxed at a flat rate at the individual level subject to a standard deduction and personal exemptions. The Flat Tax is often described as a "prepaid" consumption tax in that the absence of a deduction for saving implies that the tax on future consumption financed with such saving has been prepaid; by comparison, the expenditure tax is a "postpaid" consumption tax in that tax is not due on consumption financed with saving until consumption actually occurs. The Bradford (1986, 1987) X-Tax is a version of the Flat Tax, modified to include progressive tax rates at the individual level. A national retail sales tax would tax final consumption at the retail level (Burton and Mastroarco, 1997), while a value-added tax would collect the same tax revenue as a sales tax but at the various stages in the production process (McLure 1987). Variants of these proposals have also been constructed, including the income/VAT system advocated by Graetz (2005), the hybrid prepaid/postpaid tax proposed by McLure and Zodrow (1996), the "two-tier VAT" discussed by Weisbach (2003) which combines a credit-invoice destination-based VAT with an X-tax type individual tax, the "allowance for corporate equity" proposal (which allows a deduction for depreciation supplemented by a deduction equal to the product of remaining basis and the interest rate) advocated by Bond, Devereux and Gammie (1996), and the USA (unlimited savings allowance) Tax described in Weidenbaum (1986). The following discussion does not consider a pure wage or payroll tax, a consumption tax option that has not received serious consideration, primarily because its base does not include economic rents or any of the returns to risk-taking. Many of these proposals have been refined over time, especially to take into account administrative issues which play a critical role in choosing among the various consumption tax reform options; for example, see Bradford (2005) and Weisbach (2000, 2003).

primary difference between the income and consumption tax approaches lies in their treatments of capital income, and this paper provides an overview of what is thus the critical question in the fundamental tax reform debate – should capital income be subject to consumption-based rather than income-based taxation.

The paper proceeds as follows. The following section provides an overview of the main issues and defines the subset of those issues that will be addressed in this paper. Section III contains the analysis, which focuses on three central results in the literature as well as a variety of other issues, and Section IV concludes. Finally, before proceeding, I should perhaps note that I am not an entirely unbiased observer in the debate, having been involved in the preparation of several consumption tax prototypes (McLure, Mutti, Thuronyi and Zodrow, 1980; McLure and Zodrow, 1996) and evaluations of the relative merits of income and consumption-based taxation (Zodrow and McLure, 1991; Zodrow and Mieszkowski, 2002).

## **II. A FRAMEWORK FOR ANALYSIS**

Not surprisingly, it is difficult to separate the topic of this paper – “should we” tax capital income – from the topics addressed in the other papers in this conference, “do we” and “can we” tax capital income. After all, one of the key arguments made by proponents of consumption-based taxation is that it is exceedingly difficult to accurately measure and tax capital income, especially in the face of increasing international capital mobility and tax sheltering activity, and that in practice much capital income escapes taxation under the income tax in the US and indeed in all countries that utilize the tax. Nevertheless, I shall largely abstract from these issues, and focus on the question of whether we should tax capital income, on the assumption that it is possible to do so at a reasonable cost. But before doing so, it will be useful to consider several preliminary issues.

## **A. Is a “Pure” Consumption Tax More Likely Than a “Pure” Income Tax?**

First, it is important to note that long experience has proved that it is impossible to achieve the long advocated ideal of a comprehensive accrual income tax. Practical requirements for a tax based on realizations – loosely speaking, actual sales – rather than on accrued values, coupled with the difficulties in measuring the economic depreciation of productive assets (and a host of similar timing issues) and in adjusting capital income for inflation imply that accurate measurement of an accrual concept of real economic income is inherently exceedingly difficult. By comparison, the cash flow accounting that characterizes the consumption-based tax reform options is not beset by similar basic conceptual issues.<sup>2</sup> That is not to say that “real world” versions of the various consumption tax proposals being discussed would not be more complex than their idealized versions, especially in a world in which our trading partners continue to rely on income taxes, or that many of the problems that plague the income tax do not also arise under a consumption tax.<sup>3</sup> Nevertheless, an important advantage shared by all the consumption-based reform proposals is that consumption is inherently easier to measure than income.

Beyond measurement issues, both the corporate and individual income taxes are riddled with generally highly inefficient but politically very popular special deductions, exemptions and other forms of preferential tax treatment, most of which would be eliminated under the ideal versions of the most prominent consumption tax reform proposals (and could also be eliminated under an income tax reform). A natural question is whether any consumption tax reform that

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<sup>2</sup> See Bradford (1986) for a classic exposition of this argument. More recently, McCaffery (2005, p. 809) argues that a “great deal and possibly all of the mind-numbing complexity of America’s largest and least popular tax follows from the decision to have a progressive personal income tax,” and Shaviro (2004, p. 92) stresses that “a consumption tax could offer enormous simplification advantages.”

<sup>3</sup> For example, see Weisbach (2000), McLure and Zodrow (1996) and Feld (1995) for discussions of problems that would arise in implementing the Flat Tax as well as Bradford (1996a) for problems raised by the taxation of financial institutions under prepaid consumption tax plans, Ginsburg (1995) for a similar analysis of issues raised by the USA tax proposal (which combined a business level value added tax with an individual level cash flow tax), and Murray (1997) for a discussion of problems in implementing a national retail sales tax. Slemrod (2005) discusses the desirability of, and problems raised by, removing popular tax preferences. Note that, as demonstrated by the Bush administration’s initial proposals for integrating the corporate and individual income tax systems, ensuring that capital income is taxed once but only once under an income tax integration reform also poses significant administrative problems (Hubbard, 2005).

survived the political process could maintain such “purity”. Although a heavy dose of skepticism would certainly appear to be appropriate, several factors suggest at least some room for cautious optimism. First, with respect to the corporate tax, the structure of all of the consumption tax reform proposals implies that all new investments, regardless of industry and source of finance, would face a marginal effective tax rate of zero – that is, expensing of new investment is sufficiently generous that an investment that earns normal returns is untaxed. It is certainly possible that a uniform marginal rate of zero on all forms of investment would serve as a natural floor to preferential tax treatment – or at least that there would be far greater political resistance to outright subsidies than to mere reductions in tax liabilities, especially given current budget exigencies. Note that if favorable treatment of some narrow classes of investment were deemed desirable, e.g., in research and development in order to capture significant positive externalities, carefully targeted expenditure programs could be utilized rather than general tax preferences. Of course, the fact that recent reforms – including (temporary) accelerated depreciation, extensions of limited expensing for small businesses, reductions in tax rates on capital gains and dividends – as well as proposals for new prepaid savings accounts were not accompanied by proposals to reduce the deductibility of interest expenses (which would be required to avoid subsidies to investments rather than just marginal effective tax rates of zero) are not encouraging in this regard.

On the individual side, pressure to maintain popular deductions even within the context of fundamental tax reform would no doubt be intense under any fundamental tax reform. Although one might hope that some of this pressure would be offset by the lure of lower tax rates and the prospect of significant simplification, past experience, even with the largely successful Tax Reform Act of 1986, suggests that such optimism may be misplaced. However, especially given concerns about the distributional implications of implementing consumption taxes, some limitations on current deductions that would disproportionately affect primarily high income individuals might be palatable as part of a comprehensive tax reform package. For example, the

“upside-down subsidy” nature of current deductions for items such as home mortgage interest – which arises because the value of the deduction increases with the taxpayer’s marginal tax rate as does the extent to which the preference item exceeds the standard deduction – implies that their benefits are highly concentrated among the wealthy (Carasso, Steuerle and Bell, 2005). This suggests that proposals to convert the deduction to a credit and/or subject it to a cap – as well as eliminating the mortgage interest deduction for second homes – might be feasible within the context of a fundamental tax reform package as a means of attaining approximate distributional neutrality and keeping top rates relatively low. More generally, the potential for reemergence of tax preferences after the initial enactment of a relatively “pure” consumption tax reform might be limited by the introduction of supermajority requirements for raising its tax rates or the reintroduction of “pay-as-you-go” budget rules (Bradford, 2005; Auerbach and Hassett, 2005). Although such measures could of course just as easily be enacted under income tax reform (and indeed might have limited the unraveling of the Tax Reform Act of 1986<sup>4</sup>), they may be politically more palatable as part of a large-scale reform of the tax structure than under a more modest income tax reform. Finally, as will be discussed further below, elimination of existing deductions could be accompanied by the introduction of new (perhaps capped) deductions for investments in human capital which, in addition to political popularity, have the advantage of being consistent with the principles of consumption-based taxation (Judd, 2001). To sum up, there are several reasons why a new consumption tax, enacted in the context of fundamental tax reform, might be able to attain a greater degree of “purity” than would be possible under an incremental reform of the current income tax, but whether such arguments would in the end prove compelling and whether such reforms would be sustainable is obviously highly speculative.

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<sup>4</sup> See Steuerle (2004) for a discussion of the Tax Reform Act of 1986 and subsequent revisions of the tax structure.

## **B. Consumption-Based and Income-Based Taxation of Capital Income**

As noted above, the essential difference between consumption and income-based taxes is in their treatment of capital income. Although this is sometimes expressed as the notion that the income earned by capital is taxed under the income tax but exempt under a consumption tax, this characterization must be qualified in two critical ways. First, as will be discussed further below, consumption taxes generally apply to capital existing at the time of enactment, although this depends on the nature of the transition rules used during the movement to the new regime. Second, and more importantly for purposes of the current discussion, the differences in the tax treatment of capital income under the two approaches are more subtle than suggested by the simple characterization above (beyond qualifications related to the difficulties of implementing a true accrual income tax). Specifically, as has been stressed in the recent literature, capital income consists of four conceptually separate components.<sup>5</sup> The first is the normal or risk-free return that compensates individuals for deferring consumption, often described as the “return to waiting.” Since this component of capital income is tax exempt under a consumption tax and is fully taxed under a comprehensive accrual income tax, the standard characterization applies. In contrast, the tax treatment of the other three components of capital income are similar under income and consumption taxes. In particular, above-normal returns or economic rents are captured under both taxes; for example, under the business cash flow taxes that characterizes many consumption tax proposals, allowing expensing rather than economic depreciation is sufficiently generous in present value to exempt the normal return to investment, but any above-normal returns are fully taxed. In addition, the returns to risk-taking – both the expected risk premium and any additional (positive or negative) returns that reflect good or bad luck – are taxed under both income and consumption taxes; that is, under both tax systems the government effectively becomes a silent partner in the investment, sharing in both its risk and reward, and

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<sup>5</sup> See Weisbach (2004) and Hubbard (2005a) for comprehensive recent discussions, including demonstrations of all the basic points asserted in the text; see also Bradford (1986), Bankman and Griffith (1992), and Hubbard (2002).

earning positive expected tax revenues (which can also be viewed as compensation for the additional risk it assumes as a silent partner in private sector investments rather than as tax revenue). Thus, the difference between the tax treatment of capital income under income and consumption taxes is limited to taxation of the risk-free return, which is fully taxed under the former and exempt under the latter.

The implications of this point are quite interesting and have not been fully investigated in the literature. Risk-free real returns to capital have historically been quite low, especially in periods of high inflation, with average rates, depending on the time period, ranging from roughly 0.5-3 percent (Avi-Yonah, 2004). This suggests that the differences between income and consumption taxes have been overstated in the literature.<sup>6</sup> In particular, most computer simulation models used to analyze the economic effects of implementing consumption tax reforms assume perfect competition and certain returns and thus may overstate the extent to which capital income is taxed under the income tax, as well as the efficiency gains obtained by moving to a consumption tax. On the other hand, these models also typically do not model inflation explicitly, and thus understate the extent to which the normal returns component of capital income is taxed under an unindexed income tax. In addition, as stressed by Judd (1997, 2001), to the extent that economic rents are attributable to imperfect competition characterized by significant consumer price distortions (prices in excess of marginal costs), the efficiency costs imposed by capital income taxation are significantly higher, which in turn implies that the gains from implementing consumption tax reform would be correspondingly greater. Finally, the fact that economic rents and the returns to risk-taking are treated similarly under both taxes mitigates the transition problems associated with moving from an income tax to a consumption tax.<sup>7</sup>

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<sup>6</sup> This point is stressed by Weisbach and Bankman (2005) and McCaffery (2005).

<sup>7</sup> See Lyon and Merrill (2001).

Sorting out the relative magnitudes of all of these various offsetting effects is a useful avenue for future research.

### **C. International Issues**

Finally, following most of the existing literature and because international issues are addressed in another conference paper, this analysis will focus on the taxation of capital income in a closed economy. However, international issues play a critical role in the debate regarding the appropriate taxation of capital income. One especially troublesome issue is that a variety of administrative problems would arise if the US were to implement a consumption-based tax system while all of its trading partners continued to tax on the basis of income. In particular, avoidance schemes based on the differential treatment of capital income would be problematic under certain forms of consumption taxation (McLure and Zodrow, 1996) and transfer pricing problems would be exacerbated if, as is usually recommended, the system were origin-based (Bradford, 2003; Weisbach, 2000; Avi-Yonah, 2004). On the other hand, adoption of a consumption tax would also allow substantial simplification of international tax rules (Ballard, 2002; Weisbach, 2000).

From a theoretical perspective, open economy factors tend to reinforce the case for consumption-based tax treatment of capital income. This is especially the case in the context of a small open economy that must take the after-tax return to internationally mobile capital as fixed. In this case, Gordon (1986) and Razin and Sadka (1991) show that the optimal source-based (i.e., production-based) tax on capital income is zero.<sup>8</sup> The intuition behind this strong result is that such a tax will drive out internationally mobile capital until its before-tax rate of return rises by enough to entirely offset the tax.<sup>9</sup> This emigration of capital lowers the

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<sup>8</sup> By comparison, residence-based taxes on capital income (taxes on all of the capital income of the nation's residents, regardless of where it is earned) are theoretically more desirable but in practice exceedingly difficult to implement.

<sup>9</sup> This result is closely related to the international tax competition literature; see Zodrow (2003) for a recent discussion.

productivity of the fixed factors in the taxing country – land and labor (or at least relatively immobile labor) – so that local factors of production ultimately bear the entire burden of the capital income tax, including its efficiency costs.<sup>10</sup> The clear implication is that, solely from the viewpoint of the residents of the taxing country, it is preferable simply to tax local factors directly, and thus avoid at least the excess burden of the tax on capital income.

This result must be qualified in a number of ways. In particular, capital income taxation may be desirable to capture economic rents (especially from foreign owners of capital) and to attempt to “transfer” tax revenues from countries that tax their multinational corporations on a residence basis but allow foreign tax credits for taxes paid abroad – although this prospect is limited by numerous factors.<sup>11</sup> For example, Gravelle and Smetters (2001) show that for larger economies such as the United States which have significant market power in international capital markets,<sup>12</sup> the extent to which capital income taxes are borne by domestic labor (as is implied by the small open economy analysis) is significantly reduced when domestic and foreign goods are imperfect substitutes – although their model does not allow for any tax-induced negative effects on saving. This result contrasts with Harberger (1995), who argues that domestic labor may bear significantly more than the full burden of the corporate tax as the general equilibrium effects of tax-induced wage reductions in the corporate sector spread throughout the domestic economy, although this analysis focuses on the case in which the elasticity of supply of international capital to the domestic economy is infinite and is thus more relevant to the small open economy

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<sup>10</sup> These efficiency costs arise due to an inefficiently low overall capital intensity of production and a tax bias favoring production of labor-intensive goods (Gordon and Hines, 2002).

<sup>11</sup> Specifically, the “treasury transfer” effect is mitigated because (1) many countries utilize a territorial rather than residence-based system for taxing their multinationals, (2) many countries that use the residents pay system allow tax sparing which eliminates the “treasury transfer” effect, (3) many multinationals from countries that tax on a residence-based system, especially the US, currently have far more foreign tax credits than they can use, and (4) the value of foreign tax credits is reduced because they are paid only when funds are repatriated to the domestic parent while the source based taxes must be paid currently. See Zodrow (2005) for a recent discussion.

<sup>12</sup> Although capital is less than perfectly mobile internationally (Feldstein and Horioka, 1980; French and Poterba, 1993), much recent research suggests that the extent of international capital mobility is significant and increasing over time (Feldstein and Bachetta, 1991; Obstfeld and Rogoff, 1995; Coakley, Kulasi and Smith, 1998).

case. In a different vein, Gordon (1992) notes that, with implicit coordination of capital income taxes through the foreign credit mechanism of countries that use residence-based corporate income taxes, capital income taxation may be desirable because it provides governments with revenues as well as a backup to domestic personal income taxes. Nevertheless, on balance, international capital mobility considerations would appear to create another theoretical argument for reduced taxation of capital income. This argument is generally supported by simulation models of the effects of consumption tax reforms, as growth of the domestic capital stock, labor productivity and wages is augmented by inflows of international capital.<sup>13</sup> For example, in a recent review, Ballard (2002, pp. 137-8) concludes that “fundamental tax reform in the United States would lead to aggregate welfare gains, and ... these gains would be larger in an open-economy context.” Given recent low savings rates in the US and the concomitant reliance on foreign capital, such concerns are especially important.

### **III. AN OVERVIEW OF THE LITERATURE ON THE DEBATE**

The debate regarding the relative desirability of income and consumption taxation dates back to Hobbes, Marshall and Mill; it was rekindled some thirty years ago by the seminal work of Andrews (1974) as well as the highly influential reports of the US Treasury (1977) and the Meade Committee in the UK (Institute of Fiscal Studies, 1978), and continues unabated to this day. The debate has generated a voluminous literature,<sup>14</sup> which implies that the following discussion is necessarily selective. The approach I shall take is to focus initially on what I believe to be the three most important sets of results in the literature on optimal capital income

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<sup>13</sup> Note, however, that there are offsetting effects, as some of the tax-induced increases in personal saving go abroad (Goulder, Shoven and Whalley, 1983) and some of the welfare gains accrue to foreign residents. In addition, Grubert and Mutti (1985) show that even limited international capital mobility is sufficient to have a significant impact on an analysis of the effects of reform.

<sup>14</sup> For recent surveys, see Zodrow and McLure (1991), Gravelle (1994), Gordon (2000), Judd (2001), McCaffery (2005) and Weisbach and Bankman (2005).

taxation, as well as various qualifications to those results, and then consider some additional issues.

### **A. Results from Infinite Horizon Models Analyzing Efficiency Issues**

The most striking result in this literature is due to the seminal contributions of Judd (1985) and Chamley (1986), who analyze optimal capital income taxation in models in which individuals are assumed to be infinitely lived. Although such models are used to some extent because they are relatively analytically tractable, they can be loosely justified as a representation of the situation in which all individuals share a common utility function and a parent's utility function depends on her children's utility function, and thus on her grandchildren's utility, etc. Individual utility is defined over consumption and leisure in each period and the government must choose between labor and capital income taxation. Within this context, Judd and Chamley show that in the long run the optimal capital income tax rate is zero. The intuition behind this result is straightforward. By reducing the after-tax interest rate, a capital income tax increases the price of future consumption relative to current consumption. Although this distortion may be modest over a short time interval, it increases exponentially with time, so that even a small capital income tax rate will eventually be highly distortionary. Since the individuals in these models have perfect foresight over an infinite lifetime, their consumption patterns are highly distorted by such a tax, with significant declines in saving and capital accumulation. Indeed, in the Judd (1985) model, which has both representative workers and capitalists, the negative effects of a capital income tax on saving and capital accumulation and thus labor productivity and wages are sufficiently great that the optimal capital income tax rate is zero even solely from the perspective of workers.

More generally, the basic message of these infinite horizon models is that capital income taxation should be avoided entirely in the long run, while existing capital should be taxed to the maximum extent feasible since such taxation represents a nondistortionary or “lump sum” source of revenue. Similarly, confiscatory capital income taxation may be desirable in the short run

while capital-tax-induced distortions are relatively small.<sup>15</sup> Moreover, within the context of the basic model, the result does not require identical preferences and does not depend on the nature of individual preferences; in particular, there are no restrictions on separability of consumption and leisure in the individual utility function. The result has also been shown to be robust to a wide variety of extensions of the basic model, including the addition of exogenous growth (Lucas, 1990), stochastic shocks to production (Chari, Christiano and Kehoe, 1994), heterogeneous capital goods and imperfect competition (in which case Judd (1997) shows that the optimal capital income tax rate is negative), and various patterns of government expenditures (Judd, 1999). In addition, the relatively large saving responses that characterize the infinite horizon models imply that they tend to get relatively large effects from implementing consumption tax reforms (Engen, Gravelle and Smetters, 1997). Indeed, based on an infinite horizon modeling approach, Lucas (1990, p. 314) argues that proposals to exempt capital income from taxation would deliver “the largest genuinely free lunch I have seen in 25 years in this business, and I believe we would have a better society if we followed this advice.”

Nevertheless, the policy implications of these results are open to debate. The political feasibility of imposing huge taxes on existing capital is clearly suspect although, as discussed further below, this would occur to some extent, depending on transition rules, with the implementation of a consumption tax. Moreover, such a policy suffers from a time inconsistency problem common to all such modeling efforts. Although it may in principle be desirable to impose a huge tax on existing capital as part of an agreement to exempt future returns to capital, investors will understandably be suspicious that future governments will renege on the agreement and tax future accumulations of capital, in which case the predicted positive effects on saving and capital accumulation will not fully materialize. As a result, unless

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<sup>15</sup> A related result is obtained by Saez (2002a), who constructs a model in which the use of progressive capital income taxes (flat rate taxes above an exemption level) may be used for a finite time period to reduce wealth accumulations existing at the time of the enactment of reform.

the government can credibly commit to a future policy exempting capital income from taxation entirely, such a policy may not be optimal.

More fundamentally, as emphasized by Jones, Manuelli and Rossi (1993) and Milesi-Ferretti and Roubini (1998), the logic underlying the desirability of tax exemption of the income from physical capital in the long run in the models cited above also applies to the accumulation of human capital; that is, returns to human capital investments should also be exempt from tax. To the extent that the costs of obtaining human capital are foregone earnings and the tax system is proportional, this is much less of an issue, as the implicit deductibility of foregone earnings, coupled with taxation of the returns to the investment in the form of future wages, implies a zero effective tax rate (as such treatment corresponds to that of saving under a cash flow consumption tax). However, to the extent that the direct costs of making an investment in human capital (e.g., tuition, books and fees) are not deductible, the resulting wage income should not be taxed. Thus, tax exemption of the income to physical capital under a consumption tax should be accompanied by the deductibility of the direct costs of investing in human capital, to the extent such investments do not reflect consumption expenditures (Judd, 2001).<sup>16</sup>

Most importantly, many observers hesitate to draw policy implications from models that assume infinitely-lived individuals. Beyond questions regarding the validity of using models with infinitely-lived individuals as a representation of altruism across generations, such models

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<sup>16</sup> Early research suggested that the neutral treatment of investment in human capital (financed with foregone earnings) and investment in physical capital was an important advantage under a consumption tax, relative to an income tax which creates an inefficient tax bias toward investment in human capital by taxing only the returns to investment physical capital (Driffill and Rosen, 1983). However, in addition to its political appeal, a bias favoring human capital accumulation may be desirable to offset (1) the effects of a progressive tax system, under which the implicit deductions for foregone earnings are taken at a low rate while the subsequent returns to investment (future wages) are taxed at a relatively high rate (Dupor, Lochner, Taber and Wittekind, 1996), (2) the absence of deductions for most direct costs of investment human capital, including tuition books and fees (Nerlove, 1992), and (3) the differentially high risk associated with undiversifiable investments in human capital (Eaton and Rosen, 1980; Judd, 1998). Moreover, recent work by Taber (2002) suggests that the efficiency costs of income taxation of human capital investment are short-lived, and the transition to a new efficient equilibrium is fairly rapid. Thus, the efficiency benefits of improved tax treatment of human capital investment under the consumption tax may be fairly limited – and in any case, expenditure policy, which already plays a major role in reducing the effective cost of education in the US, is a better targeted and thus less costly means of correcting for any perceived problems in human capital formation (e.g., underinvestment due to liquidity constraints).

cannot address the critical issues related to intergenerational redistribution, as well as the transitional problems, that are raised by consumption tax reforms. Accordingly, most of the policy analysis of consumption tax reforms has focused on lifecycle models with an overlapping generations structure. It should be remembered, however, that the important insights of the infinite horizon models – especially the highly distortionary nature of capital income taxation for individuals with long (even if not infinite) time horizons and the negative effects on labor productivity and wages of capital-tax-induced reductions in savings and capital accumulation – are still relevant, if to a lesser degree, in the lifecycle models. Indeed, because such models are often at the opposite end of the spectrum from the infinite horizon models in that they assume away intergenerational altruism entirely, the insights of the infinite horizon models suggest that lifecycle models may be understating the gains from consumption tax reform.

#### **B. Results from Life-Cycle Models Analyzing Efficiency Issues**

The simplest version of the traditional lifecycle model is characterized by a representative individual who lives two periods, supplying labor (demanding leisure), purchasing consumption goods and saving during the first “earnings” period and consuming by drawing down savings during the second “retirement” period. As above, a tax on wage income in this context is equivalent to a uniform tax on consumption in the two periods, while a tax on capital income reduces the after-tax return to capital and thus effectively acts as a tax on future consumption. The government is assumed to choose wage and capital income tax rates to maximize the utility of this representative individual while financing a fixed level of government services. Since all individuals are identical in this simplest version of the problem, issues of redistribution do not arise, and the sole question is how to raise the required revenue efficiently.

This problem is analogous to the familiar issue of whether uniform or differential commodity taxation is optimal. As is well known, uniform commodity taxation is efficient only under certain circumstances, and analogous results obtained in this case. Specifically, the optimal capital income tax rate is zero (uniform taxation of consumption in both periods, as

would occur under a consumption or wage tax) only if first and second period consumption are equally complementary with leisure.<sup>17 18</sup> The intuition underlying this result reflects two considerations. On the one hand, tax distortions of intertemporal consumption allocation decisions are undesirable, so that uniform taxation of consumption in the two periods tends to be efficient. On the other hand, the inability to tax leisure directly implies that taxation of the consumption goods will inefficiently reduce labor supply. As a result, differential taxation of the consumption good that is more complementary with leisure is desirable to mitigate the negative effects of taxation on labor supply. In general, the optimal tax structure reflects a balancing of these two concerns. However, if consumption in the two periods is equally complementary to leisure, then any rationale for differential taxation disappears, and uniform taxation – a capital income tax rate of zero – is optimal.

As shown by Auerbach (1979), this condition obtains if the individual utility function is weakly separable in leisure and the two consumption goods and homothetic with respect to the consumption goods, a circumstance that will henceforth be referred to as satisfaction of the uniform commodity taxation (UCT) conditions. There is of course no guarantee that individual utility will satisfy these conditions. However, homotheticity – which implies that increases in wealth are distributed proportionately across consumption in all periods – is consistent with the generally accepted permanent income hypothesis, and indeed is a standard feature of most lifecycle model formulations. Separability of consumption and leisure is more tenuous but, as argued by Atkinson and Stiglitz (1980, p. 437), it provides a reasonable benchmark that is based on “an assumption that has been made in nearly all studies of demand and labor supply functions.” Moreover, as argued by Davies and St-Hilaire (1987, p. 56), it “seems unlikely that

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<sup>17</sup> For example, see Feldstein (1978), Bradford (1980), King (1980) and, in an explicitly dynamic context, Atkinson and Sandmo (1980).

<sup>18</sup> Goods that are complements tend to be consumed together. More formally, leisure and a consumption good are complements if an increase in the price of the consumption good reduces the demand for leisure (and thus increases labor supply).

retirement consumption is more complementary with a leisure during the working period than consumption during the first period,” the condition that would be required for positive capital income taxation to be desirable. In addition, Balcer, Garfinkel, Krynski and Sadka (1983) argue that even in situations in which the UCT conditions are not satisfied and differential commodity taxation is theoretically desirable, the efficiency gains relative to a uniform commodity tax are quite small; moreover, these results were obtained within the context of taxes on various commodities within a single period, and it seems likely that differences in complementarities with leisure would be significantly greater across different types of consumption goods than across aggregate consumption in different periods. It is also important to note that income taxation corresponds to a tax rate on capital income that is not merely positive but equal to the tax rate on wage income. If the “optimal” tax rate on capital income is positive but relatively small, the administrative costs associated with taxing capital income at a positive rate suggest that a consumption-based tax would be preferable to an income tax.<sup>19</sup> In sum, the simple two-period model arguably suggests a presumption that an optimal tax system is, or is approximated by, tax exemption of capital income. However, in the absence of convincing empirical evidence as to the extent to which the UCT conditions are satisfied, such results cannot be viewed as conclusive. Moreover, the fact that the optimality of neither income nor consumption taxation can be established unambiguously even in the simplest of theoretical lifecycle models suggests

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<sup>19</sup> Alternatively, such a result supports use of the “dual” income tax, adopted in the late 1980s and the early 1990s by the Nordic countries (Denmark, Finland, Norway and Sweden), under which capital income is taxed at a single relatively low proportional rate at either the business or individual levels, while labor income is taxed at progressive rates under the personal income tax (Sorensen, 1994; Nielsen and Sorensen, 1997). The Nordic dual income tax represents an innovative compromise between the arguments supporting full and zero taxation of capital income; this is especially true for small open economies that are concerned about the tax-induced capital outflows and transfer pricing problems associated with high capital income tax rates, but nevertheless wish to tax economic rents, including those of foreign capital owners, and take some advantage of any treasury transfer effects available from multinationals based in countries that grant foreign tax credits. However, the structure of the dual income tax structure creates a strong incentive to disguise labor income as capital income, especially for small-business owners, and measures designed to combat this evasion problem may be ineffective or instead may result in over-taxation of capital income. Moreover, economic rents and the returns to risk-taking are taxed at relatively low rates, foregoing relative efficient sources of revenue. Finally, in practice, the Nordic countries provide for preferential treatment of certain forms of capital income, even relative to the dual income tax rate structure (Cnossen, 2000). For further discussion, see Zodrow (2005).

that numerical simulations might be used to compare the economic effects of the two tax systems, and in fact that is the direction taken by much recent research.

Note also that the applicability of the simple two-period model is limited. Two obvious concerns are that for a more complete analysis individual lifecycle optimization must be combined with production and incorporated into an overlapping generations structure of the economy, and that the two-period model is an oversimplified representation of earnings, consumption and savings decisions. These two concerns are addressed in a seminal paper by Summers (1981) and the subsequent literature. Summers stresses that the two-period model with labor earnings occurring only in the first period is misleading because it misses the critical role of capital income taxation in determining the after-tax interest rate individuals use in discounting future labor earnings. He constructs a general equilibrium model of an economy comprised of lifecycle savers, each of whom maximizes utility over a fifty-year adult life, the last ten of which are spent in retirement. By assuming fixed labor supply, Summers abstracts from the leisure complementarity issues described above and instead focuses on the allocation of consumption over the lifecycle. He emphasizes that an increase in the tax rate on capital income reduces the after-tax discount rate individuals use in estimating their human wealth – the present value of all future labor earnings – when making consumption and savings decisions. The resulting increase in human wealth prompts greater consumption early in life, that is, less saving. The simulations reported by Summers suggested that this human wealth effect is highly significant and results in large reductions in savings, which in turn implies that the enactment of a consumption tax reform results in large steady state welfare gains. For example, in one central case, the enactment of a cash flow consumption tax results in a steady state welfare gain equal to 11.2% of lifetime income. The enactment of a wage tax in the Summers model also increases steady state welfare, but to a significantly smaller extent (7.0% of lifetime income) since existing capital is not subject to tax. This highlights the point, noted above, that a significant fraction of the efficiency gains

obtained from a consumption tax reform may be attributable to a one-time “hit” on old capital, reminiscent of the tax on existing capital that characterizes the infinite horizon models.<sup>20</sup>

The Summers model sparked a great deal of interest and additional research. Much of this research focused on the extent to which the savings responses in the Summers model (savings elasticities with respect to the after-tax rate of return on the order of 1-3) are sensitive to various choices about model structure and parameter values (Evans, 1983; Starrett, 1988) and appear to be unreasonably large in light of the fairly small responses estimated in the empirical literature (Ballard, 1990, 2002; Gravelle, 2002). In addition, the assumptions made by Summers of an inelastic labor supply and wages that increase exponentially over the earnings period and thus tend to inflate the human wealth effect are problematical.<sup>21</sup> These issues are addressed in the overlapping generations general equilibrium model constructed by Auerbach and Kotlikoff (1987), hereafter AK, which builds on the earlier work of Auerbach, Kotlikoff and Skinner (1983).<sup>22</sup> The AK model allows labor-leisure choices in each period, assumes a “hump-backed” wage profile over the lifecycle taken from the labor economics literature, and uses more conservative parameter values than those utilized by Summers.

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<sup>20</sup> Note, however, that the wage tax in the Summers model is not accompanied by a cash flow business tax, and thus does not reflect the effects of enacting a Flat Tax which, in the absence of transition rules, would also include a lump sum tax on existing capital due to the loss of depreciation deductions under the business tax. A separate issue is the treatment of the government budget constraint. Summers assumes that the government's budget must be balanced each year. As a result, any policy that defers taxes, such as a cash flow consumption tax or an income tax, will stimulate additional savings as individuals must save to finance the payment of future taxes; this additional saving would not occur under a wage tax reform, which reduces its savings effects and thus the long run welfare gains associated with its enactment.

<sup>21</sup> A separate issue is the tax treatment of bequests, a difficult issue as bequest motives are not particularly well understood and the effects of including bequests depends on how they are modeled; see Diamond, Johnson and Zodrow (1997) for a discussion. The effect of adding bequests is fairly small if they are simply modeled as another element in the utility function (Seidman, 1983). If individuals are instead assumed to have a “target” bequest motive, the efficiency gains from consumption-based taxation of capital income are reduced because an increase in the after-tax rate of return facilitates attainment of the bequest target and thus reduces saving. Alternatively, if bequests are modeled by assuming altruism on the part of parents toward the welfare levels of their children, the analysis becomes similar to that of infinitely-lived individuals, in which capital income taxes are highly distortionary and consumption taxation is optimal. In a life cycle context, the analysis is complicated further by the fact that bequests generate benefits to both the donor and the recipient, which implies that subsidies could be justified. For excellent recent discussions of the many issues raised by the tax treatment of bequests, see the articles in Gale and Slemrod (2001).

<sup>22</sup> See Auerbach (1996) for a recent analysis of fundamental tax reform using the AK model, and Kotlikoff (1998) for a discussion of its evolution.

As a result of these and many other differences from the Summers model, the welfare gains obtained from the enactment of a consumption tax reform in the AK model are more moderate. For example, in a base case analysis, enactment of a cash flow consumption tax increases steady state welfare by 2.3% of the present value of “lifetime resources,” a broader measure of welfare than that used by Summers as it includes the value of leisure.<sup>23</sup> More recently, Auerbach (1996) uses an updated version of the AK model to analyze the effects of several of the consumption tax proposals discussed above.<sup>24</sup> He estimates that enactment of a retail sales tax or a value-added tax would increase long run steady state welfare by 1.9% of lifetime resources; this corresponds to an efficiency gain, measured as the sustainable increase in welfare for all future generations using lump-sum redistributions to hold constant the utility levels of all individuals alive at the time of enactment, equal to 6.4% of lifetime resources. By comparison, due to its standard deduction and personal exemptions, enactment of the Hall-Rabushka Flat Tax results in smaller welfare and efficiency gains, as steady state welfare increases by 1.6% and the efficiency gain is more than halved to 2.8%. Auerbach also considers adding transition rules to the Flat Tax in the form of allowing continued deductions for depreciation on existing assets. As discussed below, such transition rules mitigate the tax-induced decline in the values of existing assets associated with a consumption tax reform; however, reducing the magnitude of this windfall loss imposed on existing capital owners also reduces the long run efficiency gains attainable with reform. Specifically, in Auerbach’s simulations, the steady state welfare increase drops to 0.67% and the long run efficiency gain drops to 2.2% of lifetime resources. Thus, a central message of Auerbach’s analysis is that

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<sup>23</sup> By comparison, for the same reasons as in the case of the Summers model, the enactment of a wage tax (again without a complementary business tax) reduces welfare by 0.9% of the present value of lifetime resources.

<sup>24</sup> See also Kotlikoff (1995).

reform-induced efficiency gains vary significantly across consumption tax reforms, and are negatively affected by adding progressivity and transition rules.<sup>25</sup>

Although they evaluate the relative merits of income and consumption taxes, the analyses by Auerbach and Kotlikoff do not directly address the issue of the optimal tax treatment of capital income in an overlapping generations model populated by individuals who optimize over a lifecycle consisting of many periods. This issue is addressed in an excellent recent paper by Erosa and Gervais (2002), hereafter, EG.<sup>26</sup> These authors construct a model that is generally similar to that utilized by AK, except that the government has complete flexibility with respect to debt policy and may have access to age-dependent taxes on labor income. In order to calculate “optimal” tax rates with multiple generations, the government is assumed to maximize a weighted sum of individual utility levels across generations.

Calculating the optimal pattern of wage and capital income tax rates is significantly more complicated in this setting. EG show that a capital income tax rate of zero is optimal if (1) the UCT conditions are satisfied, and (2) age-conditioned labor income tax rates are set appropriately. The additional complexity of age-conditioned labor income tax rates is required because, in contrast to the infinite-horizon models where consumption and leisure are constant in the steady state for the representative individual, consumption and leisure vary over the lifecycle in an overlapping generations model. Specifically, because leisure demand tends to increase (or be u-shaped) and consumption demand increases over the lifecycle, the optimal wage tax rates also vary over the lifecycle. For example, the optimal tax rate on labor income is relatively low (increasing the opportunity cost of leisure) when leisure demand is high and relatively inelastic, consistent with the standard Ramsey optimal taxation principle of taxing inelastically demanded

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<sup>25</sup> Indeed, Auerbach also estimates that the efficiency gains associated with implementing the USA tax (Weidenbaum, 1996), which provides for transition rules and multiple individual tax rates that range up to 40% as well as a variety of other features, are only 0.1% of lifetime resources.

<sup>26</sup> See also Garriga (2003).

goods at relatively high rates (Auerbach and Hines, 2002). In addition, the optimal age-dependent wage income tax rates depend inversely and fairly sensitively on the social welfare weights assigned to various generations. Since age-dependent wage income taxes are infeasible, the central issue is whether their effects can be approximately replicated with the appropriate pattern of capital income tax rates. Since the optimal time path of age-dependent wage tax rates tends to increase over most of the lifecycle, EG find that some capital income taxation is in fact typically optimal. In addition, as above, if leisure and consumption are not separable in the individual utility function, capital income taxation (or subsidization) may be desirable, depending on the relative complementarities of consumption in different periods with leisure.

In an attempt to determine the quantitative significance of their result, EG simulate optimal (constant) capital and wage tax rates in their model under a parameterization that is chosen to closely follow Auerbach, Kotlikoff and Skinner (1983), coupled with various approaches to weighting the utilities of different generations in the government social welfare function. EG show that the optimal capital income tax rate is indeed positive in their simulations, ranging from roughly 4-15%. The interpretation of this result for purposes of the current discussion, however, is open to question, as all of their optimal tax rates on capital income are roughly 30-35% of the tax rate on wage income. Accordingly, especially in light of the significant administrative costs of attempting to tax capital income at any level, the EG results could easily be interpreted as implying that the optimal tax rate on capital income is sufficiently low that tax exemption under a consumption tax may be desirable.<sup>27</sup>

Further investigation of the optimality properties of AK-type models is certainly warranted, as is an examination of the relative efficiency costs in these models of moving from the optimum toward either pure consumption (or pure income) taxation, since such “pure” policies are likely to be desirable since the administrative costs of hybrid systems are relatively

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<sup>27</sup> Alternatively, the EG results provide support for a Nordic dual income tax under which the tax rate on capital income is significantly lower than the tax rate applied to labor income.

large. In addition, an examination of the effects of relaxing the EG assumption of a perfectly flexible debt policy would be very useful, as the political feasibility of such a policy is questionable. Flexible debt policy in the EG model plays an important role, as debt can be used to offset the negative effects of consumption tax reform on the elderly if the social weight on current generations is relatively high, or to finance lower future taxes with the accumulation of current surpluses if the weight on future generations is relatively high; for example, in one case analyzed by EG, the government runs a surplus equal to three times in GDP in order to finance lower future tax rates.

### **C. Results from Models Analyzing Efficiency and Equity Issues**

Although the analysis thus far has focused exclusively on efficiency issues, equity concerns are central to the debate regarding the desirability of taxing capital income. Both horizontal equity and vertical equity issues have been addressed in the literature.

#### Horizontal Equity

With respect to horizontal equity, a central issue is the time period over which ability to pay tax should be measured. If this period is a single year taken in isolation, then potential rather than actual consumption within that year is a plausible measure of ability to pay, and a comprehensive measure of income, including all accrued capital income and often referred to as Haig-Simons income, is typically viewed as the appropriate tax base. In this case, horizontal equity implies that individuals with the same level of comprehensive income in a given year should pay the same tax.

However, the rationale underlying the Haig-Simons ideal has been called into serious question by proponents of taxation on the basis of consumption. For example, Bradford (1980), drawing on the basic lifecycle model (with no bequests or inheritances), argues that individual utility is a function not of annual income but of consumption over the lifetime, subject to a lifetime budget constraint. In this case, the appropriate measure of ability to pay is an individual's "endowment" – the present value of lifetime wage earnings – and capital income

merely represents compensation for deferred consumption. In this context, both a (proportional) tax on consumption and a tax on wages satisfy the criterion of horizontal equity, as the lifetime tax burdens under each approach are equal in present value, and equal the product of the tax rate and the value of the endowment, independent of individual consumption and saving decisions. By comparison, an income tax which taxes the return to saving penalizes savers; that is, individuals who tend to earn their income early in life or consume late in life will face a higher lifetime tax burden than individuals who have identical endowments but tend to be late earners or early consumers. Bradford argues that this implies that a consumption tax is inherently preferable on horizontal equity grounds, and this view appears, at least in principle, to have considerable support.

A closely related issue is whether this argument should be extended to multiple generations.<sup>28</sup> In particular, the “dynastic” view of horizontal equity implies that economic resources should not be taxed until actually consumed, which implies that bequests should be tax exempt as they represent a transfer of potential consumption to heirs. Under a prepaid tax like the Flat Tax or the X-Tax, this implies that inheritances should not be included in the tax base of the recipient (since the tax has been prepaid); under a postpaid expenditure tax, this implies that “withdrawals” that are used to fund to bequests should not be taxed, but should be included in the base of the recipient so that they can eventually be taxed when consumed. The sales tax or value-added tax approaches are inherently consistent with the dynastic view of equity, as tax is not assessed until consumption actually occurs.

By comparison, the “lifetime endowment” view of equity argues that an individual should be taxed on all resources available during the lifetime, including inheritances, regardless of whether they are used for consumption or to finance the making of bequests. This view of equity can be viewed as the lifetime analog to Haig-Simons income, as it implies that the correct

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<sup>28</sup> See Zodrow and McLure (1991) for further discussion of this issue.

base for measuring ability to pay tax over the lifetime tax is lifetime income, regardless of how it is used (Aaron and Galper, 1985). Under a prepaid tax like the Flat Tax or the X-Tax, this implies that inheritances should be included in the tax base of the recipient, implying that both the recipient and the donor (since the tax has been prepaid) will pay tax on the funds transferred. Under a postpaid expenditure tax, this implies that “withdrawals” that are used to fund to bequests should be taxed, and should also be included in the base of the recipient. Proponents of the dynastic equity view argue that such treatment clearly represents undesirable double taxation, and creates a tax bias against transfers in the form of bequests relative to other forms, while introducing an element of income taxation into the tax system. In contrast, proponents of the lifetime endowment view of equity argue that such treatment is essential to ensure that all individuals with the same lifetime resources are treated equally (and to limit the transmission of huge fortunes across generations). The choice between the two approaches obviously involves personal value judgments. However, it is important to note that the choice between the dynastic and lifetime endowment views of equity has similar implications for the designs of both income and consumption taxes; it is an issue for the choice between the two taxes primarily to the extent that capital income taxation is perceived to supplement poorly administered (or substitute for non-existent) estate taxes.<sup>29</sup>

Finally, the recent explosion of tax sheltering activity, most of which involves manipulations of provisions involving the taxation of capital income, may create problems of horizontal (as well as vertical) equity and certainly creates fairness issues for the income tax. Another argument for a consumption tax is that it should be relatively effective in precluding such schemes. For example, Bankman (2004) notes that many of the tax sheltering schemes that

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<sup>29</sup> Note also that capital income taxation can be justified as a replacement for (or supplement to) a wealth tax that is assessed on the grounds that wealth confers utility beyond its consumption value in the form of prestige, security, and power, including political power. However, consistent with the dynastic view of equity, Shaviro (2004) argues that such benefits reflect only the value of future consumption, which would be fully taxed under a consumption tax (although there would be no reduction in wealth accumulation under a consumption tax, in contrast to the case under an effective capital income tax).

have been utilized under the income tax would not be possible under a consumption tax. In addition, susceptibility to tax sheltering plays an important role in choosing among the alternative consumption taxes; for example, Weisbach (2000) argues that the Flat Tax is more easily evaded than some of the other consumption tax options, primarily because it is an “open” tax system that allows business deductions even in cases in which there is no offsetting inclusion (e.g., purchases from individuals, tax-exempt institutions or foreigners)<sup>30</sup> and because it may be relatively more susceptible to evasion in the form of disguising labor income as exempt capital income.<sup>31</sup>

### Vertical Equity

The vertical equity or progressivity of the tax system is also a contentious equity issue in the income versus consumption tax debate. Although a discussion of the optimal progressivity of the tax system is far beyond the scope of this paper, the following discussion examines whether capital income taxation is necessary to achieve vertical equity goals.

This issue is addressed in a seminal paper by Atkinson and Stiglitz (1976), hereafter, AS. The model constructed by AS focuses on whether differential commodity taxation is desirable to achieve a society's vertical equity goals (captured in a social welfare function that is a weighted sum of individual utility levels) if a nonlinear tax on wage income is also available and individuals differ only in their skill and thus in their wage levels. Within this context, AS show, reminiscent of results discussed earlier, that if leisure and the various consumption goods are separable in the utility function and the nonlinear tax on wage income is set optimally, differential commodity taxation is unnecessary. The intuition behind this striking result is that optimal use of the nonlinear income tax is sufficient to achieve all distributional goals, since

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<sup>30</sup> By comparison, under the credit-method value-added tax utilized in Europe and elsewhere, firms get credits on their purchases only to the extent tax has been paid by their suppliers (McLure, 1987).

<sup>31</sup> See also Slemrod (1996) and Gale and Holtzblatt (2002) for general discussions of the simplicity properties of the various reform options.

individuals differ only in their skill levels, and at any given skill level all individuals have the same earnings and consumption pattern. Thus, the wage tax used in isolation can achieve the socially desired distribution of income, taking into account the predicted individual behavioral responses and without distorting choices across consumption commodities. The only reason to also use distortionary commodity taxes would be to lessen the labor-leisure distortions resulting from the wage tax, but the assumption of separability implies that this is impossible. Moreover, Kaplow (2004) has extended this result of the case in which the tax on wage income is not set optimally. He shows that even in this case, reducing any commodity tax distortion, coupled with an income tax adjustment holding utility and labor supply constant, will raise revenue and is thus “Pareto improving,” increasing (or holding constant) the welfare levels of all individuals in the economy. As above, in the dynamic analog the consumption goods are interpreted as consumption in various periods in the lifecycle, and the AS and Kaplow results imply the capital income taxation – that is, differentially high tax rates applied to future consumption – is undesirable. Of course, if utility function is not separable, then capital income taxation would be desirable if future consumption is relatively more complementary with leisure demand. However, as argued by Gordon (2000), high levels of labor supply in the form of a large number of hours worked and later retirement seem to be positively correlated with skill levels, which would imply that for high income individuals consumption is relatively more substitutable for leisure, which in turn would suggest that capital income subsidies are desirable.

A number of papers provide caveats to the strong AS result. One strand of this research focuses on relaxing the AS assumption that all labor is homogeneous (or the different types of labor are perfect substitutes in production). For example, Naito (1999), extending the work of Stiglitz (1982), shows that under these circumstances differential commodity taxation may be desirable even if a nonlinear wage income tax is available. The intuition behind this result is that with different skill levels but a single tax on wage income, differential commodity taxes facilitate income redistribution by affecting wage levels; for example, differential commodity

taxes on goods that tend to be produced with high-skilled labor help to achieve vertical equity goals. However, Saez (2004) shows that this result depends on skill levels being exogenous. In the long run, when skill levels are endogenous as individuals make occupational choices based on after-tax returns, Saez shows that the AS theorem once again obtains since, given individual responses to differences in after-tax wages, the effects of differential commodity taxes can be replicated with the appropriate progressive wage income tax. Since the choice between income and consumption taxation is a long run decision, the Saez result suggests that heterogeneity in labor skills does not provide a compelling argument against a progressive consumption tax.

Saez (2002) relaxes another assumption underlying the AS result – that individuals are homogeneous with respect to their tastes for leisure and consumption. He shows that if demands for leisure and consumption goods vary within a given skill class, then differential commodity taxes may be desirable to supplement the redistribution that occurs under the progressive wage tax, since individuals with the same incomes may have different utility levels. In a dynamic context, the implication is that (1) if more able individuals within an observed income class tend to save more, and (2) as a result of higher savings levels, these individuals attain a higher level of welfare, then taxes on saving (future consumption) are desirable. The practical relevance of this result, however, is open to question. As noted by Bankman and Weisbach (2005), the link between ability and savings behavior has not been conclusively established, although Lawrence (1991) provides some empirical evidence to this effect. More generally, implementing the results of the Saez analysis requires basing tax policy on an inference about the specific nature of unobservable individual utility functions, rather than using the widely accepted approach of basing tax liabilities on a more easily measurable concept such as income or consumption. Note also that Saez does not estimate the quantitative significance of his qualification to the AS result. Finally, in the current environment in which low national savings rates are a perennial concern, the desirability and political feasibility of a policy designed explicitly to penalize savers seems highly questionable.

The implications of the analysis thus far are that consumption-based taxation is preferable to income taxation on horizontal equity grounds, and that at least in theory vertical equity goals can be achieved with a suitably progressive consumption-based tax, such as Bradford's X-Tax or a progressive expenditure tax.<sup>32</sup> Although opinions naturally differ on this issue, a tax system that at least roughly replicates the progressivity of the current tax system across income classes seems to be a prerequisite for reform in most circles; indeed, the charge of the President's Advisory Panel on Federal Tax Reform specified that an "appropriate" degree of progressivity was an essential element of a reformed tax structure. It is also clear that such a result cannot be obtained with the implementation of a Flat Tax or a national retail sales tax plus rebate plan – many studies have demonstrated that although these plans are successful in avoiding a tax increase on lower income households (as long as the Earned Income Tax Credit is maintained), they involve a shift in tax burden from the very wealthy to a broadly defined middle class (Mieszkowski and Palumbo, 2002; Feenberg, Poterba, and Mitrusi, 1997; Altig, Auerbach, Kotlikoff, Smetters and Walliser, 2001; as discussed above, the AAKSW study analyzes incidence in terms of lifetime rather than annual tax burdens.<sup>33</sup> Such a redistribution of tax burdens is widely seen to be undesirable, especially in light of the dramatic increase in income inequality that has occurred over the past thirty years. Indeed, this concern is sufficiently important that Robert Hall, one of the creators of the original Flat Tax plan, now argues that a "tax design to fit the times might have two or even three different tax rates at the personal level" (Hall, 2005, p. 75).<sup>34</sup>

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<sup>32</sup> Note that in addition to the vertical equity rationale, progressive taxation effectively provides social insurance against income fluctuations (Varian, 1980).

<sup>33</sup> As discussed in Fullerton and Rogers (1993), lifetime incidence analyses are preferable to studies based on annual income because they limit mismeasurement due to income fluctuations attributable to cyclical and lifecycle factors. For a dissenting view, see Barthold (1993).

<sup>34</sup> The exact nature of such a progressive consumption tax is of course a critical issue as well. Although discussions of the relative merits of the various approaches is beyond the scope of this paper, see Hall (2005) and Bradford (2005) who make the case for the Bradford X-Tax, and McCaffery (2005) who argues that a progressive personal expenditure tax is the preferred option.

A natural question is whether the current distribution of the tax burden could in practice be replicated under a progressive consumption-based tax. Note that such a replication is facilitated because the recent increase in income inequality is attributable primarily to an explosion in labor compensation levels at the very highest end of the income distribution and because capital income has become increasingly less concentrated over time (Piketty and Saez, 2003). As long as the consumption tax system captured all elements of executive compensation to the same extent as current law (e.g., treating executive pay in the form of stock options as labor compensation subject to the individual level tax), these factors suggest that maintaining the present level of progressivity under a consumption tax would be feasible.<sup>35</sup>

Several recent papers provide additional evidence on this point. Gentry and Hubbard (1997) note that high-income households tend to receive a larger fraction of their capital income in the form of returns to risk-taking and economic rents which, as argued above, are taxed similarly under income and consumption taxes. As a result, they argue that a move from the existing income tax to a consumption tax would be less regressive than it might appear; they estimate that accounting for this factor reduces the decline in the tax share paid by the top 5% of the net worth distribution by more than one third, relative to the assumption that a consumption tax exempts all capital income.

Gordon and Slemrod (1988) investigate the extent to which capital income is actually taxed under the existing income tax. They find that if the US had switched to an X-Tax-type regime in 1983, the aggregate change in personal and corporate income tax revenues would have been virtually zero; that is, the taxation of capital income under the income tax at that time was sufficiently ineffective – primarily due to corporate and personal interest deductions that were not offset by interest income taxation at individual level – that it raised virtually no revenue.

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<sup>35</sup> Note that one potential advantage of the postpaid expenditure tax approach is that it may be relatively less susceptible to evasion in the form of converting labor income to exempt capital income (Weisbach, 2000), although many such strategies are limited under the prepaid Flat Tax and X-Taxes by setting the top individual tax rate equal to the flat business tax rate.

Moreover, they also found that the burden of capital income taxation was borne primarily by lower income investors who hold a disproportionate share of taxable bonds, rather than by higher income investors, who tend to borrow heavily to invest in assets that generate more lightly taxed capital gains.<sup>36</sup> Gordon, Kalambokidis and Slemrod (2004), hereafter, GKS, replicated this analysis for the 1995 structure. They obtained a similar distributive pattern for capital income taxes in the lower and middle income classes, but also showed the very high income taxpayers bore a significant portion of the capital income tax burden in that year. In addition, replacing the income tax with an X-Tax-type regime would have, after adjusting for cyclical factors, cost \$92 billion in revenues, with the revenue increase relative to the analysis of 1983 data coming primarily from reduced opportunities for interest arbitrage by high income taxpayers due to lower interest rates and lower marginal tax rates, as well as the greater taxation of corporate income enacted as part of the Tax Reform Act of 1986. Gordon, Kalambokidis, Rohaly and Slemrod (forthcoming) replicate the analysis for 2004 and find that the amount of revenue from capital income taxation has declined, due primarily to the partial expensing provisions and dividend and capital gains rate cuts enacted in the 2002 and 2003 reforms, to only \$63.8 billion or less than seven percent of combined personal and corporate annual income tax revenues.<sup>37 38</sup>

A separate piece of evidence is provided by the analysis of Altig, Auerbach, Kotlikoff, Smetters and Walliser (2001), who extend the AK model to include 12 lifetime income groups

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<sup>36</sup> Indeed, McCaffery (2005) argues that wealthy individuals can largely avoid taxation over their lifetimes by following a strategy of investing in, and then holding until death, assets that generate capital gains while financing current consumption with debt.

<sup>37</sup> They estimate that this figure would have been \$138.7 billion if the partial expensing and dividend and capital gains tax rate reductions had not been enacted in 2002-03.

<sup>38</sup> Gordon, Kalambokidis, Rohaly and Slemrod (forthcoming) also find that expanding prepaid savings accounts, as was proposed in 2004 and is currently being discussed, could result in a situation where the taxation of capital income loses revenue. This dramatically illustrates the point that piecemeal reforms that cobble together various elements of a consumption tax reform, but do not include all of its features including especially the elimination of interest deductibility, can be highly undesirable. In particular, allowing expensing and exempting capital income from taxation at the individual level without providing for consumption-based tax treatment of interest expense loses revenue while not gaining the advantages of consumption-based taxation in providing uniform tax treatment of all saving and investment decisions and a simplified tax system.

(ten deciles, with the top (bottom) decile split into the top (bottom) 2% and the remaining 8 percent). Their simulations indicate that enactment of an X-Tax with a top marginal rate of 30 percent results in a long run increase in output of 6.4%, coupled with long run welfare increases for each of the twelve lifetime income classes of between 1-2 percent of full lifetime resources (including leisure). These gains, however, are accompanied by transitional losses for the elderly at the time of reform that range between 1-2% of remaining lifetime utility. AAKSW do not analyze the effects of adding transition relief to mitigate these losses. However, they do analyze the effects of the Flat Tax, with and without transition relief in the form of allowing continued depreciation deductions on existing capital assets; they estimate that adding transition relief reduces the long-run increase in output from 4.5% to 1.9%. This suggests that adding transition relief to the X-Tax would significantly reduce, and perhaps even reverse, its long run steady state welfare gains, especially since the windfall loss experienced by the elderly under the X-Tax is relatively large since they face a relatively higher marginal tax rate.

Although the AAKSW analysis does not directly calculate the progressivity of tax burdens, it does suggest that a progressive consumption tax reform could be designed without causing huge redistributions of income across income classes, at least if the growth effects predicted by such models in fact materialize and transition relief is limited. On the other hand, as will be discussed further below, there is still considerable uncertainty about the accuracy of such simulation exercises. Accordingly, as argued by Auerbach and Hassett (2005), it would be reasonable to err in designing a progressive consumption tax on the side of a somewhat more progressive system than such models predict would be necessary to replicate current tax burdens.

#### **D. Additional Issues**

The literature on income and consumption taxation has considered a host of additional issues relevant to the debate. The following discussion briefly discusses a few of these issues.

### The Size of Behavioral Responses

One issue that often arises in discussions of the merits of consumption tax reform is whether the behavioral responses in the simulation models discussed above, especially of labor supply with respect to the after-tax wage rate and of savings with respect to the after-tax rate of return, are unreasonably large, given the relatively modest (although generally positive) responses typically found in the empirical literature (Engen, Gravelle and Smetters, 1997; Gravelle, 2002; Ballard, 2002; Bernheim, 2002). It is certainly true that some of the effects of consumption tax reforms predicted in the literature are significantly larger than those that would be implied by the current econometric literature. For example, using an infinite horizon econometric model of the US economy, Jorgenson and Wilcoxen (2002) estimate that the enactment of a pure flat rate national retail sales tax, with no exemptions or rebates, would result in short run increases in investment of nearly 80% and in labor supply of 30%, with a long run increase in investment of roughly 16.5% and in labor supply of 15%. Large, although typically more moderate, responses also characterize some lifecycle models, especially in the short run.<sup>39</sup>

The validity of this criticism, however, is mitigated by two factors. First, as noted above, much of the recent literature has adopted more conservative assumptions in both model structure (e.g., lifecycle rather than infinite horizon models, perfect foresight rather than myopic expectations, and more careful modeling of the consumption-tax-type features of the existing income tax<sup>40</sup>) and in parameter choices, resulting in more moderate behavioral responses, especially in the long run. Second, it is also possible that the existing econometric literature does not adequately capture the behavioral responses that would occur under fundamental tax

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<sup>39</sup> See Gravelle (2002) for an extended discussion of this and other issues raised by the use of computable general equilibrium model to analyze the effects of consumption tax reforms.

<sup>40</sup> The assumption of myopic expectations tends to overstate the short run responses to the enactment of the consumption tax reform because individuals and firms do not take into account in their behavioral responses the decline in the interest rate over time that occurs with capital accumulation. More careful modeling of the many consumption-tax-type features of the current hybrid income tax implies that the enactment of a consumption tax represents a smaller change from the existing system than if it were a true income tax (Engen and Gale, 1996).

reform. In particular, Summers (1988) argues that econometric estimates of the response of saving to changes in the after-tax rate of return do not adequately capture the human wealth effect that is central to his analysis. In addition, recent research by Prescott (2005) that examines differences in labor supply in the US and Europe suggests that long run labor supply elasticities are considerably greater than those found in the existing micro-based empirical literature (which typically utilizes data over a much shorter time period). Auerbach and Hassett (2005) note that if the AK model is modified to be consistent with Prescott's labor supply elasticity estimates, the effects of implementing a consumption tax on economic growth more than double. Finally, to the extent that models of consumption tax reform, such as the AK model, allow for only a single production good, they do not capture the economic efficiency gains that would arise from taxing investment more uniformly under a consumption tax, including especially investment in owner-occupied housing, relative to other forms of investment. Thus, there is also some chance that existing estimates actually understate the benefits of providing consumption-based tax treatment of capital income.

#### Alternative Models of Saving

As described above, most of the analyses used to estimate the effects of consumption tax reforms are based on the individual lifecycle model. Since this approach represents the “workhorse” model of individual behavior in neoclassical economics, this emphasis is not surprising. Nevertheless, several researchers have suggested that such models may present an incomplete picture of individual saving behavior.<sup>41</sup>

For example, Engen and Gale (1996) argue that much saving reflects a precautionary motive, as individuals attempt to protect themselves against fluctuations in earnings and an uncertain lifetime. They show that when precautionary saving is added to a standard lifecycle

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<sup>41</sup> Indeed, AAKSW note that in their simulations they use a relatively low value of the intertemporal elasticity of substitution, a key parameter in determining saving responsiveness, to compensate for the lack of non-life-cycle saving motives in their model.

model, the savings responses induced by a consumption tax reform fall dramatically, since precautionary saving is relatively unresponsive to changes in after-tax rates of return. As a result, although the consumption tax reform still causes efficiency gains in their model, these gains are significantly smaller than in alternative analyses that do not consider precautionary saving, implying that the efficiency case for consumption tax reform is weaker if precautionary saving is a dominant factor in determining behavior.

A closely related issue is that some individual saving may reflect “target saving” behavior, that is, saving undertaken to meet a goal that is expressed in fixed dollar terms or as a target wealth-income ratio (including precautionary saving), an approach that is referred to as buffer stock saving (Samwick, 1998). In this case, a consumption tax reform may reduce saving, as a higher after-tax rate of return facilitates achievement of the savings target. Carroll and Samwick (1998) estimate that approximately one third of aggregate wealth can be attributed to such precautionary saving motives, which again would imply that lifecycle models overstate the savings responses that would occur with the enactment of a consumption tax reform.

Another issue is that individuals may not be free to borrow any point in their lifecycle, as assumed in most analyses, but instead may be credit constrained, especially early in life. For example, Hubbard and Judd (1986) note that the efficiency gains from a consumption tax reform are muted if there are a large number of individuals who are credit constrained, consume all their after-tax earnings, and are thus disproportionately negatively affected if they face higher wage or consumption taxes under a consumption tax reform. On the other hand, Hubbard and Judd also argue that a progressive consumption tax can address such liquidity problems by reducing tax rates on lower-income credit-constrained individuals, and that such an approach is preferable to a progressive income tax that distorts the saving decisions of other individuals. Moreover, problems with liquidity constraints can be addressed more directly with transfer programs such as the earned income tax credit, and presumably have been alleviated in recent years by easier access to credit card debt and tax-favored home equity loans.

In a related contribution, Aiyagari (1994) notes that for credit-constrained individuals, uncertainties about future income levels may also make some capital income taxation desirable. Specifically, individuals who are concerned about the prospect of future income declines at a point in time in which they are credit constrained will save too much. Accordingly, capital income taxation will be desirable to reduce the level of saving. However, since the discretionary saving of the relatively low-income individuals who are most likely to be credit constrained is currently very low, the empirical relevance of this proposition is unclear. In addition, Chamley (2001) shows that the case for capital income taxation under these circumstances is theoretically ambiguous, as it depends on the sign of the correlation between saving and the marginal utility of consumption, which is theoretically indeterminate. Finally, as suggested previously, the desirability and political feasibility of a tax policy designed explicitly to penalize savers in the current low-saving environment is open to serious question.

Another potentially serious concern is that individual saving behavior is far more erratic than that predicted by any of the models they characterize the conventional economic literature. Specifically, the relatively new field of behavioral economics has suggested a variety of new models of individual behavior that have implications for modeling individual saving behavior (Bernheim, 1997, 2002). To cite just one example, individual decisions may reflect a balancing of the desire for immediate gratification against the desire to engage in more prudent behavior by saving for the future. In this case, the existence of tax preferences for savings under the income tax imply government encouragement of saving that may successfully sway behavior away from immediate consumption. If such preferences are eliminated under a consumption tax reform, saving might actually decline. In particular, Bernheim (1997) notes that since employer-provided pensions would lose their relative tax advantage under a consumption tax reform, employers might reduce the extent of pension coverage. As a result, savings might decline because some individuals would no longer be constrained to save more than they desired, because current matching provisions and non-discrimination requirements may result in

additional saving, and because the existence of employer-provided pension plans may heighten employee awareness of the need to save for retirement. On the other hand, if the consumption tax reform is reasonably perceived as an even more comprehensive government encouragement of saving, then saving might increase even more than predicted in the standard lifecycle model. It seems clear that the implications of the behavioral economics literature for fundamental tax reform merit further study.

### Transitional Issues

Transitional issues are often perceived to present a formidable obstacle to the enactment of a consumption tax reform. Although a wide variety of transitional problems would arise with such a reform,<sup>42</sup> most discussions have focused on two issues. First, in the absence of transition rules, the enactment of a consumption tax reform might result in a one-time fall in equity prices. Under a value-added tax or national retail sales tax, this would most likely occur due to a one-time tax-induced increase in consumer prices that would reduce real asset values. Under the direct consumption tax options, such as the Flat Tax, X-Tax or an expenditure tax, the relative value of existing capital would decline because remaining depreciation deductions would be denied while competing investments in new capital were expensed; an equilibrium with equal after-tax returns on both new and old assets could occur only if the prices of old assets fell.<sup>43</sup> Second, the enactment of the consumption tax reform might also result in a one-time decline in the price of existing owner-occupied housing, which would lose its current tax advantage relative to alternative non-housing investments, and would experience a reduction in demand due to the elimination of home mortgage interest deductions and/or deductions for property taxes. Some

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<sup>42</sup> For example, see Sarkar and Zodrow (1993), Bradford (1996), Pearlman (1996), Shaviro (2000) and Zodrow (1997, 2002).

<sup>43</sup> Note that existing assets could be put on an equal footing with new assets only if all remaining basis were expensed at the time of enactment of a consumption tax reform.

observers have suggested that the resulting declines in asset prices would be severe – on the order of 20-30% (Gravelle, 1995; Cappelletti, Green and Hendershott, 1996).

However, as argued by Lyon and Merrill (2001), Bruce and Holtz-Eakin (1999) and Zodrow (2002), these analyses neglect a variety of factors that would act to mitigate these asset price declines. In the case of equity prices, the most important of these factors are the costs of adjusting the capital stock in response to the enactment of reform, which imply that existing capital would earn above normal returns during the transition to a new equilibrium, and the fact that the returns to capital that reflect economic rents would be taxed similarly under both income and consumption tax regimes and thus would not raise any transitional issues. Simulation results by Auerbach (1996) and Altig, Auerbach, Kotlikoff, Smetters and Walliser (2001) suggest that adjustment costs alone play a significant role in reducing and in some cases eliminating reform-induced declines in equity values.

In the case of housing, Gravelle (1996) and Diamond and Zodrow (1999) note that any tendency toward price declines would also be mitigated by numerous factors, with the two most important being declines in interest rates and reductions in the supply of owner-occupied housing including reductions in new construction, depreciation and conversion to rental housing (which would be treated very generously under the new regime). Simulations by Diamond and Zodrow (2005) suggest that the declines in the price of owner-occupied housing would be on the order of 3-5%, far smaller than those suggested above, and dissipate quickly over time.

Thus, it is far from clear that transition problems are a “show stopper” for fundamental tax reform. Note, however, that such results suggest that transition relief should be kept at a minimum during a move to a consumption tax, especially since, as discussed above, the enactment of transition rules significantly reduces the efficiency gains that can be obtained from such a reform, as well as the progressive impact of a one-time tax on existing capital (Zodrow, 2002). The relatively harsh transition rules that accompanied the enactment of the Tax Reform Act of 1986 suggest the possibility that transition relief could be limited under a consumption tax

reform, as does the fact that any distributional problems associated with are reduced if transition relief is kept to a minimum. However, as argued by Pearlman (1996), political realities suggest that some transition rules are inevitable, and transition rules eliminate the need to create complex rules that limit attempts to avoid a one-time reform-induced transition “hit” on existing capital (Shaviro, 2000; Weisbach, 2003). If so, the costs of such transition rules should be kept to a minimum by using targeted grandfather rules (Zodrow, 1992); for example, transition relief could be limited to allowing continued depreciation allowances only on long-lived assets, especially since recent equipment purchases have benefited from bonus depreciation. In addition, transition rules could be coupled with compensating provisions; for example, under the Flat Tax or X-Tax, phased-out deductions for home mortgage interest could be accompanied by similarly phased-out taxation of the associated interest income, and expensing of new investment might be limited to a fraction of the purchase price for firms with significant continuing deductions for depreciation on existing investment (Hall and Rabushka, 1995).

#### **IV. CONCLUSION**

The debate regarding whether capital income should be subject to consumption-based taxation has raged for many years and is likely to intensify as the United States examines various options for fundamental tax reform. What lessons can be drawn from the voluminous literature on this subject?

The theoretical literature is generally supportive of the desirability of consumption-based taxation of capital income. The strongest case is provided by the infinite horizon models, which argue that the exponentially increasing distortions of future consumption decisions associated with capital income taxation imply that in the long run the optimal tax rate on capital income is zero. A similar result can be obtained in the context of life cycle models, although in this case the results are more tenuous as they depend on assumptions regarding individual tastes that seem plausible, at least to a first approximation, but are unproven. In terms of tax fairness,

consumption-based taxation is desirable on horizontal equity grounds, and a central theoretical result indicates that vertical equity goals can be achieved solely with progressive direct taxes on consumption. Moreover, the relatively low level of revenues collected by the taxation of capital income under the current income tax suggests that approximating the current distribution of the tax burden is possible under a consumption tax. Although this task is facilitated by the increased importance in recent years of wage income in generating income inequality, the concern that a consumption tax, especially in the form of an indirect tax or the Flat Tax, would be significantly more regressive than the current tax system, especially at the highest income levels, pervades the debate. Consumption taxes also have the important advantage that they are inherently simpler than taxes based on income, although some of this advantage would be muted as current “pure” proposals for reform are modified to accommodate a variety of real-world complications. Indeed, one of the most critical factors in advancing the debate is the ongoing development of more fully specified proposals for consumption tax reform, with the work of David Bradford on his ever-evolving X-Tax setting the standard for such endeavors.

As described above, the results of large-scale computable general equilibrium models have played an important role in buttressing the case for consumption tax reform. Many of these models indicate that such a reform would generate impressive improvements in economic performance and gains in economic welfare, especially in the long run. At the same time, it is important to note that these gains are significantly muted, and in a few cases even reversed, once reform is accompanied by transition rules to protect old capital and as the progressivity of the tax system increases. This suggests that transition relief should be kept to a minimum in implementing a consumption tax reform (and the analysis above suggests several reasons why such treatment would be appropriate) and that limiting tax preferences and thus keeping rates relatively low, especially at the high end of the income distribution, is critical to attaining the efficiency gains from such a reform. In addition, it is equally important to note that current models do not capture all of the potential efficiency gains from fundamental tax reform, and thus

may understate the potential for such gains; items often not considered (depending on the model) include the gains attributable to an improved allocation of capital across sectors, especially across housing and non-housing production and across the corporate and non-corporate sectors, increased inflows of foreign capital, the elimination of financing distortions, and any positive externalities (e.g., on the growth rate of technological innovation) from tax-induced increases in investment (Stokely and Rebelo, 1995) – not to mention the gains from a simpler tax system that would be less susceptible to avoidance and evasion.

The discussion in this paper suggests two primary directions for future research that would help clarify the main issues in the ongoing debate.<sup>44</sup> The first is continued evolution of simulation models of consumption tax reforms in order to more fully capture both their efficiency gains and their distributional effects on both current and future generations. The second is continued development of the details of the structures of the various reform proposals, in order to understand more clearly how effectively they would cope with various real-world complications and to help in choosing among the various prototypes for reform. It is clear that the specific structures of consumption tax reforms have significant implications for their economic effects and thus their desirability that must be carefully analyzed for each proposal – and, as noted above, that piecemeal changes in the general direction of consumption tax reform run the risk of losing revenues while falling far short of attaining all the potential gains that might be achieved with a well-designed reform package.

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<sup>44</sup> See also Zodrow and Mieszkowski (2002).

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