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INCOME TAX TREATMENT  
OF HUMAN CAPITAL

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# On the Divergence Between “Ideal” and Conventional Income Tax Treatment of Human Capital

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A substantial majority of all capital is human capital, and most revenue from the income tax is from returns on human capital, wage income. Nevertheless, work analyzing the comprehensive, accrual (“ideal”) income taxation of capital has focused on physical and financial capital. Applying the learning from this work to human capital suggests that human capital is significantly undertaxed under a conventional income tax, the actual result being close to what would be appropriate under a wage or consumption tax. This undertaxation does not, however, directly alter the marginal return to investments in human capital, although it does affect intertemporal behavior and bear on the interpretation of arguments about whether income is a distributively appealing base for taxation.

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Human capital is the substantial majority of all capital (James Davies and John Whalley, 1991), and returns from human capital -- wages -- provide the bulk of revenue from income taxes as well as from proposed alternatives. Most analysis of capital income taxation, however, has focused on the taxation of physical and financial capital. In that realm, a consensus holds that realization-based taxation departs from the requirements of a comprehensive, accrual ("ideal") income tax. Possible remedies include mark-to-market and various schemes for the imputation of interest, as originally suggested by William Vickrey (1939), incorporated in original-issue-discount rules, and extended in the work of Alan Auerbach (1991). Although the taxation of investments in human capital has received some attention,<sup>1</sup> the teaching of the literature on accrual taxation of physical and financial capital has not been systematically applied to human capital.

This paper sketches such an application. It appears that conventional income taxation, even in simple cases lacking investments in human capital or uncertainty, departs significantly from accrual taxation, instead providing tax treatment close to what would be appropriate under wage or consumption taxation. This departure, however, is inframarginal in an important sense, so that investment in human capital relative to other capital is not necessarily distorted. The divergence may, however, affect labor effort in different periods and cause indirect effects on human capital investment and other savings. Moreover, the significant difference between conventional and ideal, accrual taxation of human capital raises questions about arguments concerning whether income is a distributively appealing base for taxation.

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<sup>1</sup>See, e.g., Michael Boskin (1977), Davies and Whalley (1991), Marc Nerlove, et al. (1993), Philip Trostel (1993).

## I. Ideal, Accrual Taxation of Human Capital

The claim in this section is that a conventional income tax ignores changes in the value of human capital over time and taxes only realizations, in the form of wages. To this extent, it is tantamount to a wage tax or consumption tax. How would an ideal, accrual income tax differ?

Consider a worker in his last year before retirement. At the beginning of the year, his human capital has a value equal to the present value of future labor income, which in this case is simply the expected wage income for the year,  $Y$ . (For the moment, ignore uncertainty, so that the expected wage income equals the actual wage income. Imputed, nonmarket income will be ignored throughout.) At the end of the year, the worker will have received wage income of  $Y$  and will hold a stock of human capital now worth zero. Proper accrual income measurement, therefore, implies that his income for the year is *zero*. To be sure, he has received wages of  $Y$ ; but the value of his human capital has fallen from  $Y$  to zero, so he has human capital income of  $-Y$ , for net income of zero.<sup>2</sup> Taxing the wage income of  $Y$ , as under a conventional income tax, thus is quite far from accrual taxation; instead, it is the treatment dictated by a wage tax or a consumption tax, to the extent that earnings are consumed currently. (As is familiar, an income tax differs with respect to earnings that are saved. This constitutes a difference in the treatment of physical and financial capital. The point here is that income that directly flows from human capital is taxed when realized, not when value initially accrues.)

This example can be generalized. When an individual is born, he has some level of human capital,  $K$ . It equals the present discounted value of future earnings net of any costs of earning labor income. In principle -- under an ideal, accrual income tax -- this is income. But under a

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<sup>2</sup>More precisely, some time passes from the beginning of the year until the point in time at which the last paycheck is received, so the present value of the wage income at the outset is slightly less than  $Y$ .

conventional income tax, this income is not taxed. (One could argue that one's at-birth human capital is a gift from one's parents, but an ideal, comprehensive income tax would include gifts, particularly when the value was not initially taxed to the donor. Of course, other inherited assets receive a step-up of basis, but this is understood to be a departure from comprehensive income taxation; also, if human capital were given such a basis, the depreciation deductions described below would, in principle, be available, which would imply that human capital is substantially *overtaxed* by a conventional income tax.)

In each subsequent period in which labor is supplied, there would be wage income and an offsetting depreciation deduction, as in the previous illustration. Until the final period, however, this deduction would tend to be less than current earnings, so there would be additional income subject to tax.<sup>3</sup> In each of these subsequent periods, therefore, the accrual income tax base would again differ from that under the conventional income tax, which taxes wages with no depreciation deduction.

The result both at the moment of birth and in each subsequent period departs substantially from that under accrual income taxation and precisely equals that under wage or consumption taxation (to the extent earnings are currently consumed). Observe that the present value of the tax base under an accrual tax on human capital would be higher (in plausible examples, significantly higher) than the present value of the wage stream. The reason is that the tax base would include  $K$ , which itself equals the present value of all future wages (the entire human capital base under a conventional income tax), plus the difference between the present value of wage

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<sup>3</sup>The income in each period after the moment of birth will equal the interest rate times the value of wealth at the beginning of the period: earnings will be precisely offset by a withdrawal from human capital, leaving the increase in the value of human capital due to the passage of one period of time as the only source of net income. See William Andrews and David Bradford (1988, appendix).

payments and the present value of the depreciation deductions. (The latter difference is analogous to the taxable income stream produced by an ordinary depreciable asset. For a long-lived asset with the depreciation pattern typical for human capital, the present value of depreciation deductions will be substantially less than the present value of the asset.)

Now consider *investments* in human capital. Continuing with the certainty case, both the outlays and the returns would be anticipated, and already reflected in  $K$ . The idea is that it is the *opportunity* to make the investment that produces the value. In investment years, the annual cash flow will be lower and in the return years the resulting cash flows will be higher. But the tax base is no different, in principle, than if the same pattern of cash flows arose naturally, without investment (as when a physical laborer is physically weak and thus not very productive when young but stronger upon reaching maturity).

To complete the analysis, consider *uncertainty*, which is undoubtedly substantial with regard to human capital. The effect of introducing uncertainty is the same as with other assets: when uncertainty is resolved, valuations will change, and the resulting changes in value are income (positive or negative) at the time they accrue. For example, if an individual found the earnings opportunities upon graduation from college to be better than expected, there may be a large, one-time increase in the value of human capital, producing taxable income in that year. Note that graduation per se would not give rise to income, as it would usually be anticipated; indeed, finding a weaker job market than anticipated would imply a drop in income upon graduation.

In summary, under an accrual income tax, income from human capital would arise in three ways: at birth, over time (reflecting the difference between earnings and depreciation on human capital), and at moments when uncertainty is resolved. The conventional income tax does not

attempt to measure any of these three phenomena directly; nor does its taxation of wages when realized constitute a surrogate measure rather than a pure realization system.

An income tax purist might defend conventional income tax treatment of human capital because accrual taxation would be infeasible due to serious valuation and liquidity problems. Nevertheless, it is important to identify the divergences that arise in a realization system, just as has been done for physical and financial capital, both to identify possible behavioral distortions and to assess the equitable appeal of the actual tax base.

In addition, the possibility of proxy accrual taxation of human capital should be considered, in the spirit of proposals from Vickrey (1939) to Auerbach (1991) for other capital. As a thought experiment (and not, I emphasize, a reform proposal), suppose that wage income was taxed *as if* it were part of human capital from the time of birth (that is, ignoring complications of uncertainty, among others). To be concrete, one could gross up wage income in each period to account for the fact that the present value of wages at birth were not taxed at that time and imputed interest has been earned in all subsequent periods. If an individual earned income in the very first period, there would be no gross up, whereas income in years close to retirement might be grossed up by a factor of two or three to reflect that the present value of these wages originally accrued long before and has risen in value throughout time, all free of tax.<sup>4</sup> Although applying a

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<sup>4</sup>The time-zero present value of a dollar of earnings in period  $i$  is

$$\frac{1}{(1+r)^i},$$

where  $r$  is the before-tax interest rate (assumed to be constant for all periods). Had taxes been paid initially, this value would be reduced by the tax rate  $t$  (also assumed constant for all periods). In subsequent periods, it would have accrued interest at an after-tax rate of  $r_a$ , where  $r_a = r(1-t)$ , producing an asset worth

$$(1-t) \left( \frac{1+r_a}{1+r} \right)^i.$$

much greater effective tax rate to earnings later in life may seem strange, this sort of result is actually familiar under an income tax: after all, ordinary savings from earnings are not permitted the consumption tax treatment available to pension savings and IRA's; instead, they are taxed in the same manner as human capital would be under this hypothetical scheme (if one views the entire tax on savings as if it were imposed at the time of withdrawal).<sup>5</sup>

## II. Behavioral Effects

When some capital is subject to accrual taxation while human capital is subject to conventional income taxation, one might expect distortions in investment to result. To examine this hypothesis, suppose that an individual must choose between investing in physical capital or human capital; investment in the latter case would involve direct expenditures or forgone earnings. Assume further that both projects have precisely the same pattern of before-tax returns. The accrual income tax treatment of physical capital is familiar: the returns would be included in income and the cost would be capitalized (not immediately deducted) and depreciated at a rate reflecting the change in the present value of remaining returns. Accrual taxation of human capital would produce a similar result: an investment would raise present human capital (relative to what it would be if the investment were not made), and the increment to human capital would depreciate in the same manner, providing some offset to the additional earnings that would result.

A conventional income tax, however, does not systematically account for human capital.

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The multiplier on current wages necessary to produce this result is

$$\frac{1}{t} - \frac{1-t}{t} \left( \frac{1+r_a}{1+r} \right)^i$$

To illustrate application of this multiplier, if  $r = .06$ ,  $t = .33$ , and  $i = 60$ , the multiplier would be approximately 2.4.

<sup>5</sup>If the multiplier in the previous footnote were applied to withdrawals from pension plans or IRA's, the result would be to replicate the result (in terms of after-tax savings available for consumption) that would have prevailed if the savings had been subject to accrual taxation (at the time of initial earnings and with regard to the subsequent interest).



Forgone earnings are implicitly expensed, which may be more or less favorable than accrual treatment (capitalization with depreciation) depending upon the tax rate structure.<sup>6</sup> Some cash outlays are immediately deductible, whereas others are never deductible. Interestingly, previous analyses of investment in human capital have provided what appears to be correct analysis of how conventional income taxation may distort investment without ever providing a complete statement of what full accrual taxation of human capital would look like.<sup>7</sup>

One might wonder how this can be true when, as previously described, conventional income taxation appears to be systematically generous to human capital. The answer is essentially that the generosity with regard to investments is inframarginal. To illustrate, suppose that *A* has great ability and thus will have high earnings, but only after investing in some education and training. The payoff from such investment will be large; indeed, *A*'s human capital at birth is already very high, and is untaxed (until wages are earned many years in the future). Despite this generosity, however, *A* may not be induced to overinvest. The level of investment will be determined by the *marginal* return. The return from *A*'s initial investment of resources will be high (and undertaxed because of the deferral involved); but, once that investment has been made, the marginal additional investment will have only a normal rate of return. *A* would only make further investments if the after-tax return exceeded that from alternatives. With respect to such

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<sup>6</sup>Boskin (1977) emphasizes that the implicit expensing is generous, for familiar reasons. Others, including Nerlove et al. (1993), argue that it is less favorable because of graduated rates: the implicit deduction is in a low (or zero) tax year and the lost depreciation deductions are in high tax years. But much of forgone earnings are attributable to individuals currently working and subject to tax, sometimes at substantial rates when social insurance taxes are included. Moreover, the deferral of depreciation deductions often would be substantial. I am not aware of empirical work that indicates the relative significance of these effects for prevailing tax systems and varying circumstances of potential investors in human capital.

<sup>7</sup>The discussion in the text, like most prior work, abstracts from two important sets of complications: other deviations from neutral treatment of human capital investments (notably, subsidies to education), and second-best considerations arising from the distortion in labor supply resulting from income taxation (which affects the return to human capital).

marginal investments, the previous analysis is applicable. The fact that  $A$ 's initial investments have a huge return, reflected in his current human capital -- and, in fact, in his at-birth human capital, which has been appreciating as his earning years have come closer in time -- does not bear on his marginal decision. Note that the conventional income tax, unlike a perfect accrual income tax, also tends to miss increases in value from above-market-value investment opportunities in physical and financial capital. (In a competitive economy, such opportunities will be exceptional; in fact, they usually will involve returns from prior investments or rents, a common source of which is the return on individuals' abilities.)

Additional behavioral effects also should be considered. In particular, a conventional income tax encourages individuals to earn more income in later years and less in early years. The reason is simply that if one earns currently and saves for the future, the earnings are immediately taxed and subsequent interest is also subject to tax. By contrast, if one earns more in the future instead, the higher earnings flow is not taxed additionally to reflect the difference in timing. This effect has been noted previously by those arguing that an income tax discriminates against early earners, in comparison to a consumption tax. What has not been realized, however, is that this feature is not inherent in the income tax: an accrual income tax that fully accounted for human capital would recognize that those with greater future rather than present earning power receive later wage income that involves a greater implicit interest component. Taxing that interest -- as by using the proxy method outlined previously -- would eliminate this bias. Because the conventional tax does not account for human capital, individuals' intertemporal consumption choices will be distorted less than otherwise (under a pure income tax) because individuals will accomplish some implicit savings through distortions in the timing of their earnings (that is, in their labor effort in different periods).

This phenomenon is also applicable to investment in human capital versus other forms of savings. If  $B$  wishes to transfer some consumption to the future,  $B$  can forgo some current income by investing in human capital, which will, let us suppose, increase future earnings by an amount reflecting the same before-tax rate of return as would have been earned on ordinary savings. The current income tax favors the human capital investment: the earnings will be subject to tax, but the investment is expensed and there will be no tax on the implicit interest -- that is, on the increase in the value of the resulting human capital as the future moves closer in time. The present income tax is thus like a consumption tax when savings are done via human capital, as explained previously. As with changing labor effort in different time periods, additional investment in human capital involves some distortion but serves to reduce the intertemporal distortion in consumption.

### **III. Tax Equity and Comprehensive Income Taxation**

Many commentators have favored an income tax because they believe that income best measures "ability to pay." Thus, a comprehensive income tax, involving the best practical approximation of accrual taxation of capital, is often proffered as a norm in tax policy analysis. If one truly favors full accrual taxation of all income from capital, however, the present analysis implies that one should support radical tax reform that increases labor's share in the tax base (recall the proxy approach that grosses up wages earned later in life); at a minimum, such reform might seem appropriate if proposals for moving closer to accrual taxation of physical and financial capital were adopted. If such taxation of labor income is disfavored, an income tax purist then would have to explain why it made sense to insist upon a comprehensive income tax norm with respect to a minority of capital while favoring something close to a consumption tax norm with

respect to the majority of capital -- human capital.<sup>8</sup>

I do not, however, find these sorts of arguments for tax reform persuasive. Whether human capital should truly be viewed as "capital" for purposes of defining "income" involves a semantic dispute. Much debate about the relative merits of income and consumption taxation and about defining the base for either tax is grounded in ad hoc, intuitive appeals, as to definitions of income and unelaborated intermediate norms like "ability to pay." Like others (see Joseph Stiglitz and Boskin, 1977), I believe that normative analysis of tax policy must be based directly upon first principles, namely a theory of distributive justice embodied in an explicit social welfare function. Although such norms may prove controversial, at least it is the case that argument at this level addresses the relevant questions.

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<sup>8</sup>One might object to accrual taxation of human capital because such capital is illiquid, but this is not entirely true, many individuals are net savers when young in any event, and proxy taxation at the time wages are earned is feasible. Moreover, concerns for liquidity should also call into question accrual taxation of other capital.

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