Clarifying the Relation Between Base-Broadening and Effective Marginal Tax Rates

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We advance three propositions:

First. The common claim made in connection with tax reform – that by broadening the tax base we can lower marginal tax rates – is wrong. Its corollary – that by broadening the base we can raise revenue without raising marginal tax rates – is equally wrong.

Second. The profession knows this. Proposition #1 is not new. There are multiple strands of the economics literature that refer to this principle. Yet economists have nonetheless widely embraced the misleading vocabulary that conflates nominal marginal tax rates with effective marginal tax rates.

Third. This inconsistency between economic theory and public rhetoric has been incorporated into economic models and resulted in invalid claims by modelers, including exaggerated projections of the growth effects of tax reform proposals and erroneous economic estimates of the dynamic revenue yield of base-broadening tax proposals.

Proposition #1: Tax Preferences Lower Effective Marginal Tax Rates

It has become standard to speak of the principal distortion of income taxes as that affecting the "labor-leisure" tradeoff. [i] But there is no such tradeoff. A tradeoff is between two

attractive (or two unattractive) options from which one must choose. This is not the case here. Leisure is desirable. Labor is not. Labor, unlike leisure, yields disutility. Waking up in the morning, a decision between work and leisure – if that were indeed the choice – would be easy to make. Leisure always trumps work.[ii]

The tradeoff is, of course, between leisure and consumption. Work is just the means to acquire the income needed to underwrite consumption. Labor supply is what falls out of the decision we make with respect to the leisure-consumption tradeoff. Recognizing this explicitly is an aid to thinking correctly about tax distortions of the work decision: the tax wedge we have to concern ourselves with is anything that either reduces the remuneration of work or raises the cost of consumption.

No one denies that sales taxes and VATs distort the decision as effectively as income and payroll taxes. Yet the same is true of excise taxes, which are often left out of the discussion. Moreover, the effective marginal tax rate not only must include all these things, it must take account of all the consumption that is *not* taxed by these levies. If we want to measure the effect of income taxes on the labor decision, we must look to how they play out against a particular pattern of consumption, some of which is taxed and some of which is not. What should be evident from this observation is this: in the presence of significant deductions and exemptions, nominal marginal income tax rates tell us little about the effective marginal tax rate on consumption. Therefore, nominal rates are inappropriate measures of the tax wedge distorting the labor-supply decision.[iii]

The easiest way to see this is to think in terms of the deduction for state and local income taxes. It is widely acknowledged that deductibility at the federal level effectively reduces the marginal tax rate at the state level. The combined effective marginal tax rate of the two levels of taxation is less than the sum of the two marginal rates. An alternative way of viewing it is that the effective federal marginal tax rate is lower than the nominal federal tax rate. This occurs for no other reason than that – out of each additional dollar of income – some portion of the taxpayer's spending will be for state and local taxes. Because this part of her consumption package is not part of the base of the federal income tax, the effective marginal federal tax rate is lower than indicated by the nominal rate.

As a general rule, all exemptions and deductions – unless capped – share this characteristic. As income rises, a taxpayer will spend some portion of the additional dollars of income on medical care/health insurance, charity, and mortgage interest, to name a few. The proportion may rise with income or it may fall. But we can expect that the marginal dollar of income from working will always include some non-taxed activities as part of the consumption package that the dollar finances.

Calculating the effective marginal tax rate is complicated by a number of factors. Because distortions are introduced by the tax preferences, for example, cross elasticities between tax-preferred and non-tax-preferred expenditures come into play. How much the effective marginal tax rate is affected by deductions and exemptions depends principally on the marginal propensity to consume the preferred item out of an additional dollar of income. If one knows this, one has a good first approximation of how preferences alter the effective marginal tax rate

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Table 1 shows, from aggregate IRS data, the average and marginal propensity to spend on deductible categories of consumption (the latter measured as the change in deductions divided by change in income from the previous income class) for itemized deductions for state and local taxes. As suggested by the table, the marginal and average deduction for income taxes is similar in most income brackets, while the marginal deduction for property tax tends to exceed the average deduction over many of the income classes – although it is less than the average (and quite small) at very high income levels. Table 2 examines the two other major itemized deductions: mortgage interest and charitable contributions. The relationships between the average and marginal deduction vary across the income classes.

Table 1: Average and Marginal Tax Deductions, Returns with Itemized Deductions, 2011

Income Class ($thousands)	Average Income Tax Deduction	Marginal Income Tax Deduction	Average Property Tax Deduction	Marginal Property Tax Deduction
0-50	2.7%	3.3%	5.5%	12.7%
50-75	3.6%	4.1%	4.3%	10.1%
75-100	3.9%	4.3%	3.6%	8.8%
100-200	4.3%	4.6%	3.2%	7.1%
200-250	4.9%	4.2%	2.9%	5.7%
250-500	5.2%	5.5%	2.5%	4.5%
500-1000	5.8%	4.3%	1.9%	2.6%
Over 1000	6.3%	6.1%	0.7%	0.5%

Source: Internal Revenue Service, Statistics of Income, Table 2.1

Table 2: Average and Marginal Deductions for Mortgage Interest and Charitable Contributions, Returns with Itemized Deductions, 2011

Income Class	Average Mortgage Interest Deduction	Marginal Mortgage Interest Deduction	Average Charitable Deduction	Marginal Charitable Deduction

0-50	12.7%	6.4%	4.1%	2.7%
50-75	10.1%	8.4%	3.4%	2.9%
75-100	8.8%	7.6%	3.0%	2.6%
100-200	7.1%	15.0%	2.5%	5.6%
200-250	5.7%	4.0%	2.4%	1.4%
250-500	4.5%	3.1%	2.5%	2.5%
500-1000	2.6%	4.1%	2.5%	1.4%
Over 1000	0.5%	1.0%	4.0%	$4.4

Source: Internal Revenue Service, Statistics of Income, Table 2.1

What is clear from these tables is that all of these major deductions have significant marginal effects. Gravelle and Hungerford (2013) provide diagrams that suggest many other exclusions and tax benefits, such as tax-exempt interest and pension benefits, are more concentrated in higher incomes, suggesting marginal effects. The only major tax expenditures they examined that eventually ended at some income level were the earned income tax credit and the child credit.

Even without knowing these details or having the ability to make these calculations, we still know three things about base-broadening and marginal tax rates. We know first that there is no guarantee that the effective marginal tax rate will even fall at all in a swap of base-broadening for nominal tax rate reduction reform. Depending on consumption characteristics, the rate could even rise. Second, we know that even if it does fall, that it will not fall as much as the nominal rate. Third, we also know that increasing revenues by means of base-broadening is not free in terms of the effects of marginal tax rates on incentives. Virtually any base-broadening in the form of eliminating or restricting deductions or exemptions will raise the effective marginal tax rate by virtue of the fact that some income now faces a positive tax rates instead of one of zero.

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These facts don't make tax reform undesirable. Deductions, exemptions, and other preferences still cause economic distortions. These distortions result in Harberger triangles of deadweight loss to the economy. But it is these distortions that provide the principal economic benefit of tax reform, not the effects on labor supply.

Proposition #2: The Profession Knows This

The standard model which introduces an undergraduate student to labor economics is that in which labor is characterized as yielding disutility and in which the labor supply decision is based on the utility mapping of preferences between consumption and leisure. Moreover, it is standard in the modeling of the substitution of a consumption tax for an income tax to account for the effects of both tax regimes in measuring the implications for labor supply. No one disputes that a tax on consumption affects the labor supply decision in much the same way as an income tax. Indeed, it is easily demonstrated that a consumption tax is equivalent to a wage tax (plus a lump sum levy on existing wealth).

Not only is the relation between these taxes and marginal tax rates commonly understood within the profession, but so have been the effects of *uneven* taxation of consumption (or income) on labor supply. Although much of the focus of uneven taxation has been on the distortion created between the tax-preferred and non-tax-preferred goods, considerable attention has been placed as well on the effects of uneven taxation on the overall marginal tax rate, recognizing that not taxing part of consumption lowers the marginal tax rate relevant to labor

supply.

We point especially to the explicit and systematic treatment the subject has received in the field of environmental taxation. In particular, the "tax interaction" effect of Pigovian taxes is precisely the point made in proposition #1 above (Bovenburg, 1999; Fullerton and Gravelle, 1998; Goulder, 1998; and Parry, Williams, and Goulder, 1999.)

For several years it had become fashionable for advocates of environmental taxes to speak of the possibility of a "double dividend" resulting from the imposition of a pollution tax, such as on carbon or other climate-affecting emissions. The idea was that a Pigovian tax would not only remedy inefficiency resulting from unpriced externalities, but that the revenue resulting therefrom could be used to lower other taxes and reduce their deadweight loss as well.

The tax interaction literature shows, however, that "double" is a substantial overstatement, and that indeed even "single" may be a bit of an exaggeration, depending mostly on whether the underpriced item is a substitute or complement with leisure. The reasoning is simple. Imposition of the Pigovian tax, while remedying the mispricing caused by the externality, increases taxes on consumption, increasing the deadweight loss from the leisure-consumption tradeoff. Recycling the resulting revenue just undoes that latter effect.

For some, this may defy intuition, since the Pigovian tax is just raising the price of the item in question to that which should exist if markets were perfect. However, the underpricing of any consumed item due to uncorrected externalities is indistinguishable from a negative tax on

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that item. A negative tax on any part of the consumption package therefore reduces the wedge between the before-tax and after-tax price of consumption. In the presence of an income or consumption tax, the underpricing of any consumption component therefore has the effect of mitigating the deadweight loss from the tax on consumption overall. It reduces the gap between marginal private cost of consumption facing consumers and the before-tax income they devote to consumption.

Eliminating the distortion caused by the externality, therefore, interacts with the existing distorting tax on income or consumption. Imposing the Pigovian tax raises marginal tax rates on consumption and decreases labor supply (assuming substitution effects outweigh income effects). Recycling revenue from a Pigovian tax to reduce other distorting taxes, therefore, doesn't necessarily provide an *additional* efficiency benefit. It ameliorates the additional consumption/leisure distortion that was exacerbated by its imposition in the first place. For a given set of cross-elasticities, recycling the revenue may add some efficiency gain to that already achieved by remedying the distortion from the externality, it may be just enough to keep the new tax from worsening the consumption-leisure tradeoff, or it may actually come up a bit short because even recycling all the revenue is inadequate to fully relieve the added distortion.

Base-broadening and Pigovian taxes are exactly analogous in this regard; the effects of base-broadening map one-for-one into the models used to demonstrate the tax-interaction effects. The effect of base-broadening on effective marginal tax rates is clear and unambiguous. Moreover, both of these phenomena are straightforward applications of principles spelled out in the optimal taxation literature. It doesn't matter that the new tax reduces an existing distortion

(caused by either by tax preferences or by externalities), it still affects choices on other margins in which some endeavors are taxed and others are not. This is something we teach. Everyone taking a course in graduate-level public finance learns it. There is nothing new about proposition #1.

Proposition #3: Many Analysts Forget It When They Produce Estimates

Perhaps it is because we rely so heavily on mathematics to maintain rigor in our work, that we forget that language does the same thing. After all, language – like math – consists of symbols to which we assign meaning (semantics), which are then manipulated in accordance to a set of agreed-upon rules (syntax), from which we may reason to conclusions. Yet, if we carelessly allow our vocabulary to get sloppy – using a word or set of words in a way that is inconsistent with the way we use them elsewhere – the outcome will be as erroneous as it would be if we were to accidentally transcribe an "x" in equation (3) to a "z" in equation (3b).

The casual embrace of the language of a labor-leisure tradeoff has done just that. By dropping the consumption element out of their public discussion, analysts have repeatedly failed to model the effects on labor supply of the higher taxes on the consumption package resulting from income tax base-broadening. The error is ubiquitous.

In political discourse, it may be expected. The following from a *Washington Post* editorial ironically yields its own double dividend of making the same analytical mistake with

respect to both Pigovian taxes and base-broadening. The editorial, entitled "Tax Reform on the Table" is largely a suggestion for considering a carbon tax. They state:

> "Those still worried about the economic effects need only consider how it could fit into a bigger tax-reform package such as the one Mr. Baucus wants to produce. Surely, Republicans should want to replace economy-sapping taxes on labor or business in return for a much more efficient tax on pollution." (*Washington Post*, 2013.)

In discussing tax reform, economists also sometimes miss this effect. Sullivan (2012) focuses specifically on base broadening and marginal rates, quite rightly pointing out that base broadening can affect marginal tax rates by pushing taxpayers into a higher bracket. He also notes that a percentage-of-income cap on itemized deductions can lower marginal tax rates because allowed deductions rise with income. He does not, however, address the more important effect of reducing the share of tax preferred income on effective marginal rates.

More significantly for economists, there are the examples in our own modeling. The first example comes from estimates of the economic benefits of tax reform. We see these estimates include the increase in output coming from additional labor supply as marginal tax rates are reduced. These reductions are measured almost exclusively in terms of changes in the nominal tax rates.

The analysis by Diamond (2012) of Governor Romney's plan to cut marginal tax rates is an example. Although the tax cut is to be paid for with (unspecified) changes to the tax base

which could increase effective marginal tax rates, this analysis does not include marginal effects of any of these potential changes, but rather projects (using an overlapping generations model) the effect on output of the response to a marginal rate reduction. For that matter, the effects are larger than they would be for a 20% tax cut not offset with other provisions because income effects (which tend to reduce labor supply) are eliminated. Rosen (2012) similarly focuses on marginal rates in projecting potential growth effects and refers to the Diamond study, which was widely circulated during the Presidential campaign (see Dubay, 2012, and Hubbard, Mankiw, Taylor and Hassett, 2012).

We see the error, in addition, in efforts to generate dynamic analyses of the revenue effects of proposals that involve base-broadening. The Joint Committee on Taxation (2006) analyzed a proposal to reduce marginal rates and broaden the base, including eliminating itemized deductions and other deductions, as well as including employee benefits, provisions that would have broad effects on effective marginal tax rates. They outlined the expected macroeconomic benefits as part of their analysis. In doing so, they based their analysis on changes in nominal tax rate – just as in the case of the Diamond analysis.[iv]

Not every analytical effort along these lines has shown this confusion. We note, for example, that the Congressional Budget Office took specific account of the phenomenon in its analysis of the President's proposal to convert the existing health insurance exclusion and medical expense deduction into a single standardized deduction (CBO, 2007). In that report's Appendix C (pp 59-61), the effects of changing the current treatment on effective marginal tax rates is properly described and estimated.

Two Recommendations Urged Upon Our Colleagues.

First. It is time to start doing these estimates correctly. Nominal marginal rates are not the proper measure of the incentive effects on labor supply (or saving decisions) by households. Effective marginal rates are essential for properly projecting growth effects and estimating dynamic scores. These rates must incorporate not only the nominal tax rate on taxable income, but the effect on untaxed income. They should also incorporate all taxes on consumption (including excise taxes and implicit negative taxes from the absence of proper environmental pricing). Although a proper analysis requires knowledge of cross-elasticities, lack of complete information is not a reason to resort to nominal rates. Adjusting effective rates proportionately to the estimated marginal propensity to consume the item(s) that are added back into the tax base will still yield an estimate vastly superior to the nominal rate.

Second. It is time to be more careful with our professional vocabulary. George Orwell (1946) pointed out that not only does sloppy thinking produce sloppy writing, but the reverse is true. If we employ terms in communicating ideas to the public that have different meanings among ourselves, we create confusion. All too often we attempt to co-opt non-professional vocabulary in the hopes that we will be listened to. We do this, for example, by saying "jobs" when we really mean income, or when we try to give credence to illegitimate concepts such as nations' "international competitiveness." When we do this we sow confusion. And as the example of base-broadening's effect on marginal tax rates show, we do not just confuse and

mislead our audience. We do it to ourselves.

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We ignore, for the purpose of this paper, analogous distortions claimed to arise with respect to saving and consumption. There are similar rhetorical problems and errors associated with these, as well, and analogous observations may be drawn in connection with shifts from income to wage taxes.

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Of course, it is widely recognized that there are psychic rewards to work. But we know that, however significant the rewards of work are, they are overwhelmed by the disutility of it. If this were not the case, governments around the world would not be facing crises in their pension systems. The fact that they do is evidence that the vast majority of employees are prepared to stop working as soon as they can afford to.

iii   By the nominal rate, we mean the effective marginal tax rate on *taxable income* as opposed to the rate on *all income*. The nominal rate may seem an improvement on the statutory rate in that the former will account for phase-outs and and phase-ins not represented in the latter, and reflect the effects of base changes on taxpayers' location among rate brackets. But nominal rates share the same shortcoming as statutory rates in that they are still unadjusted for the income of taxpayers that that is untaxed on the margin.

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Because JCT is not explicit in its methodology, our claim here is somewhat speculative. It is clear based on other documents that the JCT accounts for the type of marginal effects Sullivan (2013) discussed. See for example, JCT (2005). Our interpretation of what JCT shares with the reader in the 2006 study is that the study did not adjust marginal tax rates for the base-broadening effects that we are concerned with (other, possibly, than the deduction for state and local income taxes). JCT's approach appears to have been to calculate marginal rates for each source of income by using their tax model to calculate tax liability first with the existing income, and then

increasing that income, re-calculating the tax liability, and then comparing the two liabilities. This methodology is outlined in JCT (2003). While JCT increases income in these simulations, there is no indication that it also increases deductions or adjust for exemptions that would grow with that income. Moreover, the labor force response JCT gets from its simulation points to a reduction in marginal rates that could only be achieved by not accounting for the effects of deductions and exemptions in the way that we explain here.