NBER WORKING PAPER SERIES

IS THE TAXABLE INCOME ELASTICITY SUFFICIENT TO CALCULATE DEADWEIGHT LOSS? THE IMPLICATIONS OF EVASION AND AVOIDANCE

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Working Paper 13844
http://www.nber.org/papers/w13844

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
March 2008

I have benefited from discussions with Alan Auerbach, Caroline Hoxby, John Friedman, David Gamage, Adam Looney, Wojtek Kopczuk, Emmanuel Saez, Joel Slemrod, Shlomo Yitzhaki, and Philippe Wingender. Funding from the Hoover Institution is gratefully acknowledged. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

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JEL No. H21,J22,J33

ABSTRACT

Since Feldstein (1999), the most widely used method of calculating the excess burden of income taxation is to estimate the effect of tax rates on reported taxable income. This paper reevaluates the taxable income elasticity as a measure of excess burden when individuals can evade or avoid taxes. In many cases, part of the cost of evasion and avoidance reflects a transfer to another agent in the economy. I show that in such situations, excess burden depends on a weighted average of the taxable income and total earned income elasticities, with the weight determined by the marginal resource cost of sheltering income from taxation. This generalized formula implies that the efficiency cost of taxing high income individuals is not necessarily large despite evidence that their reported incomes are highly sensitive to tax rates.

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1 Introduction

In an influential pair of papers, Feldstein (1995, 1999) showed that the excess burden of income taxation can be calculated by estimating the effect of taxation on reported taxable income – the "taxable income elasticity." Feldstein's taxable income approach has since become the central focus of the literature on taxation and labor supply because of its elegance and practicality. The approach is elegant because one does not have to account for the various channels through which taxation might impact individual behavior (e.g. changes in hours, effort, training) to measure efficiency costs. It is practical because tax records containing data on reported taxable income are widely available.

The empirical literature on taxable income has generally found that elasticities are large for the highest earners (top 1%), and relatively small for the rest of the income distribution (see e.g., Lindsey 1987, Slemrod 1998, Gruber and Saez 2002, Saez 2004). This finding has led some to suggest that reducing top marginal tax rates would generate substantial efficiency gains.[1]

The taxable income reported by high income individuals is very sensitive to the tax rate partly because of tax avoidance and evasion (Slemrod 1992, 1995).[2] For example, individuals take compensation in the form of untaxed fringe benefits or use unmonitored offshore accounts to underreport taxable income. Does the efficiency cost of taxation depend on whether the taxable income elasticity is driven by avoidance or evasion rather than changes in labor supply? Existing studies (e.g. Feldstein 1999, Slemrod and Yitzhaki 2002, Saez 2004) suggest that the answer is no, as long as there are no changes in tax revenue from other tax bases. For example, Slemrod and Yitzhaki remark that "Feldstein's (1999) claim about the central importance of the elasticity of taxable income generalizes to avoidance and evasion."[3] The intuition underlying this conclusion is straightforward: an optimizing agent equates the marginal cost of sheltering $1 of income from taxation with the net marginal cost of reducing earnings by $1, so the reason that reported taxable income falls does not matter for efficiency calculations.

[1] Academic examples include Gruber and Saez (2002) and Feldstein (2006). The Joint Economic Committee (2001) has argued in favor of lowering top rates based on the taxable income evidence. See Goolsbee (1999) for a critique of the empirical literature on taxable income.

[2] Income shifting can also occur intertemporally. When tax changes are anticipated, individuals appear to retime income substantially (Goolsbee 2000). I abstract from such intertemporal effects, focusing on the question of how to measure efficiency costs using estimates of the long-run effect of taxes on behavior.

[3] Slemrod and Yitzhaki go on to emphasize that there are two critical assumptions underlying this claim that deserve further attention: no corner solutions and no externalities. The present paper essentially develops a formula for excess burden when the second assumption is violated. I discuss the connections between this paper and existing work in more detail below.

In this paper, I reevaluate the taxable income elasticity as a measure of deadweight loss in the presence of evasion and avoidance ("sheltering" behaviors).[4] Existing studies in the taxable income literature typically model sheltering as having purely a resource cost, i.e. generating a loss in economic output. However, the cost of sheltering could instead reflect a transfer to another agent in the economy. For instance, an individual may be deterred from tax evasion because of the expected cost of being fined by the tax authority or other agents in the private sector. An executive may be deterred from taking compensation in the form of perks (e.g. a better office or company cars) because he is forced to share some of these benefits with other employees.

The taxable income formula does not hold in the presence of such "transfer costs." Indeed, if tax avoidance has only transfer costs, it generates no efficiency loss at all because it leads to a reallocation of resources across agents rather than a reduction in total output. In this case, the excess burden of taxation depends purely on the *total* earned income elasticity – that is, the effect of taxes on "real" labor supply choices that affect total earnings.

In the general case where sheltering entails both resource and transfer costs, I derive a simple formula for excess burden that depends on a weighted average of the reported taxable income and total earned income elasticities. The weight is proportional to the marginal resource cost of sheltering. Intuitively, in the presence of transfer costs, the agent does not equate the marginal *social* costs of sheltering and reducing labor supply. This wedge in marginal social costs makes it necessary to distinguish evasion and avoidance responses from changes in labor supply in the formula for excess burden. The formula developed here is unaffected by revenue offsets through other taxes and by variations in the specification of the agent's choice problem. In this sense, the formula generalizes Feldstein (1999) by providing a robust method of calculating excess burden when the private and social costs of sheltering differ.

The results in this paper have several precedents in the literature, notably in the work of Joel Slemrod and co-authors. It is widely recognized that the calculation of excess burden is complicated by revenue offsets in the presence of multiple taxes (e.g. Slemrod 1998, Gordon and Slemrod 2002, Slemrod and Yitzhaki 2002, Auerbach and Hines 2002, Saez 2004). In addition, Slemrod (1995) and Slemrod and Yitzhaki (2001, 2002) point out that fines lead to a difference between the private and social costs of evasion, creating an added term in marginal revenue that must be taken into account when computing excess burden.

[4] The distinction between illegal evasion and legal avoidance is not critical for the analysis in this paper, so I use the term "sheltering" as a general description of all evasion and avoidance responses.

This paper contributes to the taxable income literature in two ways. First, it shows how transfers between agents *within* the private sector affect the calculation of excess burden. Existing formulas that adjust for revenue offsets (e.g. Slemrod 1998, Saez 2004) are not valid in the presence of private transfers. Second, even ignoring within-private-sector transfers, the formula here offers an alternative approach to measuring the excess burden of taxation in the presence of revenue offsets and fines. The Slemrod and Saez formulas adjust Feldstein's (1999) formula by adding terms for the change in revenue from other taxes In contrast, the formula here depends only on behavioral responses to the income tax coupled with an estimate of the marginal resource cost of sheltering. This permits calculation of the excess burden of an income tax without fully characterizing its complex interactions with other tax bases through evasion and avoidance responses.

The simplicity of the formula facilitates empirical implementation and yields a more precise understanding of the extent to which sheltering leads to excess burden. For instance, in the extreme case of pure transfer costs, the analysis shows that sheltering has *zero* efficiency cost when the added term mentioned by Slemrod and Yitzhaki is taken into account, completely severing the link between the taxable income elasticity and excess burden. The Feldstein formula implicitly assumes that the marginal resource cost of every evasion and avoidance response equals the marginal tax rate (approximately 40% for high-income taxpayers in the U.S.). Illustrative calculations of resource costs suggest that the deadweight losses caused by some sheltering behaviors could be an order of magnitude smaller than 40 cents per dollar sheltered (see section 3). Hence, one cannot conclude that the efficiency cost of taxing high income individuals is large directly from the evidence of large taxable income elasticities.

2 Measuring Excess Burden

This section presents formulas for the excess burden of a linear income tax under various assumptions about the costs of sheltering. As a reference, I first derive Feldstein's (1999) formula in a labor supply model without sheltering. Next, I consider a model where individuals can avoid or evade taxes by paying a real resource cost. I then consider a model where sheltering has no resource cost but entails transfers to another agent. Finally, I consider the general case where sheltering has both resource and transfer costs. To simplify the exposition, I abstract from income effects by assuming quasilinear utility in the main text; a model with curved utility is considered in the appendix.

2.1 Benchmark Model: No Sheltering

Consider the canonical model of labor-leisure choice, where the individual chooses how many hours to work (l) at a fixed wage rate w. Let t denote the tax rate on labor income, y unearned income, c consumption, and $\psi(l)$ the disutility of labor. The individual's problem is to

$$\begin{aligned}\max_l u(c,l) &= c-\psi(l)\\ \text{s.t. } c &= y+(1-t)wl\end{aligned}$$

As is standard in efficiency cost calculations, the conceptual experiment I consider is to measure the net dollar-value loss from raising the tax rate and giving the money back lump-sum to the taxpayer. For this purpose, I define social welfare as the sum of the individual's utility (which is a money metric given quasilinearity) and tax revenue:

$$W(t)=\{y+(1-t)wl(t)-\psi(l(t))\}+twl$$

Since the individual has chosen l to maximize utility, the envelope condition implies that an increase in t has only a mechanical first-order effect on the agent's utility (i.e. $\frac{\partial u}{\partial t}=-wl$). Hence, behavioral responses can be ignored when differentiating the term in the curly brackets, yielding the following expression for the marginal excess burden of taxation:

$$\begin{aligned}\frac{dW}{dt} &= -wl+wl+t\frac{\partial wl}{\partial t}\\ &= t\frac{\partial TLI}{\partial t} \qquad (1)\end{aligned}$$

where $TLI=wl$ is taxable labor income. Feldstein (1999) proved that (1) holds even in a model where individuals make a vector of labor supply decisions (l_1,...,l_n) such as hours, training, and the type of job held. Thus, the taxable income elasticity ($\frac{\partial TLI}{\partial t}$) is a "sufficient statistic" to calculate deadweight loss in a general multi-input labor supply model.

2.2 Sheltering with a Resource Cost

Now suppose the individual can shelter \$$e$ from taxation by paying a cost $g(e)$. The sheltering of \$$e$ could occur either through legal tax avoidance (e.g. setting up a trust) or illegal tax evasion (e.g. under-reporting). The resource cost $g(e)$ reflects the economic opportunity cost of sheltering

\$$e$, i.e. the loss in total output from this activity. For example, $g(e)$ could reflect the loss in profits from transacting in cash instead of electronic payments or the cost of choosing a distorted consumption bundle to avoid taxes.

The individual chooses labor supply (l) and how much income to shelter (e) to

$$\begin{aligned} \max_{l,e} u(c,l,e) &= c - \psi(l) - g(e) \\ \text{s.t. } c &= y + (1-t)(wl - e) + e \end{aligned} \tag{2}$$

Social welfare is:[5]

$$W(t) = \{y + (1-t)wl(t) - e(t)) + e(t) - g(e(t)) - \psi(l(t))\} + t(wl - e)$$

Since the individual has chosen both l and e optimally, we can again ignore behavioral responses when differentiating the term in the curly brackets. Hence

$$\frac{dW}{dt} = -[wl - e] + [wl - e] + t\frac{\partial [wl - e]}{\partial t} = t\frac{\partial TLI}{\partial t} \tag{3}$$

where $TLI = wl - e$ is reported taxable income. Equation (3) shows that Feldstein's (1999) formula holds in this model. From an efficiency perspective, it does not matter if taxable income falls with t because of a change in labor supply (l) or a reporting effect (e). Intuitively, the agent optimally sets the marginal cost of reporting \$1 less to the tax authority ($g'(e)$) equal to the marginal private value of doing so (t). Since the agent supplies labor up to the point where his marginal disutility of earning another dollar equals $1-t$, the marginal social value of earning an extra dollar (net of disutility of labor) is t. Hence, the marginal social costs of reducing earnings and reporting less income are exactly the same at the individual's optimal allocation, making it irrelevant which mechanism underlies the change in TLI for efficiency. This is the intuition underlying studies which argue that the taxable income elasticity is sufficient to calculate deadweight loss even in the presence of evasion and avoidance.

[5] This specification of social welfare assumes that we give full weight to the utility of tax evaders. Some authors (e.g. Sandmo 1981) point out that it may be more appropriate to give less weight to evaders in social welfare on ethical grounds. The qualitative results below would be unaffected by differential weighting of e and wl in W.

2.3 Sheltering with a Transfer Cost

Part of the cost of sheltering may reflect a transfer across agents. The leading example of such transfer costs are fines levied for tax evasion through audits. A fine has a private cost to the tax evader but has no social cost if the agent is risk neutral, because it simply redistributes output from the agent to the government. If the agent is risk averse, the increased uncertainty created by evasion and random audits constitutes a resource cost. To simplify the exposition, I analyze the risk neutral case in the main text. In the appendix, I show that the general formula derived in section 2.4 can be easily extended to the case with risk aversion with an appropriate redefinition of $g'(e)$ to include the loss of utility due to added risk.

I model audit deterrence of evasion using a simple variant of the framework developed by Allingham and Sandmo (1972). Suppose that an individual is audited with probability $p(e)$, where the probability of audit increases with e – egregious under-reporting may lead to a higher chance of being caught. If caught, the individual must pay his tax bill and in addition a fine $F(e)$. Let the expected cost of evading \$$e$ be denoted by $z(e,t) = p(e)[te + F(e)]$. In this subsection, I assume that audits are costless and that evasion has no other real resource cost. In addition, assume that z is a strictly convex function of e to guarantee an interior optimum in e. Aside from the convexity assumption, the derivation that follows does not depend on the specification of $z(e,t)$. Hence, although I have given a micro-foundation for $z(e,t)$ in terms of auditing for concreteness, the results below apply for *any* transfer cost z, i.e. any cost of sheltering which has a positive externality of equal size on another agent. I return to this point and discuss other examples of such transfer costs in section 2.6.

The individual chooses e and l to

$$\begin{aligned} \max_{e,l} u(c,l,e) &= c - \psi(l) \\ \text{s.t. } c &= y + (1-t)(wl-e) + e - z(e,t) \end{aligned}$$

This agent's problem is formally identical to that in (2). However, there is a key difference in the social welfare function, in which the $z(e,t)$ transfer externality now appears twice (with opposite signs):

$$W(t) = \{y + (1-t)(wl-e) + e - z(e,t) - \psi(l(t))\} + z(e,t) + t(wl-e)$$

To calculate excess burden, we exploit the now familiar envelope condition for the term in curly brackets and obtain

$$
\begin{aligned}
\frac{dW}{dt} &= -[wl-e] - \frac{\partial z}{\partial t} + [wl-e] + \frac{\partial z}{\partial t} + t\frac{\partial [wl-e]}{\partial t} + \frac{\partial z}{\partial e}\frac{\partial e}{\partial t} \\
&= t\frac{\partial wl}{\partial t} + \frac{\partial e}{\partial t}\{\frac{\partial z}{\partial e} - t\}
\end{aligned}
\tag{4}
$$

To simplify this expression, consider the first-order condition for the individual's choice of e:

$$
t = \frac{\partial z}{\partial e} \equiv z'(e)
$$

Intuitively, the individual sets the marginal private benefit of raising e (saving $\$t$) with the marginal private cost. This first-order condition implies that the second term in equation (4) is zero, so that

$$
\frac{dW}{dt} = t\frac{\partial wl}{\partial t} \tag{5}
$$

Equation (5) shows that in the transfer cost model, the taxable income elasticity is not a sufficient statistic to calculate deadweight loss. Instead, excess burden is determined purely by the effect of taxation on *total* earned income ($\frac{\partial wl}{\partial t}$) – the effect of taxes on "real" labor supply decisions.[6] If the only margin of behavior that affects total earned income is hours of work – as in the simple model analyzed here – then $\frac{\partial wl}{\partial t}$ corresponds to the traditional "labor supply elasticity" used in the labor economics literature. If there are multiple dimensions to labor supply decisions (e.g. training, effort, etc.), the total earned income elasticity is an aggregate of all these behavioral responses.

If TLI responds to t only because of sheltering, there is no deadweight loss at all. Sheltering does not lead to deadweight loss because the cost $z(e,t)$ for the agent is exactly offset by the positive fiscal externality $z(e,t)$ on government revenue. Intuitively, the total size of the pie is unaffected by sheltering; the cost z simply affects how the pie is split. In contrast, in the resource cost model, the cost of sheltering $g(e)$ is pure waste.

[6] Slemrod (2001) proposes a model of evasion in which the expected fine z depends on earnings (wl) as well as the amount evaded (e). For example, earning a higher income could increase the probability of audit or reduce the cost of hiding income. The qualitative results in this paper hold when $\frac{\partial z}{\partial wl} \neq 0$. However, (5) has an added term $\frac{\partial z}{\partial wl}\frac{\partial wl}{\partial t}$, reflecting the effect of earned income on the transfer cost. This is because the marginal disutility of labor $\psi'(l) = 1 - t - \frac{\partial z}{\partial wl}\frac{\partial wl}{\partial t}$ at the optimum, changing the social cost of distortions in labor supply.

2.4 General Case: Resource and Transfer Costs

Suppose that sheltering \$$e$ of income from taxation requires payment of both a resource cost $g(e)$ and a transfer cost $z(e,t)$.[7] The individual chooses e and l to maximize his utility net of both resource and transfer costs:

$$\begin{aligned}\max_{e,l} u(c,l,e) &= c - \psi(l) - g(e) \\ \text{s.t. } c &= y + (1-t)(wl - e) + e - z(e,t)\end{aligned}$$

Social welfare is

$$W(t) = \{y + (1-t)(wl-e) + e - z(e,t) - \psi(l(t)) - g(e)\} + z(e,t) + t(wl - e)$$

The same derivation as in the previous subsection gives

$$\frac{dW}{dt} = t\frac{\partial wl}{\partial t} + \frac{\partial e}{\partial t}\{\frac{\partial z}{\partial e} - t\}$$

The key difference relative to the pure transfer cost model is that the individual's first order condition now has an additional term reflecting the marginal resource cost:

$$t = z'(e) + g'(e) \tag{6}$$

This leads to the general formula for deadweight burden with transfer and resource costs:

$$\begin{aligned}\frac{dW}{dt} &= t\frac{\partial wl}{\partial t} - g'(e)\frac{\partial e}{\partial t} \\ &= t\{\mu\frac{\partial TLI}{\partial t} + (1-\mu)\frac{\partial wl}{\partial t}\} \\ &= -\frac{t}{1-t}\{\mu\varepsilon_{TLI,1-t}(wl - e) + (1-\mu)\varepsilon_{LI,1-t}wl\} \end{aligned} \tag{7}$$

where $\mu = \frac{g'(e)}{z'(e)+g'(e)}$ denotes the fraction of the total cost of sheltering accounted for by resource costs and $\varepsilon_{TLI,1-t} = -\frac{\partial TLI}{\partial t}\frac{1-t}{TLI}$ and $\varepsilon_{LI,1-t} = -\frac{\partial LI}{\partial t}\frac{1-t}{wl}$ denote the taxable income and total earned income elasticities, respectively.

[7] The assumption that the agent incurs the resource cost is made simply to reduce notation. The formula for excess burden is unaffected if the resource cost $g(e)$ is incurred by the government instead of the agent, because the social welfare function $W(t)$ is unchanged. Hence, in empirical implementation, $g(e)$ should be interpreted as the total social resource cost. For example, if each audit costs \$$c_A$, the term $p(e)c_A$ should be included in $g(e)$.

When there is no transfer cost, $\mu = 1$, and (7) reduces to the standard taxable income formula in (3). At the other extreme, when there is no resource cost, $\mu = 0$, and the formula reduces to (5), which depends only on the earned income elasticity. In the general case where $\mu \in (0, 1)$, the excess burden of income taxation is determined by a weighted average of the taxable income and total earned income elasticities. The weight μ is determined by the relative importance of resource and transfer costs in sheltering.

Why is it necessary to distinguish evasion and avoidance responses from changes in labor supply to calculate excess burden when $\mu < 1$? The optimizing agent still equates the marginal *private* cost of sheltering \$1 of income from taxation with the net marginal cost of reducing earnings by \$1. But the marginal *social* cost of sheltering differs from the private cost when $\mu < 1$, breaking the equality of marginal social costs condition that underlies Feldstein's (1999) result.

It is easy to see that (7) would be unaffected by the introduction of additional choice variables for the agent (multi-dimensional labor supply), since the envelope conditions would still hold. Equation (7) therefore provides a relatively simple but robust method of calculating excess burden in the presence of transfer and resource costs, much as Feldstein identified the taxable income elasticity as a sufficient statistic in a model with only resource costs.

Equation (7) calls for a two-step procedure to calculate the efficiency cost of taxation. First, estimate the total earned income and taxable income elasticities.[8] Second, estimate the marginal resource cost $g'(e)$ to calculate the weight μ. If avoidance responses are much larger than "real" labor supply responses, as documented by Slemrod (1992, 1995), excess burden can be approximated simply by multiplying existing estimates of the taxable income elasticity by an estimate of μ. This formula should be preferred to Feldstein's (1999) formula especially when the resource cost of sheltering could be small relative to the marginal tax rate (i.e. $g'(e) << t$).

2.5 Excess Burden vs. Optimal Taxation

It is important to recognize that the analysis above has different implications for the measurement of deadweight loss and the determination of optimal taxes. The taxable income elasticity is always a necessary input for revenue and optimal tax calculations, irrespective of its relevance for excess burden calculations. To see this, consider the following simple optimal tax problem. Suppose that one dollar of government spending on public goods generates social benefits of $\$1 + \lambda$, so that

[8] Total earned income can potentially be backed out from consumption data: see Pissarides and Weber (1989) or Gorodnichenko et al. (2007) for examples. One can also implement (7) by estimating the effect of tax rates on income shifting ($\frac{\partial e}{\partial t}$), as in Clotfelter's (1983) study of tax rates and tax evasion using audit data.

social welfare is now

$$W(t) = \{y + (1-t)(wl-e) + e - z(e,t) - \psi(l(t)) - g(e)\} + z(e,t) + t(wl-e) + \lambda t(wl-e)$$

A derivation analogous to that above gives

$$\frac{dW}{dt} = -\frac{t}{1-t}\{\mu\varepsilon_{TLI,1-t}TLI + (1-\mu)\varepsilon_{LI,1-t}wl\} + \lambda TLI(1 - \frac{t}{1-t}\varepsilon_{TLI,1-t})$$

It follows that the tax rate t^* that maximizes $W(t)$ satisfies:

$$\frac{t^*}{1-t^*} = \frac{\lambda TLI}{\mu\varepsilon_{TLI,1-t}TLI + (1-\mu)\varepsilon_{LI,1-t}wl\} + \lambda TLI\varepsilon_{TLI,1-t}}$$

This equation shows that when sheltering entails a pure transfer cost ($\mu = 0$), t^* is a function of both $\varepsilon_{TLI,1-t}$ and $\varepsilon_{LI,1-t}$, even though excess burden depends purely on $\varepsilon_{LI,1-t}$. This is because the relevant consideration for optimal tax design is the marginal cost of public funds (MCPF) – the marginal deadweight loss per dollar of marginal tax revenue. The taxable income elasticity determines how much the tax rate must be raised to generate an additional dollar of tax revenue, while the earned income elasticity determines the marginal efficiency cost of that tax increase. Since the denominator of the MCPF always depends on $\varepsilon_{TLI,1-t}$, it is equally important to estimate $\varepsilon_{TLI,1-t}$ and $\varepsilon_{LI,1-t}$ to analyze optimal taxation regardless of the weight μ.

A related point is that even if sheltering has no efficiency cost, it could still be desirable to reduce sheltering from the perspective of optimal policy. Reducing tax evasion through stiffer penalties could be a more efficient way to generate revenue than raising other distortionary taxes even if evasion has no resource cost. Again, the optimal policy problem involves additional elements beyond the pure calculation of excess burden. A full characterization of optimal tax rates and fines when sheltering entails transfer costs is an important problem left for future research.

2.6 Discussion: Transfer Costs

Fines for tax evasion are just one example of transfer costs. In general, transfer costs can be of two types: transfers to the government (revenue offsets) or to other agents in the private sector. I now discuss some examples of these two types of transfers, and compare their implications for the formula above as well as other formulas proposed in previous studies.

Government Transfer Costs. The leading example of a revenue offset is the shifting of income between the personal income and corporate tax bases (Gordon and Slemrod 2002). If corporate income is taxed at a rate t_c, the agent effectively pays a transfer cost of $z(e) = t_c e$ to the government to shelter \$$e$ from income taxation through shifting. The formula in (7), which applies for arbitrary $z(e)$, offers one means of accounting for revenue offsets. An alternative formula is given in Saez (2004), who adjusts Feldstein's (1999) formula by adding terms to marginal revenue that reflect the revenue raised from other taxes. Still another approach is to compare the mechanical change in total tax revenue (from all tax bases) with the actual change in total tax revenue (see e.g. Auerbach 1985, Slemrod 1998):

$$\frac{dW}{dt} = \frac{\partial R}{\partial t}|_{l,e} - \frac{\partial R}{\partial t}$$

where $R = t(wl - e) + z(e)$ denotes total tax revenue from all tax bases (including fines collected from audits) and $\frac{\partial R}{\partial t}|_{l,e}$ denotes the change in tax revenue if l and e were unchanged. When the only transfer costs of sheltering are associated with revenue offsets, the three formulas are just different representations of the same equation, and should yield exactly the same estimate of excess burden.

To implement Slemrod's and Saez's revenue-adjustment formulas, one must identify all the behavioral responses through which total tax revenue is affected following an income tax change – that is, trace out how each change in behavior affects revenue from each component of the tax system. Implementing (7) requires less data – one must estimate only the taxable and total income elasticities and the marginal revenue cost of sheltering. An additional advantage is that the representation in (7) yields insight into the key determinants of excess burden: the deadweight cost of sheltering is proportional to its resource cost, irrespective of its effects on other parts of the government's budget.[9]

Private-Sector Transfer Costs. Although the three formulas discussed above are all valid methods of accounting for transfers to the government, only the formula proposed here accounts for transfers within the private sector. There are many cases in which penalties for evasion and avoidance are imposed by other agents in the private sector rather than the government. For example, a manager may be fired by shareholders if he is discovered to use illegal tax sheltering strategies, thereby losing a bonus. A firm may lose clients to a competitor if it is identified as a tax evader. An individual may risk losing part of his wealth to theft by holding it in the form of cash or hidden accounts. Penalties that deter evasion could also deter quasi-legal avoidance strategies

[9] The drawback of the method proposed here is that one needs to estimate the average value of $g'(e)$, which may be difficult. See section 3 for a discussion on estimating $g'(e)$.

– e.g. declaring a vehicle or travel expense as a “business expense” – .since the border between avoidance and evasion is often ambiguous.

Avoidance strategies that are clearly legal may also be partially deterred by private transfer externalities. Suppose an executive is deciding whether to compensate himself in the form of a taxed dollar of labor income or untaxed perks such as amenities in the office (e.g. a better building, child care facilities, better company cars). Such perks could entail two forms of transfer costs. First, since an executive typically cannot take the perks with him to another job, some fraction of the benefits (in expectation) are transferred to subsequent executives. Second, some of the surplus from the office amenities may have to be shared with other employees even contemporaneously – it is difficult to improve only part of a building. Transfers within a family are another example: if an individual values his children’s consumption at less than $1 but the planner weights all individuals equally, the individual effectively incurs a transfer cost when sheltering money from taxation through trusts or inter-vivos transfers.[10]

In all of these examples, the agent faces a cost of sheltering $z(e)$ that accrues to another agent in the private sector and does not affect social welfare. Since the derivation above holds with arbitrary $z(e)$, equation (5) is valid in all of these situations. In contrast, the revenue-adjustment methods in Slemrod (1998) and Saez (2004) do not hold in this environment (see the appendix for a proof). This is because within-private-sector externalities never show up on the government’s budget, invalidating the approach of making adjustments based purely on government revenue.

It is important to note that the only private transfer externalities that affect the Feldstein (1999) calculation are those which are not internalized by agents through Coasian bargaining. If private externalities are internalized through Coasian bargaining, the private transfer term drops out of $z(e)$. For example, if a manager renegotiates his contract with others who are impacted by his tax sheltering activities (shareholders, other employees, etc.), he effectively faces no private transfer cost in sheltering because his salary can be adjusted to offset any externalities. In practice, transaction costs and information problems likely impede perfect contracting, and some sheltering behaviors are therefore deterred by private transfer costs.

At an abstract level, it is not surprising that private and fiscal transfers change Feldstein’s formula, since non-pecuniary externalities always introduce additional terms in efficiency calculations. Transfers are a subset of externalities where the positive externality on other agents comes

[10] Of course, each of these examples also involves some resource costs. For instance, effort spent on lobbying to receive a transfer constitutes a resource cost.

purely from a cost borne by the agent making the sheltering decision. Transfer externalities are of special interest because they create a wedge between the marginal resource cost of sheltering and the tax rate, potentially explaining why agents do not always shelter income to the point where the marginal resource cost equals the tax benefit. A standard externality that does not impose a cost on the agent who makes the sheltering decision does not lead to such a wedge. Because transfer externalities have a private cost but no effect on social welfare, they lead to a simple formula for excess burden that depends purely on the total earned income and taxable income elasticities. Thus, while it is generally difficult to account for externalities in excess burden calculations, one important class of externalities – transfer costs associated with sheltering – can be handled using the simple formula in (7).[11]

3 Conclusion: Measuring Resource Costs of Sheltering

This note has extended Feldstein's (1999) taxable income elasticity formula to an environment in which the private and social costs of sheltering differ. The generalized formula shows that to calculate excess burden, it is critical to determine (1) how much of the taxable income elasticity is driven by variation in real labor supply choices vs. sheltering ($\varepsilon_{TLI,1-t}, \varepsilon_{LI,1-t}$); and (2) to what extent sheltering entails resource costs vs. a transfer of resources between agents (μ). These issues are particularly important in understanding the efficiency cost of taxing individuals who have substantial ability to shelter income, such as high-income earners and self-employed individuals.

The transfer vs. resource cost distinction also has implications for issues beyond the efficiency cost of income taxation. For example, Gruber and Rauh (2007) estimate the sensitivity of reported corporate profits to corporate tax rates to calculate the excess burden of the corporate tax. If corporations' reported profits are sensitive to tax rates primarily because of reporting effects and these changes in reporting do not entail substantial resource costs, the excess burden from corporate taxation may be smaller than implied by Gruber and Rauh's calculations. Another example is Looney and Singhal's (2006) use of the taxable income measure to estimate intertemporal substitution elasticities using anticipated changes in tax rates. Although individuals may shift their reported taxable income significantly across periods to minimize their tax burdens, labor supply and total earnings could be less elastic intertemporally (Goolsbee 2000). Since aggregate output

[11] Other (non-transfer) externalities can be addressed using the standard method of adding terms to (7). I have abstracted from non-transfer externalities to highlight the conditions under which the taxable income elasticity is or is not informative about excess burden.

is what matters in calibrating representative-agent macro models, one must quantify the extent to which output is reduced by resource costs of intertemporal shifting in order to translate Looney and Singhal's estimates into the relevant intertemporal elasticity.

I conclude by discussing how the marginal resource cost of sheltering $g'(e)$ can be quantified in practice.[12] This parameter can be measured by answering the question, "What is the loss in total surplus from of an additional dollar of sheltering?" I provide simple calculations of average resource costs for a few common sheltering behaviors, which yield a rough sense of marginal resource costs under the assumption that the cost curves are not highly convex.

Some sheltering responses – especially evasion – are likely to have resource costs that are an order of magnitude smaller than top marginal tax rates (roughly 40% in the U.S.). For example, one common sheltering strategy is to conduct business transactions in cash and under-report net profits.[13] The resource cost of conducting business in cash can be approximated by the fee that firms are willing to pay credit card companies (approximately 2-4% per transaction).[14] Another evasion strategy is to set up offshore bank accounts to avoid double-reporting of income. A survey of offshore banks indicates that the average cost for setting up and maintaining a $1,000,000 balance in a business or individual account is 0.2% of the assets invested.[15] A common strategy for legal tax avoidance is to set up a trust to shield bequests from estate and capital gains taxation. A survey of estate tax planners indicates that the average cost for setting up a $1,000,000 trust is roughly 2% of the assets invested.[16] Although these calculations neglect other potential resource costs such as greater risk and additional legal fees, they indicate that resource costs for certain types of sheltering could be far smaller than top marginal tax rates.

At the other extreme, tax avoidance through distortion in consumption patterns is likely to have a marginal resource cost equal to the marginal tax rate. Individuals who buy bigger houses, over-consume healthcare, or fly in first class simply to reduce their personal income tax burden

[12] Ideally, one should calculate both $z'(e)$ and $g'(e)$ to fully understand the costs of sheltering. However, it is only necessary to calculate one of these to compute the weight μ since agent optimization implies $g'(e) + z'(e) = t$. Calculating transfer costs is likely to be more difficult than resource costs given private transfers.

[13] According to Internal Revenue Service (2006) estimates of the "tax gap", of the $350 billion (15% of tax revenue) in tax liabilities that were not paid in 2001, $290 billion was due to under-reporting of personal income taxes. Of this, the majority is due to under-reporting of small business income.

[14] Enforcement costs add relatively little to the resource costs of evasion. According to the Internal Revenue Service (2006), the government spent $6.63 billion on tax enforcement, relative to a base of about $350 billion in tax evasion.

[15] A graduate student and I compiled rates from seven banks offering offshore banking services (either by phone or using figures quoted on websites). Our raw data are available upon request. The percentage cost is defined as setup charges plus the annual fee for maintaining a basic interest-earning account with a $1,000,000 balance.

[16] We compiled fees from six law firms offering estate planning services. We defined the cost as the total fees charged for setting up a trust to pass money to descendants at lower tax rates.

pay large resource costs to shelter income because of the distortions in their consumption bundles. Other tax avoidance measures may have intermediate resource costs because they do not affect the overall level of expenditures significantly – e.g. capital income payments instead of labor income or claiming a car as a business expense – but still distort some attributes of the consumption bundle, such as the location or timing of consumption.

The considerable uncertainty about the marginal resource cost of sheltering combined with its central importance for tax policy suggests that estimating the mean value of this parameter should be a high priority for future research. One promising empirical approach is to compare the effects on tax changes on reported income and consumption bundles, recognizing that any real resource costs must ultimately result in lower consumption.[17] An interesting recent example of such an analysis is Gorodnichenko et al. (2008), which shows that a large tax reform in 2001 in Russia induced large changes in reported taxable income but little change in both the level and composition of consumption. The findings imply that the resource costs of changes in reported taxable income are small in the Russian case. Additional studies on the effects of tax reforms on consumption would be valuable given the prevalence of evasion and avoidance even in the U.S.: recent studies estimate that the evasion tax gap in the U.S. is 15% of tax revenue and that the avoidance tax gap is also substantial (Slemrod and Yitzhaki 2002, Slemrod 2007).

[17] Consumption measures will not capture purely psychological costs, such as the cost of violating ethical principles by evading taxes. Such costs could potentially be an important deterrent to sheltering, and understanding whether they should be treated as real resource costs in welfare calculations is an interesting issue for future research.

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Appendix: Extensions

I. Auditing model with a risk averse agent

Let the agent's utility be denoted by $u(c)$, which we assume is increasing and concave. In the state where the agent successfully evades taxes and is not audited, his income is $y+(1-t)(wl-e)+e$, where y represents unearned income. In the state where he is audited and caught, his income is $y+(1-t)wl-F(e)$ where y denotes unearned income. Let $V(t,y)$ denote the agent's expected utility as a function of the tax rate and unearned income and $E(t,V)$ denote the corresponding expenditure function. Following Auerbach (1985), I define excess burden using the compensated variation measure:

$$EB = E(t,V(0,y)) - y - R(t)$$

where $R(t) = t(wl^c(t) - e^c(t)) + p(e^c(t))[te^c(t) + F(e^c(t))]$ is tax revenue and $l^c(t)$ and $e^c(t)$ are income-compensated Hicksian demand functions. The objective is to derive an elasticity-based expression for $\frac{dEB}{dt}$. To begin, observe that the agent's indirect utility function is

$$V(t,y) = \max_{e,l}(1-p(e))u(y+(1-t)(wl-e)+e) + p(e)u(y+(1-t)wl-F(e)) - \psi(l)$$

The expenditure function is

$$E(t,V) = \min_{e,l,\mu} y + \mu(V - (1-p(e))u(y+(1-t)(wl-e)+e) - p(e)u(y+(1-t)wl-F(e)) + \psi(l))$$

where μ denotes the multiplier on the utility constraint. Let c_h denote consumption in the "good" state (where the agent is not caught) and c_l denote consumption is the state where he is caught and $Eu'(c) = (1-p(e))u'(c_h) + p(e)u'(c_l)$ denote the expected marginal utility of consumption. Using the first order conditions from agent optimization, it is easy to see that $\mu = \frac{1}{Eu'(c)}$. Note that $c_h - c_l = te + F$. Hence

$$\begin{aligned}
\frac{dE}{dt} &= \frac{1}{Eu'(c)}\{(1-p(e))u'(c_h)(wl-e) + p(e)u'(c_l)wl\} \\
\frac{dR}{dt} &= wl - e + p(e)e + t\frac{\partial wl^c}{\partial t} + \frac{\partial e^c}{\partial t}(-t + p'(e)[te+F] + p(e)[t+F'(e)])
\end{aligned}$$

It follows that

$$\begin{aligned}
-\frac{dEB}{dt} &= t\frac{\partial wl^c}{\partial t} + p(e)(1-p(e))e\frac{[u'(c_h) - u'(c_l)]}{Eu'(c)} \\
&\quad + \frac{\partial e^c}{\partial t}[(-t + p'(e))(te+F) + p(e)(t+F'(e))]
\end{aligned}$$

To simplify the third term in this expression, consider the agent's first order condition with respect to the choice of e:

$$t = p'(e)\frac{[u(c_h) - u(c_l)]}{u'(c_h)} + p(e)\frac{[u'(c_h)t + u'(c_l)F'(e)]}{u'(c_h)}$$

Using this expression and collecting terms, we obtain

$$\begin{aligned}
-\frac{dEB}{dt} &= t\frac{\partial wl^c}{\partial t} + p(e)(1-p(e))e\frac{[u'(c_h) - u'(c_l)]}{Eu'(c)} \\
&\quad + \frac{\partial e^c}{\partial t}[p'(e)\{c_h - c_l - \frac{u(c_h) - u(c_l)}{u'(c_h)}\} + p(e)F'(e)\{\frac{u'(c_h) - u'(c_l)}{u'(c_h)}\}]
\end{aligned}$$

To clarify the intuition for this formula, I take a quadratic approximation to the utility function around c_h and write the formula in terms of the coefficient of relative risk aversion, $\gamma = \frac{-u''(c)}{u'(c)}c$:

$$-\frac{dEB}{dt} \approx t\frac{\partial wl^c}{\partial t} - \gamma\{p(e)(1-p(e))e\frac{\Delta c}{c}\} - \gamma\frac{\partial e^c}{\partial t}\{p(e)F'(e)\frac{\Delta c}{c} + \frac{1}{2}p'(e)c_h(\frac{\Delta c}{c})^2\} \tag{8}$$

where $\frac{\Delta c}{c} = \frac{te+F}{c_h}$ denotes the percentage loss in private income when the agent is caught. Note that when $\gamma = 0$ (risk neutrality), the last two terms drop out of (8) and it coincides with (5) as expected. The second term reflects the cost of the additional risk directly from the increase in the tax rate, which raises the difference in income between the two states in proportion to the amount of tax evaded e. The third term reflects the cost of the additional risk that the agent bears from one dollar of additional evasion, due to the increased fine and probability of audit. Both of these additional risk costs constitute real resource costs because they reduce net social welfare.

Defining the marginal resource cost of evasion as $g'(e) = \{p(e)F'(e)\frac{\Delta c}{c} + \frac{1}{2}p'(e)c_h(\frac{\Delta c}{c})^2\}$ and the marginal resource cost directly from the increase in the tax rage as $g_t'(e) = \gamma\{p(e)(1-p(e))e\frac{\Delta c}{c}\}$, we can rewrite (8) as

$$\begin{aligned}\frac{dW}{dt} &= -\frac{dEB}{dt} = t\frac{\partial wl}{\partial t} - g'(e)\frac{\partial e}{\partial t} - g_t'(e) \\ &= -\frac{t}{1-t}\{\mu\varepsilon^c_{TLI,1-t}(wl-e) + (1-\mu)\varepsilon^c_{LI,1-t}wl\} - g_t'(e)\end{aligned}$$

where $\varepsilon^c_{TLI,1-t}$ denotes the compensated taxable income elasticity and $\varepsilon^c_{LI,1-t}$ denotes the compensated total earned income elasticity. This equation coincides with the formula for the general case with resource and transfer costs in (7) except for the additional term $g_t'(e)$ reflecting the direct cost of subjecting the agent to increased risk when tax rates are high. Excess burden still depends on a weighted average of the taxable income and total earned income elasticities, with the weight proportional to the resource cost of evasion. Hence, the main result of the paper still holds in the case of a risk-averse agent, provided that the marginal resource cost of evasion is defined to include the risk-bearing costs of evasion.

II. Revenue Adjustment Formula

When sheltering has only resource costs,

$$\frac{dW}{dt} = t\frac{\partial TLI}{\partial t} = \frac{\partial R}{\partial t}|_{l,e} - \frac{\partial R}{\partial t}$$

where $\frac{\partial R}{\partial t}|_{l,e}$ is the "mechanical" change in tax revenue (ignoring behavioral responses). This is the classic "revenue adjustment" formula discussed e.g. in Auerbach (1985) and Slemrod (1998).

In the case with resource and transfer costs, recall from section 2.4 that

$$\frac{dW}{dt} = t\frac{\partial wl}{\partial t} + \frac{\partial e}{\partial t}\{\frac{\partial z}{\partial e} - t\}$$

To rewrite this formula using the revenue-adjustment strategy proposed by Slemrod, it is useful to distinguish two cases.

1. Revenue offset. Suppose $z(e)$ accrues to the government, so that $R = t(wl-e) + z(e)$. Then $\frac{\partial R}{\partial t}|_{l,e} = wl - e$ while $\frac{\partial R}{\partial t} = wl - e + t\frac{\partial(wl-e)}{\partial t} + \frac{\partial z}{\partial e}\frac{\partial e}{\partial t}$. Hence the standard tax revenue distortion

formula in Slemrod (1998) holds:

$$\frac{dW}{dt} = \frac{\partial R}{\partial t}|_{l,e} - \frac{\partial R}{\partial t}$$

2. Private transfer cost. Suppose $z(e)$ is a private transfer to another agent in the economy. Then $\frac{\partial R}{\partial t} = wl - e + t\frac{\partial(wl-e)}{\partial t}$, and we obtain

$$\frac{dW}{dt} = \frac{\partial R}{\partial t}|_{l,e} - \frac{\partial R}{\partial t} + \frac{\partial z}{\partial e}\frac{\partial e}{\partial t}$$

where the additional term reflects the externality transfer within the private sector that occurs through the agent's behavioral response to the tax change. Hence, the revenue adjustment formula does not hold with private transfers.