Theories of Tax Deductions: Income Measurement versus Efficiency

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Abstract

What is the purpose of tax deductions? A common view among tax law scholars is that tax deductions are required to properly measure income. In this paper I present an alternative theory of tax deductions, relying on standard economic efficiency grounds. I develop a model which highlights the fact that economic activities have costs and benefits, but an income tax system taxes only some of those benefits. The efficient deduction rule allows the deduction of a share of the cost equal to the share of the benefit that is taxed. I also show that the deadweight loss due to a departure from the efficient deduction rule increases quadratically with the departure, making larger departures from the rule much more costly than smaller ones. I then review various tax deduction rules in the Internal Revenue Code, demonstrating that the efficiency theory of tax deductions provides a clearer framework for teaching tax deductions, and a better guide to optimal policy, than the income measurement theory of tax deductions.

1 Introduction

What is the purpose of tax deductions? For many tax law scholars, deductions exist primarily "to *measure* income accurately" (Graetz et al. 2018, p. 233). According to this theory, "while gross income may give some indication of the taxpayer's income status. . . the net figure is the only suitable *measure* of the taxpayer's 'income'" (Chirelstein and Zelenak 2018, p. 117). William Andrews thus argues that the "function of net income *measurement*

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is not only the clearest and most important function of deductions, but in some sense the only true appropriate function." Economists similarly agree that "pure costs of doing business. . . must be deducted or otherwise excluded in properly *measuring* net income" (Kaplow 2007, p. 731). Bradford (1986, p. 20) thus notes that "the basic approach employed to *measure* individual income" is using "deductions as allowances for outlays deemed not to constitute consumption or saving."

The income measurement theory of tax deductions is grounded in an appeal to the Haig-Simons *definition* of income. Gruber (2016, p. 564) accordingly explains that "because the comprehensive income *definition* refers only to the net increment to resources over the period, any legitimate costs of doing business should be deducted from a person's income."

But why should the accurate measurement of income be important in and of itself? In the standard law and economics approach, the focus is on the effects of rules rather than on measurement considerations. In particular, legal rules are usually justified on efficiency grounds. Can this standard approach be applied to tax deductions? To be sure, the effect of specific tax deductions on taxpayers' behavior is often acknowledged by tax scholars. Still, no single, widely accepted, unified economic framework for thinking about tax deductions exists.

I begin the paper by demonstrating the prevalence of the income measurement theory of tax deductions. This theory is most clearly reflected in the discussion around the treatment of business expenses. I show that the consensus among both lawyers and economists is that deducting business expenses is necessary to properly measure income.

I then develop a simple economic model of the efficient deduction rule. In the model a taxpayer chooses a level of activity. This could be any activity: a business activity such as hiring employees, or the consumption of a good. The activity yields a benefit to the taxpayer, but also involves a cost. In the absence of an income tax, the taxpayer chooses the level of activity by comparing the marginal benefit to the marginal cost of the activity. This comparison yields the efficient level of activity.

When an income tax is imposed, some activity benefits are taxed, while others are not. For example, the income one derives from hiring an extra employee is taxed, while the utility one derives from consuming a good is not taxed. This reflects technological constraints on the operation of an income tax. The policy question is whether to allow a deduction for the cost of the activity.

If our goal is to obtain the efficient outcome, an ideal deduction will guarantee that the benefit-cost comparison is not distorted. Accordingly, if the benefit from the activity is not taxed, as in the case of the utility from consuming a good, for the benefit-cost comparison not to be distorted the cost of the activity should not be deducted. If the benefit from the activity is taxed, as in the case of the income from an extra employee, for the benefit-cost comparison not to be distorted the cost of the activity should be deducted. Generally, the efficient deduction rule requires that the share of the cost that should be deducted must be equal to the share of the benefit that is taxed.

In addition to the efficient deduction rule, this simple economic model allows for the analysis of the social cost of inappropriate deductions. I show that the social loss from providing an inappropriate deduction is proportional to the square of the deduction rate. This means that larger departures from the efficient deduction rule are much more costly than smaller ones.

After developing an efficiency theory of tax deductions, I review various tax deductions in the Internal Revenue Code, to which the income measurement theory of deductions has been applied by tax scholars. This approach often results in ambiguities regarding the desired policy, as tax scholars frequently debate whether each deduction is needed to properly determine true income. I show that the efficiency theory of tax deductions provides a clearer framework for understanding tax deductions, and a better guide to optimal policy. The goal here is to demonstrate that, as an alternative to the income measurement theory, the efficiency theory of tax deductions provides a simple unified framework for analyzing tax deductions, a framework that can be used when teaching and thinking about tax deductions.

I begin with the treatment of business and personal expenses. According to the efficient deduction rule, business expenses should be deducted, since the benefit resulting from these expenses is fully taxed, as it is included in the individual's taxable income. Personal expenses should not be deducted, since they result in a benefit that is not taxed. Though the efficiency theory of tax deductions does not lead to a different deduction policy than the income measurement theory of tax deductions in this case, it does provide a well grounded economic rationale for the existing policy.

I then turn to mixed business and personal expenses. The Internal Revenue Code allows the deduction of only half the expenses for meals. Most tax scholars view this rule as arbitrary, and hard to justify using the income measurement theory. The efficiency theory of tax deductions may provide an

explanation for this rule. Since large departures from the efficient deduction rule are much more costly than smaller ones, allowing the deduction of half the expenses is socially less costly than either allowing a full deduction or allowing no deduction, which are the practical alternatives often considered.

When applying the income measurement theory of deductions to childcare and commuting expenses, the standard focus is on the question of causation, as these expenses are jointly caused by one's business activities and one's personal life. This has led tax scholars to a doctrinal dead-end, with no clear view of how these expenses should be dealt with in an ideal income tax. I show that the efficient deduction rule also applies in this context. If we do not want to distort a taxpayer's joint choice of a home and a workplace, the share of commuting expenses that should be deducted must be equal to the share of the benefit that is taxed. Though implementing this ideal rule would often be administratively difficult, understanding the ideal rule is a first step for choosing among second best policies.

After discussing mixed business and personal expenses, I move to the deduction of interest. According to the income measurement theory, interest incurred for the purpose of funding personal expenses should be deductible. By contrast, according to the efficient deduction rule personal interest should not be deductible, as it is a cost that yields a benefit that is not taxed in an ordinary income tax.

Though the Internal Revenue Code allows for the deduction of interest incurred in a trade or business, as well as investment interest, interest paid on debt used in investments that are tax exempt, such as municipal bonds, is not deductible. The income measurement theory of deductions does not provide a good explanation for this exception, though it can easily be explained using the efficient deduction rule. Since the benefit from tax exempt investments is not taxed, deducting their cost would lead to inefficient over-investment.

Turning to personal deductions, some have argued, using the income measurement theory, that medical expenses should be deducted. According to the efficient deductions rule, however, medical expenses should not be deducted. Since the benefit one derives from medical expenses is generally not taxed, deducting these expenses will lead to inefficient overspending. Like medical expenses, some have argued that proper measurement of income requires the deduction of charitable contributions. According to the efficient deduction rule, however, charitable contributions should not be deducted, since the benefit one derives from contributing is generally not taxed. To the extent charitable contributions create a positive externality, a credit rather

than a deduction should be given.

Regarding the deduction of state and local taxes, scholars have argued that this deduction is required to define income properly as what is actually available for consumption. By contrast, according to the efficient deduction rule, since the benefit resulting from the payment of these taxes is not taxed, as it is simply the benefit state residents enjoy from public goods and services, if our goal is not to distort economic choices, the cost of state and local taxes should not be deducted.

Lastly, I deal with capital expenditures. Generally, the Internal Revenue Code does not allow the deduction of capital expenditures, though there are many exceptions to the rule. This rule is traditionally justified using the income measurement theory of tax deductions. According to the efficient deduction rule, however, a full and immediate deduction of capital expenditures should be allowed. When capital expenditures are capitalized and recovered through depreciation deduction, or when the asset is sold, it means that, in present value terms, a partial rather than a full deduction is provided. But since the benefit from the investment is fully taxed, such a rule leads to inefficient under-investment.

The income measurement theory of tax deductions has a long history in tax scholarship. In particular, many scholars have relied on this theory to address the question of personal deductions, with different conclusions (Andrews 1972, Bittker 1973, Surrey 1973, Halperin 1974, Kelman 1979). Griffith (1988) criticizes this theory, arguing that it is not grounded on a coherent normative principle. Kaplow (1991) criticizes the appeal to definitions in debates about deductions, and argues for the evaluation of tax rules based on their effect on individuals' well-being. To the best of my knowledge no attempt has been made to provide a unified alternative theory of tax deductions on efficiency grounds. In particular, the efficient deduction rule developed in this paper, according to which the share of the cost that should be deducted must be equal to the share of the benefit that is taxed, has not been explicitly stated before, and neither has the fact that the social loss from providing an inappropriate deduction is proportional to the square of the deduction rate. Furthermore, as illustrated in great detail in this paper, when teaching tax deductions all tax law textbooks often appeal to the income measurement theory of tax deductions (for example, Graetz et al 2018; Bankman et al. 2018; Chirelstein and Zelenak 2018; Schmalbeck et al. 2018; Andrews 1999). Public finance textbooks similarly appeal to the income measurement theory when covering tax deductions (for example,

Gruber 2016, Rosen and Gayer 2008, Stiglitz 2000). Thus, the efficiency theory of tax deductions presented in this paper can also be viewed as an alternative framework for teaching tax deductions.

It is important to keep in mind that considerations besides those I highlight in this paper may be important in particular situations. Other economic goals, notions of fairness, and administrative simplicity may at times outweigh the gains from the efficient deduction rule. Still, the efficient deduction rule can serve as a useful benchmark, and departures from the rule can be explained and justified.

The paper proceeds as follows. Section 2 presents the income measurement theory of tax deductions, demonstrating the consensus around this theory in the context of the deduction of business expenses. Section 3 develops a simple economic model, deriving the efficient deduction rule and noting the cost of inappropriate deductions. Section 4 applies the efficient deduction rule in different contexts, highlighting some concrete policy implications of the rule relative to the prescriptions of the income measurement theory. Section 5 extends the analysis in the paper, and considers other types of deductions, and also a broader optimal income tax framework. Section 6 concludes.

2 Income Measurement Theory of Deductions

The income measurement theory of tax deductions is most clearly demonstrated in the context of the deduction of business expenses. Why are business expenses deductible under an income tax? The consensus among tax law scholars is that "the deduction of ordinary and necessary business expenses . . . is essential if we are to tax net income" (Graetz et al. 2018, p. 233). As Chirelstein and Zelenak (2018, p. 117) note, "reducing gross income to a net figure by subtracting the taxpayer's expenses is an unavoidable step unless the income tax is to be turned into a kind of sales or excise tax on transactions by volume." In other words, these "deductions are necessary to ensure that what is ultimately taxed is indeed 'income' and not something else, like 'revenue' or 'gross receipts" (Bankman et al. 2019, p. 415). Business deductions are thus necessary for the "proper *measurement* of income" and are "justified largely by their *definitional* properties. . . The tax rules are simply an attempt to *define* income properly" (Schmalbeck et al. 2018, 493).

The idea that deducting business expenses is necessary for the proper *measurement* and *calculation* of income was recognized by the earliest contributors to the theory of income taxation. After defining income as "consumption and accumulation," Simons (1938, p. 53-54) notes that "determining and defining appropriate deductions" is necessary for "determining what positive items shall be included in *calculations* of income." Surrey (1973, p. 16) similarly recognizes the importance of determining what "expenses [should be] allowed to obtain the proper *measure* of net income for an income tax."

The income measurement theory is also accepted by economists. Bradford (1986, p. 20) notes that "the basic approach employed to *measure* individual income" is using "deductions as allowances for outlays deemed not to constitute consumption or saving." Musgrave and Musgrave (1989. p. 332) similarly acknowledge that "income under the accretion approach should be *measured* in terms of net income, i.e., income after the costs of earning it are deducted." Kaplow (2007, p. 731) likewise notes that "pure costs of doing business (a sole proprietor's cost of goods sold, rent, utility bills, and so forth) must be deducted or otherwise excluded in properly *measuring* net income." And Slemrod and Bakija (2017, p. 41) explain that "net income is *computed* by beginning with receipts and subtracting the costs of doing business."[1]

Unlike business expenses, personal expenses are not deductible under an income tax. The different treatment of business and personal expenses under an income tax leads to the "necessity of distinguishing between consumption and expense" (Simons 1938, p. 54). But why are personal expenses not deductible under an income tax? The reason for that, according to many tax law scholars, is that deducting personal expenses will lead to a change of the tax base. In other words, "if the income tax is to be imposed on 'income' . . . personal expenditures should be disallowed" (Chirelstein and Zelenak 2018, p. 117). This point was already noted by Robert Haig (1921, p. 13), who thought that those who "classify all personal and family expenditures for food, clothing, and shelter as deductible expenses, [are] rendering the income tax substantially a tax on merely saved income." Similarly, Bittker (1973, p. 195) notes that "if the taxpayer could deduct his consumption expenditures. . . only his savings would be left as the taxable base. For this reason, consumption expenditures do not ordinarily qualify for deduction."

[1] Other public finance books simply ignore the deduction of business expenses (for example, Salanie 2003, Kaplow 2008).

And Kaplow (2007, p. 731) explains that "in properly *measuring* net income. . . items of consumption. . . need to be kept within the tax base."[2]

As one can see, in the context of business and personal expenses a legal policy, such as allowing or disallowing a deduction, is usually justified using measurement considerations, or by appealing to the Haig-Simons definition of income. In the standard law and economics approach, the focus is on the effects of rules rather than on measurement considerations. In particular, legal rules are usually justified on efficiency grounds. Can this standard approach be applied to explain the deduction of business expenses, and the non-deduction of personal expenses? In the following section such an attempt is made.

To be sure, the effect of specific tax deductions on taxpayers' behavior is often acknowledged by tax scholars.[3] And efficiency is of course an important criterion that tax scholars consider when thinking about tax policy. Still, as shown, efficiency arguments are not usually used to explain the deduction of business expenses. Moreover, no single, widely accepted, unified economic framework for thinking about tax deductions exists. The next sections attempt to develop a simple framework for thinking about tax deductions.

3 Efficiency Theory of Deductions

3.1 Setup

Consider a taxpayer who has to choose x, the level of an activity. This could be any type of activity, a business activity such as hiring employees, or the consumption of a good. Each activity has a benefit, $b(x)$, where $b'(x) > 0 > b''(x)$, that is there is a positive but decreasing marginal benefit

[2] While the deduction of business expenses is always justified on measurement grounds, the non-deduction of personal expenses is sometimes justified on efficiency grounds, among other arguments. For example, Gratez et al. (2018, p. 272) notes that "Allowing business deductions for personal consumption produces both horizontal and vertical inequities; taxpayers with similar incomes have different abilities to obtain these deductions depending on their occupations, while taxpayers with higher income often have more opportunities to obtain these deductions than do people with lower incomes. Such deductions also induce a misallocation of resources as spending flows toward deductible forms of consumption."

[3] For example, with respect to the deduction for charitable contributions, see Graetz et al. (2018, p. 453), Bankman et al. (2019, p. 585), Gruber (2016, p. 573).

from the activity. The cost of the activity is normalized to one, for simplicity.[4]

When an income tax is imposed the taxpayer has to pay a share t in tax. However, the tax is not imposed on the full benefit, but rather only on the taxable part of the benefit, which I denote with $\beta \in [0,1]$. This assumption is supposed to capture the idea that not all benefits are taxed in an income tax. Some benefits, such as the income generated by an extra employee, or the income from an investment, are fully taxed, and therefore $\beta = 1$. Other benefits are not taxed at all. For example, the utility one derives from consumption is not taxed. This reflects technological constraints on the operation of the income tax, and in these cases $\beta = 0$. When $\beta \in (0,1)$ part of the benefit derived from the activity is taxed.

The policy question is whether to allow a deduction for the cost x of the activity. A parameter $\delta \in [0,1]$ reflects this policy choice. When $\delta = 0$ no deduction is allowed for the cost. When $\delta = 1$ a full deduction is allowed for the cost. When $\delta \in (0,1)$ a partial deduction of the cost is allowed.

3.2 Analysis

In a world with no tax, the taxpayer chooses how much to spend on the activity by solving:

$$\max_x b(x) - x \tag{1}$$

That is, the taxpayer maximizes his benefit from the activity ($b(x)$) minus the cost of the activity (x).[5] This seems to reflect how people actually think when they spend money on an activity. This simple problem yields the following first order condition:

$$b'(x^*) = 1 \tag{2}$$

[4] To get an interior solution assume that $b'(0) > 1$. Assume also that the taxpayer's utility function is quasilinear, and additively separable with respect to the different activities. This utility function allows us to analyze the taxpayer's choices regarding each activity independently of other activities.

[5] This expression is the result of the following constrained maximization: $\max_{x_1,x_2} y + b_1(x_1)$, subject to the budget constraint $y = I + b_2(x_2) - x_1 - x_2$, where I is assumed to be very large. In this setting there is a numeraire consumption good, y, another consumption good, $b_1(x_1)$, and a business activity, $b_2(x_2)$.

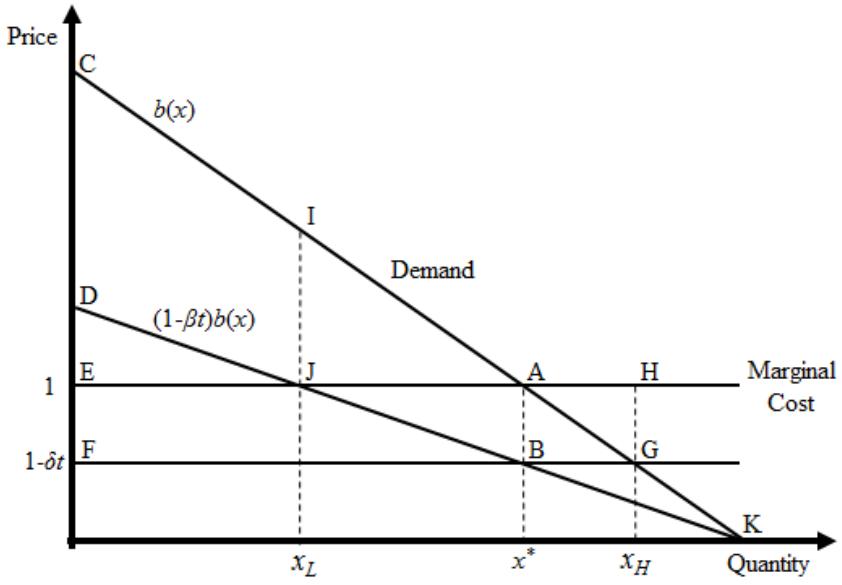

Figure 1: Choice of activity level with no tax, and with an income tax at a rate t.

The first order condition in Expression 2 defines x^*, the efficient activity level. This activity level is efficient, since the marginal benefit of the activity is equal to the marginal cost of the activity.

The taxpayer's choice in a world with no tax is illustrated in Figure 1. In that figure, the taxpayer's demand for the activity is captured by the line CK, and the market price for the activity he faces is captured by the line EH. They intersect in point A, which reflects the taxpayer's choice of activity level, x^*.

In a world with an income tax, a share β of the benefit is taxed, and a deduction is allowed for a share δ of the cost. The taxpayer therefore solves the following problem:[6]

$$\max_x (1-\beta t)b(x) - (1-\delta t)x \tag{3}$$

[6]Note that this analysis ignores income effects, since a quasi-linear utility function is used. However, nothing in the analysis would change if I allow for the demand for the activity to shift as a result of the tax, since the focus of the analysis is on taxpayers' decisions on the margin.

That is, the taxpayer maximizes the benefit minus the cost of the activity. The taxpayer gets the full benefit ($b(x)$), minus the share of the benefit that is taxed (β) multiplied by the tax rate (t). The cost (x) is reduced if a positive deduction (δ) is given, and the effect of this deduction depends on the tax rate (t). This problem yields the following first order condition:

$$b'(\hat{x}) = \frac{1 - \delta t}{1 - \beta t} \tag{4}$$

The first order condition in Expression 4 defines $\hat{x}$, the level of activity in a world with an income tax.

Comparing Expressions 4 and 2, one can see that to get $\hat{x} = x^*$, that is for the taxpayer to choose, given a tax, the efficient level of activity, we must have $\delta = \beta$. This can be summarized in the following proposition.

Proposition 1 *The efficient deduction rule is $\delta^* = \beta$, namely the share of the cost that should be deducted must be equal to the share of the benefit that is taxed.*

The taxpayer's choice in a world with a tax rate of t is illustrated in Figure 1. The tax causes a proportional shift inward of the taxpayer's demand curve, from the line CK to the line DK. The deduction shifts the marginal cost curve the taxpayer faces downward, from the line EH to the line FG. If $\delta = \beta$ the taxpayer's choice is captured by point B, where the new demand and marginal cost curves intersect. Note that the taxpayer's activity level is still x^*. In such a case the revenue collected from the taxpayer is captured by the area of the trapezoid ABCD. At the same time the taxpayer receives a subsidy which is captured by the area of the rectangle ABEF. Thus the net revenue that is collected is the difference between the area of the trapezoid ABCD and the area of the rectangle ABEF. Note that this difference is positive, and increasing with t, since only at $x = x^*$ the tax is equal to the subsidy.

Using Expression 4, one can see that when $\delta > \beta$, that is when the deduction allowed is greater than the share of the benefit that is taxed, we get $\hat{x} > x^*$, that is the level of activity is inefficiently too high. Similarly, when $\delta < \beta$, that is when the deduction allowed is smaller than the share of the benefit that is taxed, we get $\hat{x} < x^*$, that is the level of activity is inefficiently too low. Moreover, using the implicit function theorem on Expression 4, one can show that as the rate of the deduction increases, so

does the level of activity, that is $\frac{\partial \hat{x}}{\partial \delta} > 0$.[7]

What is the deadweight loss from providing an inappropriate deduction? To address this question we can express the loss L as the difference between the net social benefit when $x = x^*$, and the net social benefit when $x = \hat{x}$. Formally:

$$L = [b(x^*) - x^*] - [b(\hat{x}) - \hat{x}] \tag{5}$$

Since x^* maximizes the expression $b(x) - x$, by definition we get $L > 0$.

The deadweight loss from inappropriate deductions can be seen in Figure 1. If $\delta > \beta = 0$, that is if the benefit is not taxed but a deduction is allowed for the cost, the taxpayer will choose point G, and the activity level x_H. In such a case the deadweight loss is captured by the area of the triangle AGH. This deadweight loss reflects realized net social loss, since it covers levels of activity for which the cost of the activity is greater than its benefit, yet the activity is undertaken. Conversely, If $\beta > \delta = 0$, that is if the benefit is taxed but no deduction is allowed for the cost, the taxpayer will choose point J, and the activity level x_L. In such a case the deadweight loss is captured by the area of the triangle AJI. This deadweight loss reflects unrealized net social benefit, since it covers levels of activity for which the benefit from the activity is greater than its cost, yet the activity is not undertaken.

Now, let us assume that $\beta = 0$, meaning that no part of the benefit is taxed. In such a case, as we saw in Proposition 1, the efficient deduction rule calls for $\delta^* = 0$, that is no deduction should be allowed for the cost of the activity. We can therefore look at how the deadweight loss from providing an inappropriate deduction is affected by a marginal increase in the deduction rate δ:[8]

$$\frac{\partial L}{\partial \delta} = \frac{\partial \hat{x}}{\partial \delta} \delta t \tag{6}$$

In Expression 6 we see that the loss from a marginal increase in the allowed deduction, when no deduction should be allowed, is increasing with δ, the deduction already given, and t, the tax rate. In other words, the deadweight loss from providing an inappropriate deduction is proportional to the square of the deduction rate (δ^2). An increase in the inappropriate

[7] Formally, $\frac{\partial \hat{x}}{\partial \delta} = -\frac{t}{b''(\hat{x})(1-\beta t)} > 0$.

[8] Formally, $\frac{\partial L}{\partial \delta} = b'(x^*)\frac{\partial x^*}{\partial \delta} - \frac{\partial x^*}{\partial \delta} - b'(\hat{x})\frac{\partial \hat{x}}{\partial \delta} + \frac{\partial \hat{x}}{\partial \delta} = \frac{\partial \hat{x}}{\partial \delta}\delta t$, where we get to the final term by plugging in the terms $b'(x^*)$ and $b'(\hat{x})$ from Expressions 2 and 4 (recall that we assumed that $\beta = 0$).

deduction allowed, increases the deadweight loss from a marginal increase in the deduction. This finding is along the lines of the well-known result that deadweight loss is proportional to the square of the tax rate.[9] This means that large departures from the efficient deduction rule are much more costly than smaller ones.

Figure 2 illustrates the increasing cost of inappropriate deductions. Suppose again that $\beta = 0$, but that a deduction $\delta_1 > 0$ is allowed. In such a case the taxpayer will choose x_1 as the activity level, and the deadweight loss is captured by the area of the triangle ABC, which is a second order loss, since the area of this triangle tends to zero as the deduction rate δ_1 tends to zero. Suppose now that the deduction rate is increased to $\delta_2 > \delta_1$. This will make the taxpayer choose x_2 as the activity level. The increase in the deadweight loss is captured by the area of the trapezoid BCFD, which includes a second order loss captured by the triangle CEF, and a first order loss captured by the rectangle BCED. This latter loss does not tend to zero as the deduction rate δ_1 tends to δ_2.

4 Applying the Efficient Deduction Rule

According to the efficient deduction rule from Proposition 1, the share of the cost that should be deducted should be equal to the share of the benefit that is taxed ($\delta^* = \beta$). In this section I investigate whether the efficiency theory of tax deductions, developed in Section 3, can provide a unified framework of analyzing tax deductions, Such a framework can be used when teaching and thinking about tax deductions, instead of the income measurement theory often employed by tax law scholars, according to which deductions are required for the accurate measurement of income.

To be sure, some of the conclusions I reach when applying the efficiency theory to various deductions have been noted in prior work, which focused on specific deductions, and sometimes used other criteria than efficiency.

[9] An increase in the deduction rate δ leads to an increase in $\hat{x}$, the amount spent on the activity. As one can see in Expression 5, when $\hat{x} > x^*$, the social loss from a marginal increase in $\hat{x}$ is the derivative of Expression 5 with respect to $\hat{x}$, which is $1 - b'(\hat{x})$. This latter expression is increasing in $\hat{x}$ (because $b''(x) < 0$). In other words, when $\hat{x} \approx x^*$ (and therefore $b'(\hat{x}) \approx 1$) the social loss from a marginal increase in $\hat{x}$ is very small, and when $\hat{x} >> x^*$ the social loss from a marginal increase in $\hat{x}$ is large. This is like the deadweight loss from taxation, where the social loss from a marginal increase in tax increases as we move farther away from the competitive equilibrium.

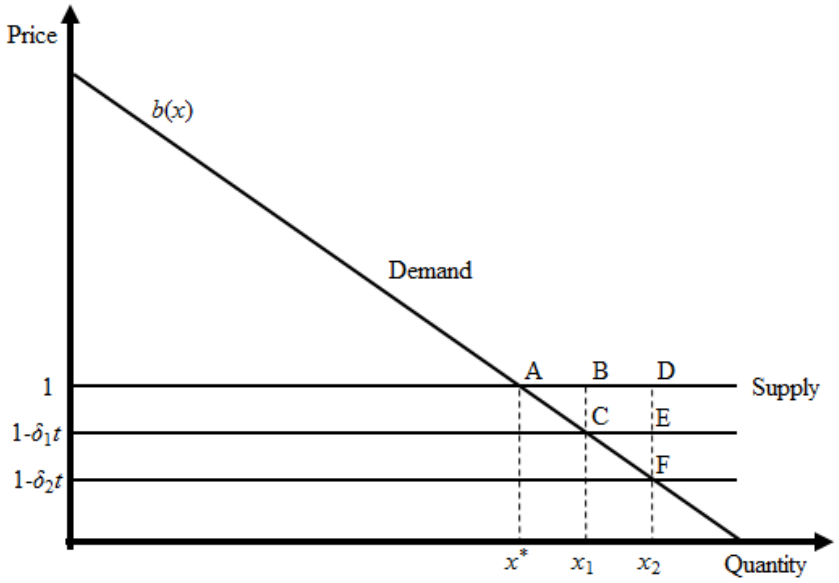

Figure 2: The deadweight loss from inappropriate deductions

Thus, I am not arguing that each conclusion in the following analysis is new. Rather, the goal here is to demonstrate that, as an alternative to the income measurement theory, the efficiency theory of tax deductions provides a useful unified framework for analyzing tax deductions.

4.1 Pure Business and Personal Expenses

The Internal Revenue Code allows for the deduction of business expenses (Internal Revenue Code ("I.R.C.) Section 162), while "personal, living, or family expenses" cannot be deducted (I.R.C. Section 262). As explained in Section 2, according to the income measurement theory of tax deductions, the different treatment of business and personal expenses is required to properly measure income.

The income measurement theory is well illustrated in the discussion around the disallowance of the deduction for unreimbursed employee business expenses in the 2017 tax reform. One justification for the new policy is "that the increased standard deduction should obviate the need for miscellaneous itemized deductions" (Bankman et al. 2019, p. 21 n. 26). Indeed, if the pur-

pose of tax deductions is to measure income, then in principle one can replace one deduction (the deduction for employee business expenses) with another (an increased standard deduction), and end up with the correct measurement of income.[10]

According to the efficiency theory of tax deductions, the goal of tax deductions is to reduce distortions to activity levels. What matters therefore is whether the benefit resulting from the expense is taxed. The case for the deduction of business expenses, that is expenses paid or incurred in carrying on any trade or business, is clear. Since the benefit resulting from these expenditures will be fully taxed, as it will be part of the individual's income, this means that $\beta = 1$. Accordingly, to make sure we do not distort business decisions we must allow for a full deduction, that is set $\delta^* = 1$.

The case for the disallowance of the deduction of pure personal expenses is also clear. These expenses, such as personal, living, or family expenses, are expenses that result in a benefit that the income tax will not tax, which means that $\beta = 0$. To make sure we do not distort spending decisions we must disallow any deduction for these costs, that is set $\delta^* = 0$.

Although the efficiency theory of tax deductions does not lead to an altogether different policy than the income measurement theory of tax deductions in the case of pure business and personal expenses, it does explain why one cannot simply replace the deduction of business expenses with an increased standard deduction.[11] Moreover, it provides a well grounded economic rationale for the existing policy. In this respect the argument made here is along the lines of the argument made in the canonic law and economics literature in contract law, where it was shown that expectation damages, the general remedy for breach of contract, which was usually defended through an appeal to natural justice, can be justified by considerations of economic efficiency (Birmingham 1970, Barton 1972, and Shavell 1980). Similarly, in the law and economics literature on tort law it was shown that negligence, the dominant standard of civil liability for accidents, which was traditionally defended through an appeal to a moral concept of blame or criticized from the perspective of victim compensation, can be justified as maximizing social welfare (Posner 1972, 1973, Brown 1973). Here too, the deduction of busi-

[10] See also (Graetz et al. 2018, p. 433), who explain that "the standard deduction. . . may be viewed as a substitute for itemized deductions for those taxpayers whose itemized deductions would be of relatively small amounts."

[11] Of course, there could be other reason for the non deduction of unreimbursed employee business expenses, such as enforcement and administrative concerns.

ness expenses and the non-deduction of personal expenses are traditionally justified on grounds of income measurement, as was shown in 2, but can be justified by considerations of economic efficiency.

4.2 Mixed Business and Personal Expenses

4.2.1 Meals

The Internal Revenue Code allows the deduction of only half the expenses for meals, even when these costs are directly related to the conduct of the taxpayer's trade or business (I.R.C. Section 274(n)). Using the income measurement theory of tax deductions, some have argued that "this rule makes good sense if we assume that it costs twice as much to eat 'on the road' (in the case of business travel meals) as it does to eat at home, and that the taxpayer obtains no extra gratification for the extra cost" (Schmalbeck at al. 2018, p. 542). Others view this rule as somewhat arbitrary. Thus, Graetz et al. (2018, p. 301) note that "Congress arbitrarily treats the consumption as one-half the cost of the meal."

The efficiency theory of tax deductions may provide a better explanation for the Section 274(n) rule. When a taxpayer takes out a client to a business lunch, some of the benefit the taxpayer derives from the meal is the increase in expected income due to the improved relationship with the client. This benefit is taxed. The taxpayer also derives a benefit from the lunch that is not taxed. This is the direct utility the taxpayer derives from dining at a nice restaurant, as well as the money saved on the cost of lunch. According to the efficient deduction rule, the share of the cost that should be deducted should be equal to the share of the benefit that is taxed ($\delta^* = \beta$).

If we knew that the share of taxpayers' benefit from meals and entertainment that is taxed is 50%, then the rule in Section 274(n) seems accurate. However, we often do not know this share (β). Still, as shown in Section 3, we know that the social loss from providing an inappropriate deduction is proportional to the square of the deduction rate, which means that large departures from the efficient deduction rule are much more costly than smaller ones. Thus, for any symmetric distribution of β around $\beta = 0.5$, allowing the deduction of half the expense would be less socially costly than either allowing a full deduction or allowing no deduction, which are the practical alternatives often considered. Furthermore, even if we know that the distribution of β is skewed to one side, but we are uncertain as to which side,

allowing the deduction of half the expense would be less socially costly than either allowing a full deduction or allowing no deduction.[12]

4.2.2 Childcare and Commuting Expenses

Following *Smith v. Commissioner* (1938), childcare expenses are not deductible, although the Internal Revenue Code provides a modest tax credit for childcare expenses (I.R.C. Section 21), and a certain amount can be excluded from income for childcare through what is known as a cafeteria plan (I.R.C. Section 129). Commuting expenses cannot be deducted from income, following *Commissioner v. Flowers* (1945).

When applying the income measurement theory of deductions to childcare and commuting expenses, the standard focus is on the question of causation, that is on whether an expense is caused by one's personal choices, or by one's business choices. The assumption is that expenses that are caused by one's personal choices should not be deducted, whereas expenses that are caused by one's business choices should be deducted, and the challenge is to identify the true cause of each expense. As summarized by Chirelstein and Zelenak (2018, p. 122):

> Business expenses would be those caused by the taxpayer's profit motivated activities, and personal expenses would be those *caused* by the taxpayer's personal (non-business) life. The problem, of course, is that the classic work-related expenses of child care and commuting are jointly *caused* by one's business activities and one's personal life. Take away either the child or the job and the child care expenses disappear. Take away either one's home or one's workplace and the need to commute between the two disappears.

This focus on identifying the true cause of expenses is also noted by Bradford (1986, p. 20), Andrews (1999, p. 513), and Bankman et al. (2019, p. 532-533, 581). This emphasis on causation led tax scholars to conclude

[12] See also Baake, Borck and Löffler (2004), who employ an optimal tax framework to argue that only partial deduction should be allowed for mixed personal and business expenditures, when tax authorities cannot monitor which part of the expenditure is work-related and which part is consumptive.

that "it is not obvious how the ideal income tax should treat such jointly caused expenses" (Chirelstein and Zelenak 2018, p. 122).[13]

The efficiency theory of deductions, developed in Section 3, puts little emphasis on the question of causation. Rather, the focus is on taxpayer's choices. The goal is to set a deduction such that taxpayers' choices will not be distorted by the tax system.

Each taxpayer chooses one pair of a home and a workplace. In a world without tax the taxpayer will choose the combination of a home and a workplace that, given the cost of commuting, maximizes the taxpayer's total net benefit. We can analyze this case by making minor modifications to the model in Section 3. Assume that the taxpayer's benefit b depends on his choice of home, h, and workplace, w. The taxpayer's commuting cost, x, also depends on his choice of home and workplace. In a world with no tax, the taxpayer chooses his actions by solving:

$$\max_{h,w} b(h,w) - x(h,w) \tag{7}$$

Assume that the solutions to this problem are h^* and w^*.

In a world with an income tax, the taxpayer's income from work would be taxed, while the benefit from the location of the home would not be taxed. Assume therefore that the share of the benefit that is taxed is β. As before, a deduction is allowed for a share δ of the costs. The taxpayer therefore solves the following problem:

$$\max_{h,w} [1 - \beta t] b(h,w) - (1 - \delta t) x(h,w) \tag{8}$$

To explain, the taxpayer gets the full benefit minus the share of the benefit that is taxed (β) multiplies by the tax rate (t). The cost (x) is reduced if a positive deduction (δ) is given, and the effect of this deduction depends on the tax rate (t).

Comparing Expressions 7 and 8, one can see that the efficient deduction rule, that is the rule that would lead the taxpayer to choose h^* and w^* for his home and workplace, is $\delta^* = \beta$. This is the same rule as the efficient deduction rule in Proposition 1, that is the share of the cost that should be deducted must be equal to the share of the benefit that is taxed.

[13] The focus on causation can also be found in the economics literature in this area. For example, Richter (2006) adopts the view that commuting is caused by one's personal life, noting that "commuting cannot be assumed to earn taxable income" and that the "gains from commuting are not taxable."

A similar analysis can be undertaken for childcare expenses. In that case the taxpayer chooses family size and whether to work, and these choices affect the taxpayer's benefit (b), and the cost of childcare (x).

Thus, unlike the income measurement theory of deductions, which provides no clear answer to how the ideal income tax should treat jointly caused expenses, the efficiency theory of deductions provides a clear answer to this question. Of course, implementing this ideal rule would be administratively difficult in many cases, but understanding the ideal rule allows us to understand the cost of second best rules, such as disallowing a deduction ($\delta = 0$) or allowing a full deduction ($\delta = 1$). Furthermore, since we are often uncertain about the precise value β, the fact that the social loss from providing an inappropriate deduction is proportional to the square of the deduction rate means that it may well be that providing a deduction of half the cost of childcare and commuting may be better than the two extreme solutions, for the same reasons noted above in the discussion on the partial deduction for meals.

4.3 Interest

4.3.1 Personal Interest

As a rule, the Internal Revenue Code does not allow for the deduction of interest incurred for the purpose of funding personal expenses (I.R.C. Section 163(h)(1)). A major exception to this rule is interest for a home mortgage, for which a deduction is allowed (I.R.C. Section 163(h)(3)).

Under the income measurement theory of deductions, personal interest is deductible. Bradford (1986, p. 41) notes that "the interest paid on amounts borrowed to finance consumption should be deduced in calculating accrual income, that is the sum of consumption and saving." Andrews (1999, p. 458) similarly notes that "interest reduces what a taxpayer has available to spend on consumption and saving, and is therefore negative income in the Haig-Simons sense." And according to Shaviro (2017, p. 115) "interest deductions generally should be allowed in a comprehensive, well-functioning income tax, as they are (negative) returns to (dis-)saving, and thus the mirror image of positive returns to saving that an income tax reaches."

Under the efficiency theory of tax deductions, the focus is on whether the benefit resulting from the interest payment is taxed, since the goal of the deduction policy is not to distort taxpayers' choices. Personal interest

is a cost that yields a benefit that is not taxed in an ordinary income tax. This untaxed benefit could be the imputed income from housing, or simply the utility derived from the consumption of goods and services earlier rather than later. Therefore this cost should not be deducted. The deduction of this cost would lead to inefficient over-spending on personal expenses. For example, taxpayers may buy a home that is inefficiently too large, in a sense that their benefit from the marginal room is smaller than its true economic cost.

4.3.2 Business and Investment Interest

As a rule, the Internal Revenue Code allows for the deduction of interest incurred in a trade or business (I.R.C. Section 163(a) and section 163(h)(2)(A)), as well as investment interest (section 163(d)). The standard income measurement justification for the deduction of these costs is that "the deduction of interest paid is simply the logical implication of the inclusion of interest received" (Bradford 1986, p. 39). Others argues that they are the costs of doing business. As noted by Graetz et al. (2018, p. 356): "Interest on indebtedness used to operate a trade or business is a cost to the taxpayer of doing business and thus is deductible like any other business expense." These deductions are also justified according to the efficiency theory of deductions, since they are a cost that yields a benefit that is fully taxed.[14]

One exception to this general rule has to do with certain types of investment interest. According to the Internal Revenue Code, interest paid on debt used in investments that are tax exempt, such as municipal bonds, is not deductible (I.R.C. Section 265(a)(2)).

The standard explanation for this exception focuses on the prevention of what is known as a "tax arbitrage" (Bradford 1986, p. 39). This problem is explained by Chirelstein and Zelenak (2018, p. 168): "Absent Section 265(a)(2), a 35% taxpayer would be well advised to borrow money in order to buy municipals even if the interest she had to pay on her loans was

[14]Note that, unlike the income measurement theory of tax deductions, the efficiency theory of tax deduction calls for a different treatment of personal interest as opposed to business and investment interest. Because money is fungible this raises administrative difficulties. Still, understanding the ideal rule is important, because in some cases distinguishing between business and personal interest is not difficult. In cases where making this distinction is difficult understanding the first best rule allows us to asses the cost of second best policies.

greater than the interest she expected to receive on her bond investment." The deduction of the interest makes such an investment profitable in after tax terms. Almost identical examples of tax arbitrage are given by Graetz at al. (2018, p. 363-364) and Bankman at al (2019, p. 372–373).

What is the precise problem with tax arbitrage? According to Chirelstein and Zelenak (2018, p. 168), it is a form of "sophisticated tax avoidance," with serious consequences "from the standpoint of both revenues and taxpayer morale." Graetz et al. (2018, p. 364) claim that a tax arbitrage creates "a negative rate of tax." Bankman at al. (2019, p. 373) explain that the problem with tax arbitrage is that it "can motivate deliberately generating pretax losses, because after-tax one comes out ahead."

The first thing to notice is that the standard explanations for the disallowance of interest deductions in Section 265(a)(2) do not rely on standard income measurement arguments. The income measurement theory of deductions does not provide a good explanation for this exclusion, and an appeal has to be made to external concepts relating to efficiency or tax avoidance. Furthermore, from the examples used to illustrate the tax arbitrage problem, it appears that the problem arises only when the interest on the loan is greater than the expected interest on the bond investment. What if the interest on the loan is lower than the expected interest on the bond investment? Would deducting the interest in such a case be considered "tax avoidance" even though the transaction would have take place even if the deduction was not allowed?

The efficiency theory of tax deductions provides a much more straightforward explanation for Section 265(a)(2), an explanation that is consistent with the rationale for all other deductions. According to the efficiency theory, the goal of the deduction is to reduce distortions to taxpayer's choices, and in this case to amounts invested relative to the amounts invested in a world without a tax. Accordingly, a deduction should be allowed for the cost of an investment only if the benefit from the investment is taxed. If the benefit is not taxed, as is the case for municipal bonds, the cost should not be deducted. In other words, according to the efficiency theory of tax deductions, Section 265(a)(2) is no exception to the rule, but simply reflects the basic rationale of all tax deductions.

4.4 Personal Deductions

4.4.1 Medical Expenses

Medical expenses are deductible if they exceed ten percent of a taxpayer's adjusted gross income (I.R.C. Section 213(a)). According to the income measurement theory of deductions, a deduction for medical expenses can be justified because it leads to a more accurate measurement of true income. As noted by Andrews (1972, p. 314): "As between two people with otherwise similar patterns of personal consumption and accumulation, a greater utilization of medical services by one is likely not to reflect any greater material well-being or taxable capacity, but rather only greater medical need." Similarly, Bittker (1973, p. 198) notes that "by permitting medical expenses to be deducted. . . the result is a measure income that. . . is more faithful to the Haig-Simons concept income ("accumulation plus consumption") than would be achieved by denying the deduction." And Chirelstein and Zelenak (2018, p. 210) explain that "the medical expense and casualty loss deductions serve similar purposes: the refinement of a taxpayer's net income base by excluding from it large and unanticipated outlays or losses that impair the individual's ability to meet her tax obligations."

Others have used the income measurement theory of deductions to argue against the idea that deducting medical expenses is required to measure income more accurately. They claim that whether medical expenses should be considered consumption has no bearing on whether they should be excluded from the measurement of income (Surrey 1973, p. 20-21; Kelman 1979).

Unlike the income measurement theory of deductions, the efficiency theory of deductions yields a clear answer in the case of medical expenses. According to the efficiency theory, a deduction should be given if it eliminates some distortion to taxpayer choices regrading medical expenses. Therefore, the question to be addresses is whether the benefit resulting from the medical expenses is taxed. Since the main benefit resulting from a medical expense is the utility derived from feeling better, and this utility is not taxed in an ordinary income tax, the cost of medical expenses should not be deducted. A deduction would distort the taxpayers' actions, leading him to spend more on medical expenses that he would have spent in the absence of an income tax. For example, that taxpayer may choose socially wasteful treatments, with a benefit lower than their cost, because of the deduction.[15]

[15] Of course, one can argue that in some cases some of the benefit resulting from medical

4.4.2 Charitable Contributions

The Internal Revenue Code allows the deduction of charitable contributions (I.R.C. Section 170(a)). Using the income measurement theory of deductions, some have argued in favor of this deduction. This argument originated with Andrews (1972, p. 346), who claimed that the consumption part of the Haig-Simons definition of income includes "only the private consumption of divisible goods and services whose consumption by one household precludes their direct enjoyment by others." Since charitable contributions do not meet this criterion, they are to be deducted to obtain an accurate measurement of income. Bradford (1986, p. 56) similarly argues that "amounts given away are not consumed and therefore should be deducted in arriving at a measure of accural income."

Others have argued against the deduction of charitable contributions, appealing again to the income measurement theory of deductions. Their claim is that whether charitable contributions are considered consumption, based on some notion of "personal consumption," should not affect whether they should be excluded from the measurement of income (Surrey 1973, p. 20-21; Kelman 1979).

According to the efficiency theory of tax deductions, a deduction is given only if the benefit from the activity is taxed. Since the benefit the taxpayer derives from giving charitable contributions is not taxed in a standard income tax, the contributions should not be deducted from the taxpayer's income.

Others have used an efficiency argument to suggest that the deduction of charitable contributions may be justified because such contributions generate a positive externality. This argument can be incorporated into the simple model developed in Section 3 by making a minor modification to the model.

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expenses is an increase in taxable income. For example, the taxpayer may be able to work longer hours after recovering from a sickness. In such cases the efficient deduction rule calls for a deduction equal to the share of the total benefit resulting from medical expenses that is taxable. Still, it seems plausible that in most cases much of the benefit of feeling better is not taxable.

The simple setting analyzed in the paper does not consider questions of insurance and risk aversion, which are relevant for large medical expenses. These question are thoroughly addressed in Kaplow (1991), who concludes that "if individuals make informed, rational decisions concerning consumption and the purchase of insurance, deductions for casualty losses and medical expenses are undesirable" (Kaplow 1991, p. 1487). Thus, the simple efficiency analysis in this paper leads to the same conclusion as the more comprehensive analysis.

Recall that the taxpayer derives a benefit $b(x)$ from giving a charitable contribution of x, and assume now that this contribution also generates a positive externality of ex, where e is the marginal social benefit from the positive externality. A social planner choosing the optimal contribution to maximize social welfare solves the following problem:

$$\max_x b(x) + ex - x$$

This simple problem yields the following first order condition:

$$b'(x^*) = 1 - e \tag{9}$$

In a world with an income tax, the donor's contribution is still determined by Expression 4, but since he is not taxed on the benefit he derives from the charitable contribution, we know that $\beta = 0$.

Comparing expressions 4 (when $\beta = 0$) and 9, one can see that to get $\hat{x} = x^*$, that is for taxpayer to choose, given a tax and a positive externality, the efficient amount of money to donate, we must have $\delta^* = e/t$. Thus, if charitable contributions generate a positive externality, the share of the cost that should be deducted must be equal to the marginal social benefit from the externality (e) divided by the tax rate (t).

Note that as the positive externality (e) increases so does the optimal deduction. This makes intuitive sense. Furthermore, taxpayers facing a higher marginal tax rate (t) should receive *a lower* deduction for charitable contributions. The reason is that a deduction of a dollar is worth more to someone with a high marginal tax rate than to someone with a low marginal tax rate. But since we want to reduce the cost of donating to all taxpayers by a similar amount (e), to reflect the positive externality generated by their contribution, so that each taxpayer will choose the efficient amount to donate, we need to provide a higher deduction to taxpayers facing a lower marginal tax rate. This seems inconsistent with the current policy, which provides the same deduction to all taxpayers, regardless of their marginal tax rate. A tax credit policy which provides a fixed reduction to the cost of donating, regardless of one's marginal tax rate, seems to be desirable.

4.4.3 State and Local Taxes

Until 2017 all state and local taxes could be deducted from income, if a taxpayers chose to itemize (I.R.C. Section 164). The 2017 tax reform capped the deduction for state and local taxes at $10,000 (I.R.C. Section 164(b)(6)).

Applying the income measurement theory of tax deductions, some have argued that the deduction of state and local taxes has "something of an income-defining quality, suggesting that 'income,' for purposes of assessing the reasonableness of tax burdens, should be determined only on the basis of what is actually available for consumption" (Schmalbeck et al. 2018, 402). Thus, Andrews (1972, p. 376) has argued that "there is a case to be made for deducting state and local taxes. Funds spent for. . . taxes are not available for bread, wine, or travel." Bittker (1973 ,p. 201) has similarly argued that the deduction "may therefore be defended as a mode of refining the concept of income."

Others have used the income measurement theory to argue against the deduction of state and local taxes. Their argument is that there is "an element of consumption in the amount of state and local taxes paid, at least in the aggregate for all citizens of a particular state. And consumption ordinarily belongs in the tax base, according to the Haig-Simons income definition" (Schmalbeck at al. 2018, p. 402). The focus of the debate is thus on whether the payment of state and local taxes can be viewed as a type of consumption.

According to the efficiency theory of tax deductions, a deduction should be provided only if it does not distort economic choices. In the case of state and local taxes one has to begin with understanding how the level of state and local public goods and services would be determined in the absence of a federal income tax.

In the absence of a federal income tax a benevolent governor would collect tax revenue to finance public goods and services, such as police and fire protection, education, medical benefits, a legal infrastructure for the enforcement of contracts, etc. The tax revenue can also be used to redistribute income among state residents. The aggregate demand for such goods and services is captured in Figure 3 by a downward sloping demand curve, reflecting the decreasing marginal benefit from public goods and services. It is important to note that this curve reflects the total value that state residents derive from public goods and services, and thus captures all positive externalities from the provisions of these goods and services. The cost of taxation is captured in Figure 3 by an upward sloping marginal cost curve. This reflects the increasing marginal cost of collecting revenue from state residents.

A benevolent governor would collect taxes and provide public goods and services as long as the marginal benefit of providing goods and services is greater than the marginal cost of taxation. This means that the governor

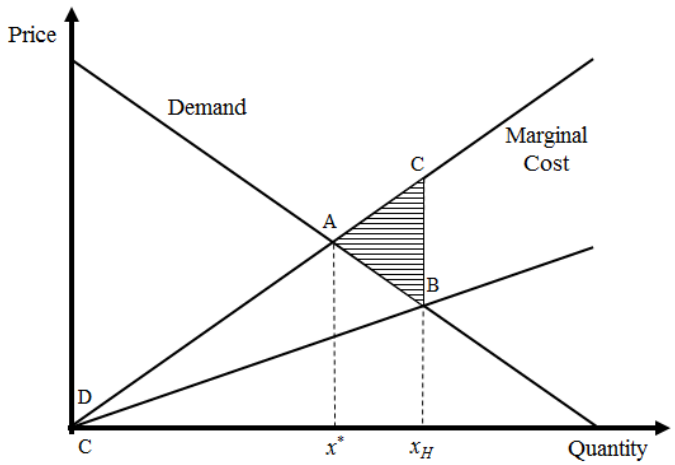

Figure 3: The Demand for and Cost of State and Local Public Goods and Services

would choose point A in Figure 3, and the level of public goods and services would be x^*.

Now, if a federal income tax is imposed and a tax deduction is provided for state and local taxes, the cost of taxing state residents goes down proportionally. In Figure 3 this is reflected by a shift of the marginal cost curve from the DC curve to the DB curve. Under this new effective cost the governor would choose point C in Figure 3, and the level of public goods and services would be x_H. This level of public good and services generates a deadweight loss, which is noted by the shaded triangle ABC.[16]

A more direct way of reaching this conclusion is by simply applying the efficient deduction rule. Recall that according to that rule a cost should be deducted only if the full benefit resulting from this cost is taxed. In the case

[16]Note that the analysis here ignores the fact that the introduction of a federal income tax may shift the demand curve and the marginal cost curve. Specifically, the demand for public good and services may go down, since the federal government is providing some of those goods and services. The marginal cost curve may go up, since the cost of collecting state tax is higher when some tax is already paid to the federal government. Still, incorporating these changes into the analysis will not change the final outcome. As long as the there is a deduction for state and local taxes we will have a dead weight loss, that is public good and services that are provided despite providing a benefit to residents that is lower than their economic cost.

of state and local taxes, the benefit resulting from the cost of the taxes is the benefit residents enjoy from public goods and services. This benefit is generally not taxed. Therefore, if our goal is not to distort economic choices, the cost of state and local taxes should not be deducted.

4.5 Capital Expenditure

Capital expenditures are generally not deductible (I.R.C. Section 263). Instead, these expenditures are capitalized and recovered on a year-to-year basis through depreciation deduction. Expenditures for non-depreciable assets, such as land or company shares, are recovered when the asset is sold. There are, however, many exceptions to this general rule. Deductible capital expenditures include those related to research and development (I.R.C. Section 174), the development of mines or deposits (I.R.C. Section 616), and soil and water conservation (I.R.C. Section 175). The 2017 tax reform significantly expanded the ability to expense capital expenditures. Small businesses can now expense their business property, such as machinery and equipment (I.R.C. § 179). Large business may also expense the cost of machinery and equipment in the next few years (I.R.C. § 168(k)).

The standard income measurement theory explanation for the rule which disallows the deduction of capital expenditures is that it "is consistent with the basic goal of a sound accrual accounting principles, which is to provide a true reflection of income" (Bankman at el. 2019, p. 425). Thus, if a taxpayer purchases a car for a business, then "if his taxable income is to measure accurately his profit or loss for the year, he should be allowed a deduction for the amount by which the car has declined in value during the year" (Schmalbeck et al. 2018, p. 599). According to the income measurement theory, all cases in which the law allows for capital expenditures to be expensed or provides an accelerated depreciation are tax expenditures (Surrey 1973, p. 95-97).

According to the efficiency theory of tax deductions, a deduction should be allowed when it reduces distortions to taxpayers' choices. Thus, a deduction should be allowed for the cost of an activity when the benefit from the activity is taxed. Since the benefit from capital investments is fully taxed, if we want to reduce distortions to capital investments we should allow for a full deduction, also known as expensing, of capital expenditures.

This point can be illustrated if we view the model in Section 3 in present value terms. Suppose that the cost of buying x production machines is x, and that the present value of the revenue from the machines' production is $b(x)$.

In a world with no tax the taxpayer will buy machines until the marginal benefit, in present value terms, is equal to the marginal cost. That is, the taxpayer will purchase x^* machines, where $b'(x^*) = 1$.

In a world with an income tax, if we allow the expensing of the cost of the machines, then their cost to the taxpayer is $(1-t)x$, rather than x. The benefit from the machines is fully taxed ($\beta = 1$), so in present value terms it is $(1-t)b(x)$, rather than $b(x)$. Under such a regime, the taxpayer will buy machines until the marginal benefit, in present value terms, is equal the marginal cost. That is, the taxpayer will buy x^* machines, as before. Thus, when we expense the cost of capital investments, the taxpayer's choices are not distorted by the tax system.

If instead of providing an immediate deduction for the cost of the machines we allow the recovery of the cost through depreciation deduction, we are simply allowing for the deduction of the cost in the future, rather than in the present, when the machines are bought. This means that, in present value terms, we are providing a partial rather than a full deduction of the cost x, since the present value of a future deduction of x is less than x. Thus, despite the fact that the full present value of the benefit of the investment is taxed ($\beta = 1$), only a partial deduction of the cost is provided ($\delta < 1$), which means that such a regime leads to inefficient under-investment. This point was made by Brown (1948, p. 305), who noted that this distortion to investment "stems from the failure of the present worth of the tax rebates from depreciation to reduce the cost of the asset by an amount proportionate to the rate of tax." Therefore, "because the tax proportionately reduces the net receipts. . . but does not proportionately reduce an asset's cost, the tax makes some of the outlays unprofitable which were previously profitable." Accordingly, if the goal of tax deductions is to reduce distortions to taxpayers' economic choices, capital expenditures should be expensed.[17]

[17] I am well aware that expensing capital expenditures turns the income tax into a consumption tax, and therefore such a policy choice is related to the vast literature on consumption tax versus income tax. Discussing that literature is outside the scope of this paper, and the point here is only to highlight the fact that the same policy rule that calls for the deduction of business expenses leads to the expensing of capital expenditures.

5 Extensions

5.1 Other Types of Deductions

The efficiency theory of tax deductions, presented in this paper, focused on the policy question whether a cost should be deductible. The analysis in that showed that, from an efficiency perspective, the answer to this question depends on whether the benefit resulting from this cost is taxed. Though this framework fits many tax deductions, there are certain exceptions.

Some deduction are unrelated to any cost. For example, the standard deduction does not reflect the deduction of any cost. Similarly, the 2017 tax reform provides a deduction equal to 20% of the "qualified business income" of a non-corporate taxpayer. This deduction is also unrelated to any cost.

The appropriate way to view deductions that are unrelated to any cost is as a change to the rate structure. Thus, the new deduction for "qualified business income" simply means that for some taxpayers the top rate bracket is 29.6% instead of 37%. Similarly, the standard deduction simply means that income up to the amount of deduction is tax free. Whether such rates are desirable raises standard policy questions relating to the progressivity of the tax system, which are altogether different from the focus of this paper.

Still, in the case of the standard deduction, since taxpayers have to choose whether to itemize or claim the standard deduction, the deduction has an indirect efficiency effect. Specially, since the 2017 tax reform significantly increased the standard deductions, the number of taxpayer choosing to itemize is expected to significantly decrease. To the extent that some of those itemized deductions, such as the deduction for mortgage interest or the deduction for state and local taxes, are inefficient, the increase in the standard deduction enhances efficiency.

In other cases there is a deduction of a cost that is unrelated to a specific benefit. For example, the casualty loss deduction raises questions of insurance and risk aversion, and is therefore not covered here. This deduction has been analyzed from an efficiency perspective in Kaplow (1991, 1992).

5.2 Optimal Income Tax Framework

The analysis in Section 3 focused on the question of tax deductions independently, and did not consider the question in a broader optimal income tax framework. In such a framework the income tax is used to redistribute in-

come, but since it distorts work effort, society will stop short of its distributive ideal because of the inefficiencies involved in the process of redistribution.

When thinking about tax deductions in this broader framework, a possible argument for not applying the efficient deduction rule is that, perhaps we can get the same level of redistribution with less distortion to work effort, if we allow some distortion to our tax deductions. Or alternatively, given a certain level of distortion to work effort caused by the income tax, perhaps we can use inefficient tax deductions to further redistribute.

The basic problem with this argument is that inefficient deductions will tend to discourage work effort to the same extent as making the rate structure more redistributive. However, when inefficient deductions are employed to redistribute income, there is not only a distortion of work effort. There is also the cost directly associated with the inefficiency of the deduction. Thus, one can show that adopting the efficient deduction rule, with an appropriate change to the rate structure, leaves individuals equally well off, but leaves the government with a surplus, which can be used for further redistribution or to make each individual better off.

This means that, when the income tax rate structure can be adjusted, the efficient deduction rule dominates alternative deduction rules. Thus, the analysis in Section 3, which focused on the efficiency of tax deductions and ignored the broader optimal income tax framework, is generally accurate.[18] This argument is along the lines of the argument for the efficiency of legal rules (Shavell 1981, Kaplow and Shavell 1994, which build on Atkinson and Stiglitz 1972). The argument here therefore is that tax rules are no different than other legal rules. They too should generally be efficient.

[18]Some qualifications to this to this argument apply. The analysis employed a quasi-linear utility function that was additively separable with respect to the benefit from each activity. When the marginal benefit from each activity is affected by the benefit from other activities a social welfare maximizing policy may call for a deduction that is different than the efficient deduction rule. Furthermore, if an activity is complementary to leisure, we may choose to offer a lower deduction for its cost than the efficient deduction rule calls for, to offset somewhat the preexisting distortion to labor effort caused by the income tax. Similarly, when there is heterogeneity in the engagement in activity among people within the same wage class, the alternative tax regime will only be able to keep utility constant on average for each wage class. So one can only say that the alternative tax regime is preferred in expectation. See further discussion on these qualifications in Kaplow and Shavell (2000).

6 Conclusion

Tax deductions are a fundamental topic in every law school course on income taxation. The income measurement theory, held by most tax law scholars, argues that tax deductions are necessary to accurately measure income. This paper applies a standard economic efficiency criterion to the question of tax deductions, developing an efficiency theory of tax deductions.

I present a simple economic model to derive the efficient deduction rule that would not distort expenditures on activities. I then illustrate the application of the efficient deduction rule by considering various particular cases. I argue that the efficiency theory of tax deductions provides a clearer framework for understanding and teaching tax deductions, and a better guide to optimal policy, than the income measurement theory of tax deductions.

To be sure, economic goals, notions of fairness, and administrative simplicity may outweigh the gains from the efficient deduction rule. Still, the efficient deduction rule can serve as a useful benchmark, and departures from the rule can be explained and justified.

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