

Effective Marginal Tax Rates, Part 1: Basic Principles

By Alex Brill and Alan D. Viard

Alex Brill is a research fellow at the American Enterprise Institute and economic adviser at Buchanan Ingersoll & Rooney PC. Alan D. Viard is a resident scholar at the American Enterprise Institute. Copyright 2008 American Enterprise Institute. All rights reserved.

This article, which launches AEI's On the Margin column, is the first part of a two-part series. We discuss how different types of tax provisions shape effective marginal tax rates on income, and identify basic principles that should govern the roles of these provisions in setting effective marginal tax rates. In the next article, we will apply these principles to critique some of the provisions that shape effective marginal tax rates in the current U.S. tax system and in certain proposals.

I. Introduction

Public debate about the tax system often focuses on the level of tax payments by different individuals and groups. Particular attention is often paid to an individual's *average* tax rate, defined as the individual's total taxes as a share of his income. The average tax rate is important for an assessment of how the tax system redistributes resources across different members of society. Lawmakers have generally ensured that average tax rates rise with income to achieve a progressive distribution of the tax burden.

The *incentive* effects of the tax system depend, however, on marginal rather than average tax rates. The marginal tax rate on an activity is the increase in tax that arises when an additional dollar of the activity occurs. In this article, we focus on a particular marginal rate, namely the effective marginal tax rate (EMTR) on income. The EMTR is the change in tax liability that occurs when an additional dollar of income, here taken to be labor income, is earned. In an income tax system, the EMTR measures the impact of the tax system on the incentive to earn income. To minimize disincentives, it is desirable to keep EMTRs low for all taxpayers. As discussed below, however, policymakers face an important trade-off between progressivity and incentives.

At first glance, it may seem that the EMTRs at different income levels can be inferred from the published statutory tax rate schedule. In the U.S. tax system and other tax systems, however, the statutory tax rates are only one of the

factors determining EMTRs. In this article, we explain how EMTRs are also affected by other items, including exemptions from taxable income, income-based phaseouts of credits and deductions, nonrefundability of credits, and the exclusion of some types or uses of income from the tax base.

As we explain below, setting tax policy through exemptions, phaseouts, and other items rather than through changes in statutory tax rates does not alter the trade-off between progressivity and incentives. Revenue-neutral measures that make the distribution of the tax system more progressive must increase EMTRs, and reduce work incentives, at some income levels, regardless of how the increase in progressivity is implemented. Accordingly, the decision whether to use phaseouts and other items in place of statutory rate changes should not be based on the mistaken view that this trade-off can be evaded. Instead, the decision should be based on the actual differences between these different types of provisions: whether they provide taxpayers with appropriate incentives to choose between different uses of income, whether they add to or detract from the simplicity and transparency of the tax system, and whether they give the population a stake in restraining the cost of government. We draw on these differences to formulate some basic guidelines for making these decisions. In the next article, we will use those guidelines to evaluate key provisions of the U.S. tax system and certain tax proposals.

II. Benchmark Tax System

We start the analysis with a benchmark income tax system that applies a set of statutory tax rates to all income, with no deductions or exclusions. If the tax system has any credits, they are flat credits that are independent of the amount, type, or use of income and are fully refundable (payable in cash when credits exceed tax liability). To make the discussion more concrete, we work with a simple numerical example, in which the statutory marginal tax rate is 10 percent on the first \$50,000 of income and 30 percent on all income above that level, with no credits. In the benchmark system, the EMTR always equals the statutory marginal tax rate. In Section III, we introduce deviations from the benchmark system of the kinds that are observed in the U.S. tax system and discuss how the deviations affect progressivity and EMTRs.

Even in this simple case, however, the *average* tax rate often differs from the EMTR. When a household's income moves above \$50,000, its EMTR jumps to 30 percent and then remains constant. However, the average tax rate rises with income, as additional income is taxed at the 30 percent marginal rate, while always remaining below 30 percent. At \$50,000, tax liability is \$5,000 and the average tax rate is 10 percent; at \$100,000, tax liability is \$20,000 and the average tax rate is 20 percent; at \$500,000, tax liability is \$140,000, and the average tax rate is 28 percent.

Marginal rates and average rates are not the same, but they are related to each other. All else being equal, an increase in the marginal tax rate at any given income level raises the average tax rate at all higher income levels.¹ Suppose, for example, that the marginal rate was increased from 30 to 40 percent for income in the \$70,000 to \$80,000 range. Tax liability would then be \$1,000 higher at all income levels above \$80,000, implying higher average tax rates. This relationship between the average and marginal rates gives rise to a trade-off. A revenue-neutral increase in progressivity requires an increase in EMTRs at some income levels.

III. Deviations From the Benchmark Tax System

A. Nonrefundability

In the benchmark example, any tax credits are refundable. Refundability means that if the value of a household's tax credit exceeds its precredit tax liability, the government provides the household a cash payment equal to the excess. (The term "refundability" is a misnomer because the household is not receiving a refund of any payment it previously made.) The household faces a negative tax liability and receives a net payment from the government. Flat refundable credits do not change marginal tax rates, because they simply subtract a constant number from the tax liability that is read off of the statutory rate schedule.

In the U.S. tax system, however, most tax credits are nonrefundable in accordance with section 26(a)(1). (The section 32 earned income tax credit and the section 35 health insurance credit are refundable, and the section 24 child credit is partially refundable.) While nonrefundability, relative to refundability, detracts from progressivity, it lowers marginal tax rates. A household enjoying negative tax liability due to a refundable tax credit is likely to face a positive EMTR while a household paying zero income tax as a result of a nonrefundable tax credit is likely to face a zero EMTR.

Table 1 illustrates this point using a specific example, by introducing a \$1,200 credit into the benchmark tax system. Consider a household with taxable income initially equal to \$10,000, implying a before-credit tax liability of \$1,000. If the \$1,200 credit is refundable, the household's tax liability is initially negative \$200, but would rise to negative \$190 if its income rose to \$10,100 and would fall to negative \$210 if its income fell to \$9,900. The household's EMTR equals its statutory marginal tax rate, 10 percent. If the \$1,200 credit is nonrefundable, however, the household's tax liability is fixed at zero around the \$10,000 income level. If the household's income rose to \$10,100 or fell to \$9,900, its tax liability would remain equal to zero. The household faces a zero EMTR until its income reaches \$12,000.

Table 1. Impact of Credit Refundability on EMTR

	Refundable Credit	Nonrefundable Credit
Household Income		\$10,000
Statutory Tax Rate		10%
Tax Liability Before Credits		\$1,000
Value of Tax Credit		\$1,200
Tax Liability	-\$200	\$0
Tax Liability If Income Rises to \$10,100	-\$190	\$0
EMTR	$\frac{(-190 - (-200))}{(10,100 - 10,000)}$ = 10%	\$0

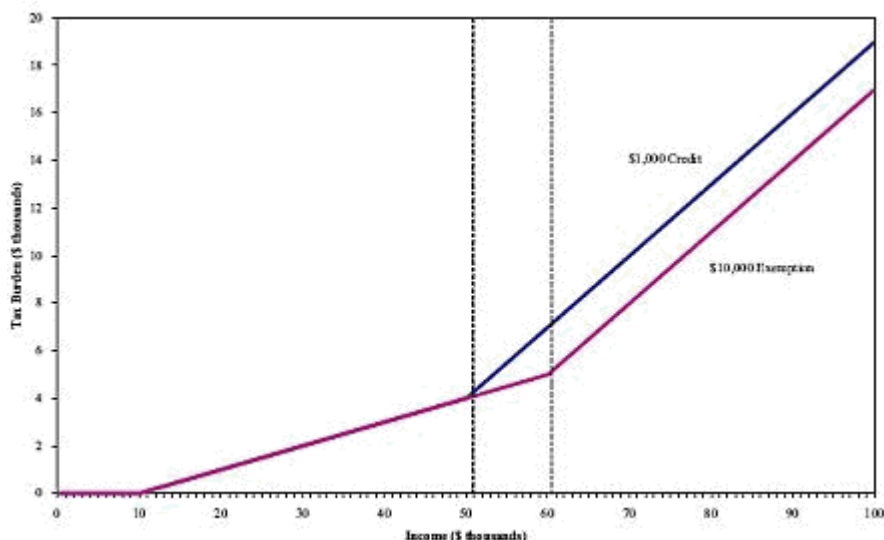
Because a large share of households does not pay federal income tax, expanding refundability can be a powerful tool to increase progressivity. But, like other methods of increasing progressivity, it imposes a cost in the form of higher EMTRs.

B. Fixed Deductions or Exemptions

A fixed exemption is an amount deducted from total income in the computation of taxable income. No tax is paid if total income is below the exemption amount; if total income exceeds the exemption amount, then tax is paid only on the excess amount.

Figure 1 illustrates the difference between a \$10,000 flat exemption and a \$1,000 flat (nonrefundable) credit in the benchmark tax system. Compared with the credit, the exemption is a step away from progressivity. As shown in the figure, tax liability is lower with the exemption at income levels above \$50,000. Households with incomes of \$60,000 or more enjoy a \$3,000 tax savings from the \$10,000 exemption (30 percent * \$10,000) while those with incomes of \$50,000 or less enjoy only a \$1,000 tax savings (10 percent * \$10,000). (Households with incomes between \$50,000 and \$60,000 obtain an intermediate amount of tax savings.) Exemptions and deductions are worth more to those in higher tax brackets.

Figure 1. Exemption Versus Credit



As in the case of nonrefundability, however, the reduction in progressivity is associated with a reduction in EMTRs. The \$1,000 flat credit does not change anyone's marginal tax rates, but the \$10,000 flat exemption reduces the EMTR along one income segment. Households with total incomes between \$50,000 and \$60,000 (the interval between the two dashed lines in the figure) move from the 30 percent bracket into the 10 percent bracket by claiming the \$10,000 deduction; the lower EMTR is reflected by the flatter slope of the tax liability line in the figure. The trade-off between incentives and progressivity continues to apply.

C. Income-Based Phaseouts

In the U.S. tax system, many tax deductions or credits are limited to taxpayers as their incomes rise. In other words, these tax breaks *phase out* as incomes rise. The second article will canvass the numerous provisions; a few examples include the phaseout of the tax exemption for Social Security benefits under section 86, the education tax credits under section 25A(d), and the EITC under section 32. Those phaseouts take the form of specifying a particular income range over which the deduction or credit is gradually removed. Other provisions are phased out through income-based floors; for example, because medical expenses are deductible under section 213(a) only if and to the extent that they exceed 7.5 percent of income, earning an additional \$100 of income phases out \$7.50 of the deduction.

Income-based phaseouts raise the tax payments of higher-income taxpayers and can thereby promote progressivity. However, they increase EMTRs. When a credit is phased out, the marginal rate is increased by the phaseout rate; if a \$100 income increase causes a taxpayer to lose \$3 of a credit, the EMTR rises by 3 percentage points. When a deduction or exclusion is phased out, the marginal rate is increased by the statutory rate multiplied by the phaseout rate; if

a \$100 income increase causes a taxpayer to lose \$10 of a deduction and the taxpayer is in the 30 percent bracket, the resulting increase in tax payments is \$3 and the EMTR rises by 3 percentage points.

D. Tax Preferences

For any given level of statutory tax rates, the EMTR is generally reduced when a deduction or credit is offered for particular uses of income, as with the section 25A credits for spending on higher education and the section 170 deduction for charitable contributions. The EMTR is also generally reduced when a component of labor income is excluded from taxable income, as with the section 106 exclusion for employer-provided health insurance. The reduction in EMTR occurs as long as part of each additional dollar of income earned is devoted to the tax-preferred use or takes the form of the tax-preferred component. For any given level of statutory tax rates, such provisions then reduce EMTRs because the statutory rate no longer applies to all of an additional dollar that a household earns.

For example, suppose that the benchmark tax system is modified by allowing a deduction for spending on apples and that half of all income is spent on apples.² Then the EMTR is only 5 percent for households in the 10 percent bracket and only 15 percent for households in the 30 percent bracket. The EMTR that applies to the earning of additional income is lower than the statutory tax rate because half of the additional income is tax free. The same result would apply if half of all labor income took the form of employer-provided health insurance and that insurance was excluded from taxable income.

This point has sometimes been overlooked by analysts who have focused unduly on statutory tax rates. For example, some analysts viewed the Tax Reform Act of 1986, which sharply lowered statutory tax rates, as dramatically lowering EMTRs. As Alan J. Auerbach and Joel Slemrod pointed out, however, the statutory rate reductions were accompanied by the removal of many credits and deductions, yielding little net impact on EMTRs. Because the revenue-neutral reform did not reduce progressivity, it could not systematically reduce EMTRs, although it may have had other beneficial consequences.³

Varying tax rates across necessities and luxuries does not avoid the trade-off between incentives and progressivity. Taxing luxuries rather than necessities increases progressivity because the tax bears more heavily on households with higher incomes. Because luxuries become a larger share of spending as earnings rise, however, a tax on them raises the EMTR by a larger amount per dollar of revenue raised. The one case in which differential tax treatment of goods improves the trade-off is when some goods are work related, as discussed below.

IV. Choosing Among the Policy Tools

The above analysis stresses the ubiquity of the trade-off between progressivity and incentives. If a particular income range is deemed to merit a higher EMTR to promote progressivity, work incentives will be reduced whether that increase is implemented through an increase in the statutory rate, a modification in exemptions or nonrefundable credits that moves the income range into a different bracket under the existing statutory rate schedule, or an income-based phaseout of credits or deductions. If work incentives are affected in the same manner, does it matter which method is chosen?

The choice among these policy tools remains important because they differ significantly along other dimensions. The policy tools vary greatly in their impact on taxpayers' incentives to allocate income efficiently among different uses and in their impact on tax simplicity, transparency, and the political economy of government spending.

A. Efficient Tax Incentives

A key concern should be the efficient provision of incentives for any activities that merit a subsidy. Suppose, for example, that apple consumption is beneficial to society (has a positive externality) and merits a subsidy of some form. The primary factor in choosing the form of the apple subsidy (deduction, refundable credit, etc.) should be economic efficiency; the size of the subsidy to a particular taxpayer's apple consumption should match the degree of social benefit arising from that person's apple consumption. Deviating from this prescription to increase progressivity or to lower EMTRs is generally unwarranted, because statutory tax rates can be adjusted to achieve those purposes.

One important implication of this principle is that there should be no tax break of any kind for activities that do not provide a benefit to society, beyond the benefit directly enjoyed by consumers. Although tax preferences for uses and components of labor income can lower EMTRs, they are inefficient relative to a reduction in statutory rates. The inefficiency arises because these preferences, unlike statutory rate reductions, encourage taxpayers to shift into the tax-favored activities. Although base-broadening reforms that reduce the statutory rate, like the Tax Reform Act of 1986, do not lower EMTRs, they can scale back inefficient incentives to shift resources into the previously tax-favored activities.

This general principle about how to subsidize goods that do provide additional benefits to society can be illuminated by first discussing a special case in which tax incentives should be provided through refundable tax credits without income phaseouts. In this case, deductions, nonrefundable credits, and income phaseouts should be avoided. This case has been discussed by Brian H. Jenn⁴ and also by Lily L. Batchelder, Fred Goldberg, and Peter Orszag.⁵

In the special case, the size of the extra benefits conferred by consumption of the good does not depend on the identity of the consumers. For example, if each dollar spent on apples provides 30 cents of additional benefit to the rest of society, then a 30 percent refundable credit with no income phaseouts is the best tax policy to encourage the consumption of apples and thereby expand the resulting benefits to society.

This policy is best because everyone faces the correct incentive for apple consumption; each person receives a 30 percent subsidy that matches the benefits he actually confers on society. Efficiency is obstructed if the credit is replaced by a deduction, because a larger subsidy is then provided for apple purchasers in a high tax bracket, although their purchases are no more beneficial than anyone else's. Efficiency is similarly obstructed if the credit is made nonrefundable, because no subsidy is then provided for some low-income apple purchasers, or if an income phaseout is applied to the credit, because no subsidy is then provided for high-income apple purchasers.

Although supporters of work incentives may be tempted to lower the EMTR by turning the credit into a deduction or by making it nonrefundable, a reduction in the statutory marginal tax rate better serves that purpose under the stated assumptions. Conversely, although supporters of progressivity may be tempted to add an income phaseout to the credit, an increase in the statutory marginal tax rate better serves that purpose.

The section 163(h)(3) mortgage interest deduction offers an example of the improper use of a deduction when a credit would be more sensible. The deduction is intended to lower the cost of buying a home and to promote homeownership, but it provides a larger cost reduction for those in higher tax brackets, an effect that has no policy justification. A similar issue arises for the section 106 exclusion for employer-provided health insurance.

Of course, if the stated assumptions do not hold, efficiency may call for a different type of subsidy. The social benefits of apple purchases may vary across different income groups, making one or more of the other policies preferable to uniform refundable credits. In general, measuring the social benefit of a particular activity can be a complex task. While a democratic legislative process may offer a good way to determine the optimal progressivity of the tax code, determining the proper subsidy for a good with a positive social benefit is likely to be a more uncertain endeavor.

Different considerations also apply to work-related goods. When a household earns an additional \$100 of income by working more, it may allocate more of that income to certain goods than it would if it simply received a \$100 gift or a \$100 increase in earning power from its current work. Such goods may include work-related tools or clothing or goods that become more attractive when leisure time becomes scarcer, such as child care and frozen dinners. Setting aside

compliance and complexity concerns, economic analysis confirms that preferential treatment should be given to work-related goods, with a full deduction for goods that serve no purpose except to enable work and a partial deduction for other goods that become more attractive as work increases. Giving a tax preference for these goods boosts work incentives without a corresponding reduction in progressivity because purchases of the goods are associated with additional work.⁶ Tax preferences for work-related costs should generally take the form of deductions. The higher tax savings for those in higher brackets are efficient because taxpayers in higher brackets face larger work disincentives that can be alleviated by the preferential treatment of these items.

B. Other Factors

There may be other relevant factors that are not reflected in stylized economic models.

Some policy tools may either increase or reduce the complexity of the tax system. For example, income-based phaseouts increase complexity. Transparency is another relevant feature. Policies that reduce EMTRs in an opaque manner may be particularly undesirable; if households do not understand the reduction in their EMTR, they may not respond to the incentive to earn income and the reduction in progressivity is wasted. On the other hand, opaque increases in the EMTR may increase progressivity without actually causing households to earn less income. (Income-based phaseouts may fall into this category.) Even then, however, a lack of transparency may undermine public faith in government and impede proper policy deliberations. Furthermore, households' general awareness of the existence of income phaseouts or other opaque provisions may discourage them from earning income, even if they do not know the details of the provisions.

The use of credits raises another concern. Providing tax credits for a wide range of activities may easily result in a situation in which a large number of taxpayers have zero income tax liabilities (or negative liabilities if the credits are refundable). Such households may then perceive that they do not bear any of the costs of government, eliminating any incentive to vote in a manner that restrains those costs.

There may be another option, if voters are subject to a particular type of fiscal illusion. Credits that are income-independent and refundable may be an efficient way to subsidize goods that provide social benefits, but such credits have no inherent connection to the rest of the income tax system. If administrative considerations permit, such credits could be replaced by matching grants implemented as spending programs. Households that pay taxes while receiving grants through separate spending programs may still perceive themselves as having a stake in restraining the general cost of government. To be sure, any difference in perceptions would rest on fiscal illusion. The households that

perceive that a general expansion of the government may increase their positive tax liabilities should also perceive that it may reduce their matching grants. It seems hard to deny, though, that paying a positive explicit tax liability is a powerful way to dramatize the costs of government.

V. Conclusion

EMTRs play a key role in governing incentives to earn income. EMTRs are affected, sometimes in relatively subtle ways, by a variety of features of the tax system.

Our analysis yields the following conclusions:

- A variety of policy tools employed in the current tax system creates EMTRs that differ significantly from statutory tax rates. Credits, deductions, income floors, exemptions, and refundability can raise, lower, or shift tax rates considerably.
- Subsidizing goods that are not work related generally leads to inefficiency and distortion, unless the goods provide quantifiable extra benefits to society (beyond the benefits to consumers).
- Work-related costs should be deductible if administratively feasible.
- If a good yields widespread social benefits (beyond the benefits to consumers) that are independent of who consumes the good, then a flat refundable credit with no income phaseout may be the best way to subsidize the good through the tax system. It may be preferable, however, to provide the subsidy through a spending program instead.
- Avoid income phaseouts, except when there is a reason why the subsidy to the purchases of a good should apply only in a particular income range.

In the second article of this series, we will apply these principles to critique the U.S. income tax system and recent proposals to change it.

FOOTNOTES

¹ In mathematical terms, the average tax rate at, say, \$100,000 is the sum of two terms. The first term is the average of the marginal tax rates that apply at all of the income levels between zero and \$100,000. The second term is the zero-income tax liability (the positive or negative tax that applies to a household with zero income) divided by \$100,000.

² If the amount spent on apples did not depend on income, the deduction would not have the effects described in the text, although it would still lower EMTRs in the same manner as the fixed exemption considered in subsection B by moving some taxpayers into lower brackets.

³ "The Economic Effects of the Tax Reform Act of 1986," 35 *J. of Econ. Literature* 589 at 600-603 (June 1997).

⁴ "The Case for Tax Credits," 61 *Tax Law*. 549 (Winter 2008).

⁵ "Efficiency and Tax Incentives: The Case for Refundable Tax Credits," 59 *Stanford L. Rev.* 23 (Oct. 2006).

⁶ For a technical discussion, see Anthony B. Atkinson and Joseph E. Stiglitz, *Lectures on Public Economics* (New York: McGraw-Hill, 1980), pp. 435-441.