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The Effect of Base-Broadening Measures on Labor Supply and Investment: Considerations for Tax Reform

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Summary

One source of interest in a tax reform that broadens the base and lowers the rate is the potential increase in growth, as labor supply and investment respond to lower marginal tax rates. Yet, studies of a signature reform in the past, the Tax Reform Act of 1986, found little effect on growth. The act was revenue and distributionally neutral, which is a goal of some recent tax reform proposals. One reason advanced for the limited effects on growth is that the effects of provisions that broaden the base to finance lower statutory rates increase effective marginal tax rates for some taxpayers.

This report shows how options to broaden the tax base by placing limitations on itemized deductions can potentially work counter to the growth effects of reducing marginal tax rates, primarily through reducing labor supply. It also shows how these effects—along with other base-broadening provisions, such as slowing depreciation—limit the effects on investment and savings and can eventually reduce the size of the capital stock in the economy. The effects on labor supply and the capital stock are considered in turn.

To examine the potential effects of base broadening on effective tax rates facing labor, the analysis examines provisions to eliminate itemized deductions for state and local taxes, for charitable contributions, and for both. It also examines provisions to eliminate itemized deductions altogether or to impose dollar caps ($17,000 and $25,000). Eliminating itemized deductions would raise effective marginal tax rates by almost two percentage points on average and is estimated, using common behavioral responses, to reduce labor supply by 0.2% to 0.6%. These effects are significant compared to projected effects in the Tax Reform Act of 2014 (H.R. 1, 113th Congress), where labor supply was projected to increase by 0.4% to 0.8%. More limited restrictions to itemized deductions result in smaller reductions in labor supply.

Similar to the analysis for labor supply, the potential effects of base broadening on effective tax rates for capital investment are examined. The analysis includes two itemized deduction restrictions: disallowing the deduction for state and local taxes and disallowing all itemized deductions. Eliminating these provisions increases the effective marginal tax rate on business income, interest income, dividends, and capital gains. It also included the effects of three provisions that affect how quickly an investment is recovered. One is to move to the alternative depreciation system that forms the baseline for measuring the benefits of accelerated depreciation. The other two provisions are to depreciate two types of intangible investments, research and development and advertising, over a 10-year period. The analysis also considered repeal of the production activities deduction (which allows a 9% deduction from taxable income for certain domestic production, such as manufacturing) and indexation of interest deductions and payments for inflation.

Moving to the alternative depreciation system had the greatest effect, reducing the long-run capital stock (using a range of behavioral responses) by 0.8% to 1.6%. It more than offset the effect of a 10 percentage point corporate rate reduction. Indexing interest deductions and payments for inflation had the next largest effect, 0.5% to 1.1%. Repealing itemized deductions for state and local taxes reduced the capital stock by 0.1% to 0.2%, and repealing all itemized deductions reduced it by 0.1% to 0.3%. Repealing all itemized deductions offset about a third of the effect of reducing the statutory corporate tax rate by 10 percentage points.

An inevitable characteristic of a revenue-neutral tax reform is a tendency to balance out positive and negative effects on labor supply and growth. Revenue-neutral tax reform may have other virtues, but given the inevitable trade-off of such an approach, a major impact on growth may not be one of them.

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The federal tax system has the ability to influence the economy and decisions of individual taxpayers. This influence has engendered a healthy debate about the extent to which the current federal tax system promotes the socially optimal amounts of economic growth and income redistribution.

This debate has played itself out in recent years in the context of tax reform. In these discussions, the Tax Reform Act of 1986[1] (TRA86, P.L. 99-514) is often used to represent an example for tax reform. TRA86 lowered marginal tax rates by broadening the tax base for both individuals and corporations, while roughly maintaining revenue and distributional neutrality.

While there are many possible goals for tax reform,[2] subsequent economic analysis of TRA86 did not find the significant supply-side effects some expected from the reductions in marginal tax rates that occurred as part of the act. Supply-side growth results from factors that reduce *effective marginal tax rates*.[3] According to advocates of supply-side economics, high marginal tax rates strongly discourage income, output, and the efficiency of resource use.[4]

In a meta-analysis of the economic effects of TRA86, Auerbach and Slemrod[5] suggest that large supply-side effects were not observed because the reduction in marginal tax rates overstates the overall reduction in effective marginal tax rates, once other provisions are taken into account. As the authors state,

> The constraints put on the tax reform—revenue and distributional neutrality—made large overall effective rate reductions ... unlikely or even logically impossible.

As the Tax Reform Act of 2014 (H.R. 1, 113th Congress) and proposals put forward by various other bills, commissions, panels, and think tanks have followed a similar model as TRA86, an examination of how changes to provisions other than marginal tax rates affect effective marginal tax rates may be instructive.

The potential for economic growth continues to motivate tax reform. This growth arises from four basic sources: labor employed in the economy, the stock of capital, land, and technological advance. Land is fixed, and most technological advance is generally treated as exogenous and not influenced by policy, although tax policy can affect investments, for example, in research and development which create intangible assets. Thus the basic sources of inputs affected by tax policy are labor and capital.

This report attempts to show how options to broaden the tax base by placing limitations on itemized deductions can potentially work against the expansionary effects of reducing marginal tax rates. After base-broadening tax reform taxpayers may face lower statutory marginal rates but some taxpayers—those who itemize—may have more of their income subject to tax, effectively increasing their marginal tax rates. The report also addresses other common base-broadening provisions that increase the effective marginal tax rate on the return to capital.

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[1] A brief summary of the Tax Reform Act of 1986 can be found at http://www.taxpolicycenter.org/legislation/1980.cfm#TRA1986.

[2] Improved economic efficiency, equity, and simplicity are three such criteria often used to motivate and evaluate tax reform.

[3] An effective marginal tax rate is the percentage of an additional dollar of earnings that its recipient would pay in taxes.

[4] James D. Gwartney, *The Concise Encyclopedia of Economics: Supply Side Economics*, Library of Economics and Liberty, http://www.econlib.org/library/Enc/SupplySideEconomics.html.

[5] Alan J. Auerbach and Joel Slemrod, "The Economic Effects of the Tax Reform Act of 1986," *Journal of Economic Perspectives*, pp. 589-632, June 1997. The article reviews and provides citations for numerous economic studies on the effects of the Tax Reform Act of 1986 and uses this information to make conclusions concerning the overall effects of the Tax Reform Act of 1986.

The report considers the effects on labor supply and savings (which affects the stock of capital) in turn. The primary effect of the increase in marginal tax rates arising from itemized deductions is to labor supply as taxpayers respond to higher marginal tax rates. The capital stock is also affected through changes in savings and investment, but this change takes place slowly. The report also analyzes the eventual effects of restricting itemized deductions, along with other base-broadening provisions, such as slowing depreciation, on the capital stock.

This report does not attempt to model a full-scale tax reform with multiple policy levels moving simultaneously. Instead it models, in the case of labor supply, the principal driver of output effects in the budget window, a simplified version of current law applied to a sample of 2008 tax filers in which the only policy changes made are new limits on itemized deductions. The report also examines, in addition to the new limits on itemized deductions, several different types of changes to tax burdens on savings and investment that have commonly appeared in tax reform proposals.

Labor Supply

The effect of marginal tax rates on labor supply occurs through what economists term the "substitution effect."[6] In the context of labor supply, the substitution effect represents the effect of taxes on the relative prices of leisure and consumption. According to economic theory, the substitution effect predicts that an increase in taxes on labor will decrease the amount of labor supplied because lower after-tax wages make the alternative use of time, leisure, less expensive. The magnitude of this reduction depends upon two factors, the change in effective marginal tax rates and the responsiveness of workers to the change in effective marginal tax rates (what economists refer to as the elasticity).

The analysis in this section examines the effects of several base-broadening proposals that have appeared in tax reform proposals. In particular, all of the proposals examined would limit itemized deductions. The resulting changes in effective marginal tax rates are then multiplied by commonly used labor supply elasticities of substitution to arrive at the estimated effects on labor supply.

This calculation does not take into account feedback effects from the economy. The contraction in supply causes the wage to decline which could, in turn, affect labor supply. As shown in **Appendix C**, such effects are likely to be negligible. Similarly, eventual changes in the capital stock are likely to have negligible effects on labor supply.

Effects on investment, where the effective marginal rate is only one input, are examined in the "Capital Stock" section.

Effective Marginal Tax Rates for Selected Policy Options

Effective marginal tax rates in this report are calculated by applying a simplified individual income tax calculator to the 2008 IRS Statistics of Income Public Use File (see **Appendix A**). The parameters in the calculator are from 2014, with dollar values discounted to 2008 dollars.[7]

Tax rates are estimated for six options to limit itemized deductions (plus a current law base case). The tax rate estimates are weighted by their shares of labor income, interest income, dividend

[6] In standard economic labor supply models, theory predicts that the substitution effect will be opposed by an income effect working in the opposite direction. When wages fall both consumption and leisure are reduced. Which effect dominates is an empirical question and depends upon both marginal tax rates (which determine the substitution effect) and average tax rates (which determine the income effect). As this report does not attempt to measure average tax rates, this analysis focuses solely on the substitution effect.

[7] See **Appendix A** for a more detailed description of the methods used to calculate effective marginal tax rates.

income, capital gains income, and business income for each decile (see **Table A-4** in **Appendix A**). These estimates are used as inputs into the analysis in the next section of the report. The remainder of this section estimates effective marginal tax rates and changes in effective marginal tax rates for the following policy options:

- Elimination of itemized deductions for state and local taxes
- Elimination of itemized deductions for charitable giving
- Elimination of itemized deductions for state and local taxes and charitable giving
- Elimination of itemized deductions[8]
- Capping itemized deductions at $17,000
- Capping itemized deductions at $25,000[9]

These policy options were chosen to illustrate the potential effects, though they do not necessarily reflect current policy proposals.

The resulting effective marginal tax rates for itemizers[10] for current law and each of the six options are shown in **Table 1**. The rows in **Table 1** differ by how they treat tax rates faced over different portions of the income distribution—for each of the listed sources. For example, taxpayers in the top decile of income earn just over one-third of all interest income. As a result, the tax rate faced by taxpayers in the top decile receives a weight of just over one-third for all estimates weighted by labor income.

Table 1. Effective Marginal Tax Rates

Weighted by Source of Income, Itemizers Only

	Current Law	Eliminate itemized deduction for state and local taxes	Eliminate itemized deduction for charitable contributions	Eliminate itemized deduction for state and local taxes and charitable contributions	Eliminate itemized deductions	Cap itemized deductions at $17,000	Cap itemized deductions at $25,000
Labor Income	24.03	25.88	24.68	26.48	26.85	25.94	25.37
Interest Income	22.41	24.16	23.03	24.73	25.18	24.23	23.66
Dividend Income	27.70	29.76	28.4	30.43	30.71	29.98	29.45
Capital Gains Income	29.56	31.74	30.28	32.44	32.69	32.03	31.52
Business Income	26.72	28.73	27.41	29.39	29.71	28.93	28.40

Source: CRS calculations using the IRS 2008 Public Use File.

[8] Urban-Brookings Tax Policy Center, *Options to Repeal or Limit Itemized Deductions*, http://www.taxpolicycenter.org/numbers/displayatab.cfm?Simid=449.

[9] The $17,000 and $25,000 caps are deflated to 2008 dollars in the analysis.

[10] Itemizers represent roughly one-third of all taxpayers, but receive over two-thirds of all income.

To estimate the effects of the policy options on the effective marginal tax rates of itemizers as calculated in this report, one can subtract the effective marginal tax rate in the current law column from the columns representing the policy options. While the resulting differences reflect the effect of the policy option on itemizers, they cannot be correctly applied to economy-wide estimates of labor supply—as this difference does not account for the income earned by taxpayers that do not itemize.[11]

Table 2 presents the effects of the policy options after adjustment for non-itemizers. Regardless of the type of income used to weight the change in effective marginal tax rates across deciles, the option to eliminate itemized deductions for charitable contributions yields the smallest effect—well less than one percentage point. Conversely, the option to eliminate all itemized deductions results in the largest effect in all cases.

Table 2. Percentage Point Change in Effective Marginal Tax Rates

Weighted by Source of Income

		Eliminate itemized deduction for state and local taxes	Eliminate itemized deduction for charitable contributions	Eliminate itemized deduction for state and local taxes and charitable contributions	Eliminate itemized deductions	Cap itemized deductions at $17,000	Cap itemized deductions at $25,000
Change in Effective Marginal Tax Rate (versus current law)	Labor Income	1.15	0.40	1.53	1.76	1.19	0.83
	Interest Income	1.22	0.43	1.62	1.93	1.27	0.87
	Dividend Income	1.68	0.56	2.23	2.46	1.86	1.43
	Capital Gains Income	1.70	0.57	2.25	2.44	1.93	1.54
	Business Income	1.69	0.57	2.23	2.50	1.85	1.41

Source: CRS calculations using the IRS 2008 Public Use File.

Notes: Marginal effects for mortgage interest and property taxes will appear after an adjustment period.

Finally, in order to calculate the labor supply effects, the estimated percentage point changes presented in **Table 2** need to be converted into the percentage changes in the after-tax share (the change in the tax rate divided by one minus the tax rate). These percentage point changes are presented in **Table 3**.

[11] In addition, the rates for capital gains and dividends are subject to special lower rates (although they are subject to increased marginal rates determined by the statutory rate). The initial rate for labor income is 24.97%. The rates for interest income, dividend income, capital gains income, and business income are, respectively, 22.00%, 14.57%, 15.41%, and 27.00%.

Table 3. Percentage Point Change in After-Tax Share

Weighted by Source of Income

		Eliminate itemized deduction for state and local taxes	Eliminate itemized deduction for charitable contributions	Eliminate itemized deduction for state and local taxes and charitable contributions	Eliminate itemized deductions	Cap itemized deductions at $17,000	Cap itemized deductions at $25,000
Percentage Change in Effective Marginal Tax Rate (versus current law)	Labor Income	1.56	0.54	2.06	2.37	1.61	1.12
	Interest Income	1.60	0.57	2.14	2.54	1.68	1.15
	Dividend Income	2.39	0.81	3.17	3.50	2.65	2.03
	Capital Gains Income	2.50	0.83	3.30	3.59	2.83	2.25
	Business Income	2.37	0.81	3.14	3.51	2.60	1.97

Source: CRS calculations using the IRS 2008 Public Use File.

Notes: Marginal effects for mortgage interest and property taxes will appear after an adjustment period.

Responsiveness of Labor Supply to Changes in the Effective Marginal Tax Rate

The size of the taxpayer response to policy options to limit itemized deductions is governed by how sensitive their work decision is to changes in the effective marginal tax rate. As noted earlier, the substitution effect between leisure and consumption causes the labor supply to increase in response to increases in the marginal wage. The elasticities discussed in this subsection are estimates of the labor supply response to a permanent wage change (such as one that would arise from a permanent tax cut or increase) for the labor force. That type of supply response is incorporated in dynamic models with supply-side effects. The labor supply response to a change in wage is uncertain in direction because it is the result of a positive elasticity of substitution and a negative elasticity of income (i.e., as wages increase, consumption of both goods and leisure increases). Previous analyses have accounted for income effects as well as the substitution effects from changing tax rates,[12] and this analysis considers only the additional marginal (substitution) effects from base-broadening.

[12] Accounting for both effects is standard in dynamic analysis and the revenue effect and effect on average wage of a change in the base is automatically incorporated even though the marginal effect is not. For examples of analyses which specifically apply the income and substitution effects see U.S. Congress, Joint Committee on Taxation, *Macroeconomic Analysis of the "Tax Reform Act of 2014,"* February 26, 2014, JCX-22-14, https://www.jct.gov/publications.html?func=startdown&id=4564 and numerous other publications of the Joint Committee on Taxation and the Congressional Budget Office referenced in CRS Report R43381, *Dynamic Scoring for Tax Legislation: A Review of Models*, by Jane G. Gravelle.

Recent surveys of labor supply responses of men indicated that labor supply was largely inelastic.[13] A working paper by researchers at the Congressional Budget Office reviewed recent research and indicated a substitution elasticity for men from 0.1 to 0.3; married women had substitution elasticities from 0.2 to 0.4. For the work force as a whole, a substitution elasticity of 0.1 to 0.3 was indicated and is reported in **Table 4**. In addition, a 2014 Macroeconomic Analysis conducted by the Joint Committee on Taxation used a wage-weighted population substitution elasticity of 0.1 to 0.2.[14]

Table 4. Labor Supply Substitution Elasticities

	Lower-Bound	Upper-Bound
Congressional Budget Office (2012)	0.1	0.3
Joint Committee on Taxation (2014)	0.1	0.2

Source: Robert McClelland and Shannon Mok, A Review of Recent Research on Labor Supply Elasticities, Working Paper, Congressional Budget Office, October 12, 2012, and U.S. Congress, Joint Committee on Taxation, *Macroeconomic Analysis of the "Tax Reform Act of 2014,"* 113th Cong., February 26, 2014, JCX-22-14.

Overall Labor Supply Response to Limiting Itemized Deductions

As discussed above, the supply-side response to limiting itemized deductions—as a manner of base broadening—can be calculated using the percentage change in marginal effective tax rates and the labor supply substitution elasticity. Increases in effective marginal tax rates—which decrease the portion of labor income that a person keeps—provide an incentive for individuals to work less and, in aggregate, supply less labor to the economy. Estimates of this aggregate labor supply response are presented in **Table 5**.

Table 5. Percentage Decrease in Labor Supply from Limiting Itemized Deductions

	Low-Elasticity (0.1)	High-Elasticity (0.3)
eliminate itemized deduction for state and local taxes	0.16	0.47
eliminate itemized deduction for charitable contributions	0.05	0.16
eliminate itemized deduction for state and local taxes and charitable contributions	0.21	0.62
eliminate itemized deductions	0.24	0.71
cap itemized deductions at $17,000	0.16	0.48
cap itemized deductions at $25,000	0.11	0.34

Source: CRS calculations using the 2008 Public Use File.

Notes: The estimated effects are obtained by multiplying the substitution elasticity by the percentage change in after-tax share (the change in tax rate divided by one minus the tax rate). The effects could be slightly different in

[13] Michael P. Keane, "Labor Supply and Taxes: A Survey," *Journal of Economic Literature*, vol. 6, no. 4 (December 2011); and Robert McClelland and Shannon Mok, A Review of Recent Research on Labor Supply Elasticities, Working Paper, Congressional Budget Office, October 12, 2012.

[14] U.S. Congress, Joint Committee on Taxation, *Macroeconomic Analysis of the "Tax Reform Act of 2014,"* February 26, 2014, JCX-22-14, Table 7, https://www.jct.gov/publications.html?func=startdown&id=4564.

the short run if income and substitution effects are different due to feedback effects from wages. See the discussion in **Appendix C**.

In tax reform proposals, these negative effects on labor supply from base broadening would partly offset the positive effects on labor supply from lower marginal tax rates. To put the results presented in **Table 5** in perspective, the Joint Committee on Taxation (2014) analysis of a comprehensive tax reform proposal, the Tax Reform Act of 2014 (H.R. 1, 113th Congress), found labor supply increases ranging from 0.4% to 0.8% for FY2014-FY2023.[15] This estimate was for a complex proposal with many elements.[16] Depending on how changes in effective marginal tax rates are incorporated in macroeconomic models, including these effects could reduce estimated growth effects of tax reform. It appears, however, that incorporating the supply reductions from using the high elasticity estimates associated with eliminating itemized deductions for state and local income taxes (a provision included in that proposal) could offset a significant share of the gains in labor supply estimated in an analysis of the growth effects of tax reform.[17]

Capital Stock

The effects of many base-broadening provisions, such as slowing depreciation, have frequently been included in calculations of how tax reform affects savings and investment. Increases in individual income rates through base broadening, however, also affect the return on savings and investment, through effects on the tax rate for unincorporated businesses, as well as taxes on passive investment returns (interest, dividends, and capital gains). These effects have generally been excluded from calculations of tax reforms' effects on economic growth. This section examines the effect of both individual base-broadening provisions as discussed in the previous section and of other base-broadening changes that have been widely considered in analyzing the macroeconomic effects of tax reform. These effects are estimated for the returns on investment in equipment, structures, and intangible business assets.

In the 10-year budget horizon, the effect of base broadening on the capital stock is likely to be smaller than the effect on labor because capital changes accrue gradually while labor participation can change more quickly. And, as in the case of labor supply, the response is likely to be modest.[18] Capital could also be attracted from abroad for some changes, but these effects are also likely

[15] U.S. Congress, Joint Committee on Taxation, *Macroeconomic Analysis of the "Tax Reform Act of 2014,"* February 26, 2014, JCX-22-14, Table 7, https://www.jct.gov/publications.html?func=startdown&id=4564.

[16] U.S. Congress, Joint Committee on Taxation, *Marcoeconomic Analysis at the Joint Committee on Taxations and the Mechanics of its Implementation: Outline of Presentation of the Joint Committee Staff at the Brookings Institution Program "Dynamic Scoring: Now What?",* committee print, January 26, 2015, JCX-3-15.

[17] The estimate in this report is for the total change in labor supply (which could capture changes in both labor force participation and hours supplied by workers. As noted earlier, the absolute value of the effect on actual labor employed can be slightly reduced by the general equilibrium interactions in the economy (see **Appendix C**). The Joint Committee on Taxation reports an employment effect, which captures this small general equilibrium effect and in some scenarios, be increased by taking into account short-run demand side effects (which in turn depend on assumed actions of the Federal Reserve). For example, with their higher elasticity, the employment effect is 0.5% rather than 0.8% without the demand-side effects.

[18] See CRS Report R43381, *Dynamic Scoring for Tax Legislation: A Review of Models*, by Jane G. Gravelle and CRS Report R42111, *Tax Rates and Economic Growth*, by Jane G. Gravelle and Donald J. Marples for discussions of economic effects of taxes on savings.

small.[19] In addition, with base-broadening effects, a revenue-neutral tax reform accompanied by rate reduction can have no effect or even a negative effect on the cost of capital.[20]

The effective marginal tax rates for investment income are the same measure as the marginal tax rates for labor income: they estimate the share of the earnings from investments that are paid in taxes. Many features of the tax code outside of statutory rates affect this share, which depends on the amount and timing of tax payments, deductions, and credits. The effective marginal tax rates on earnings from investment are calculated by first determining a required after-tax rate of return and an expected rate of decline in productivity of the asset due to economic depreciation. Economic depreciation measures the change in the value of the asset as it is used up over time, and in an infinitely lived investment the rate of decline in this value is equal to the rate of decline in productivity. The analysis then determines how much the investment must initially produce in order for the sum of after-tax profits over time, discounted by the after-tax rate of return, to equal the investment outlay (i.e., to break even).[21] Then all of the tax payments and deductions are eliminated, and the before-tax profit flows are used to determine what pre-tax discount rate would match the flows to the original cost. The effective tax rate is the pre-tax rate of return minus the after-tax rate of return, divided by the pre-tax rate. This discounted cash flow method produces a formula termed the user cost of capital or the rental price of capital, which can be used to derive an effective tax rate. The formula accounts for the major tax provisions that affect tax burdens, including tax rates and the speed with which the investment cost is deducted (tax depreciation rates).

The analysis begins with the tax rates under current law. These estimates do not include the effects of "extender" provisions: bonus depreciation and the tax credit for research and development.[22] They include all business assets (and thus exclude owner-occupied housing) except for land (where taxes are likely to be capitalized) and inventories (which are expected to be relatively unresponsive to rates of return).

Tax rates are estimated for 32 different assets: 22 equipment assets, 7 structures assets, and 3 categories of intangible assets. Separate estimates are provided for corporate and noncorporate capital stocks with the totals weighted by their shares of different types of assets. The details of the asset distribution and other measures incorporated in these estimates are shown in **Appendix B**. The remainder of this section estimates effective tax rate effects for the following changes:[23]

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[19] See CRS Report R41743, *International Corporate Tax Rate Comparisons and Policy Implications*, by Jane G. Gravelle for simulations of the effect on capital inflows of a corporate rate cut.

[20] See, for example, the Joint Committee on Taxation's Analysis of H.R. 1, the tax reform proposal introduced in the 113th Congress by then Ways and Means Committee Chairman Dave Camp, *Macroeconomic Analysis of the Tax Reform Act of 2014*, JCX-22-14, February 26, 2014, https://www.jct.gov/publications.html?func=startdown&id=4564. Their analysis found that base-broadening effects, such as repeal of accelerated depreciation, offset the effects of rate reduction and resulted in no discernable effects on the cost of capital.

[21] Discounting means dividing each flow by a discount factor. For a flow earned a year from now, the discount factor is $(1 + R)$, for a flow earned two years from now $(1+R)^2$, for a flow three years from now $(1+R)^3$, where R is the discount rate. In practice, however, the analysis uses a continuous time method with continuous compounding.

[22] For a discussion of these provisions that expire and have been renewed, generally a year or two at a time, see CRS Report R43898, *Tax Provisions that Expired in 2014 ("Tax Extenders")*, by Molly F. Sherlock.

[23] Most of these provisions appear in tax expenditure lists. Exceptions are capitalizing advertising and indexing interest, the latter because the tax expenditure list does not account for the effects of inflation. These provisions or similar ones have appeared in numerous proposals, including H.R. 1 in the 113th Congress, a series of tax reform bills sponsored or co-sponsored by Senator Ron Wyden, the latest S. 727 in the 112th Congress, and the proposals to reform cost recovery and tax accounting by the Finance Committee staff under Senator Baucus's chairmanship, November 19, 2013, at http://www.finance.senate.gov/newsroom/chairman/release/?id=536eefeb-2ae2-453f-af9b-946c305d5c93.

- Three capital cost recovery provisions that affect how quickly the cost of an investment is deducted for tax purposes. One is to move to the alternative depreciation system that forms the baseline used by the Joint Committee on Taxation for measuring the benefits of accelerated depreciation. The other two provisions are to depreciate two types of intangible investments, research and development and advertising, over a 10-year period. These investments are currently expensed (deducted immediately).
- Repeal of the production activities deduction, which allows a 9% deduction from taxable income for certain domestic production, such as manufacturing.
- Indexation of interest deductions and payments for inflation.
- Elimination of the itemized deduction for state and local income taxes.
- Elimination of all itemized deductions.

Tax Rates Under Current Law

Current effective tax rates for equity investments, just considering the firm's taxes, are shown for each asset in **Table 6**. These rates capture the effects of accelerated depreciation (deducting the cost of investments faster than their decline in economic value), as well as the production activities deduction. The rates in this table can be compared with the statutory corporate tax rate of 35% and the estimated statutory tax rate for noncorporate firms of 27% (as determined by the analysis of the Public Use Files as discussed in the previous section on labor).

Table 6. Effective Tax Rates by Asset Type, Current Law, Firm-Level Equity Investments

Asset Type	Corporate Business (%)	Noncorporate, Business (%)
Autos	32	25
Office/Computing Equipment	29	23
Trucks/Buses/Trailers	22	17
Aircraft	17	13
Construction Machinery	21	16
Mining/Oilfield Equipment	26	20
Service Industry Equipment	27	21
Tractors	24	19
Instruments	26	20
Other Equipment	26	19
General Industrial Equipment	23	17
Metalworking Machinery	23	17
Electric Transmission Equipment	23	17
Communications Equipment	18	13
Other Electrical Equipment	29	22
Furniture and Fixtures	25	19
Special Industrial Equipment	20	15

Asset Type	Corporate Business (%)	Noncorporate, Business (%)
Agricultural Equipment	23	17
Fabricated Metal	28	22
Engines and Turbines	30	23
Ships and Boats	22	16
Railroad Equipment	17	12
Mining Structures	11	9
Other Structures	33	26
Industrial Structures	36	28
Public Utility Structures	25	18
Commercial Structures	34	27
Farm Structures	25	19
Residential Structures	28	22
Intangibles, R&D	0	0
Intangibles, Advertising	0	0
Intangibles, Other	0	0

Source: Congressional Research Service. See **Appendix B** for method of computation and assumptions.

As this table indicates, most assets are taxed at effective rates below the statutory rate. Most equipment assets, along with public utility structures (treated as equipment in the tax code), are taxed at rates well below the statutory rate, even after considering the effects of the production activity deduction (which decreases the corporate statutory rate by about a percentage point and the noncorporate rate by less than 0.2 percentage points). These lower rates are due to generous tax depreciation rules that allow costs to be recovered faster than the estimated economic decline in the value of capital. Tax rates on intangibles are zero[24] because these costs are expensed (deducted in full when acquired), and tax rates on mining structures (primarily oil and gas) are also low because much of the cost is expensed. Commercial and industrial structures, such as office buildings and plants, tend to be taxed at a higher rate because of the much longer recovery period (39 years), although farm buildings and residential rental structures are favored relative to other buildings due to shorter depreciation periods.

Table 7 provides some aggregated tax rates, combining equipment and nonresidential structures other than public utility structures into groups. Equipment overall and public utility structures are taxed at about two-thirds of the statutory rate for corporations and about 77% of the rate for noncorporate businesses. Intangibles have a zero tax rate.

Table 7. Weighted Average Effective Firm-Level Tax Rates (Assuming No Debt)

Asset Type	Corporate (%)	Noncorporate (%)
Equipment	23.6	17.9
Public Utility Structures	24.9	18.9

[24] Expensing of investment produces a zero tax rate because the value of deducting the cost immediately offsets the present value of taxes paid over the life of the investment.

Asset Type	Corporate (%)	Noncorporate (%)
Other Nonresidential Structures	30.8	23.9
Residential Structures	28.2	21.6
Intangibles		
R&D Intangibles	0	0
Advertising Intangibles	0	0
Other Intangibles	0	0
Total	22.3	20.8

Source: Congressional Research Service. See **Appendix B** for method of computation and assumptions.

Note: Equipment reflects a weighted average of the first 22 rows of **Table 6**. Other nonresidential structures reflect a weighted average of rows 23-25 and 27-28.

Note that the tax rates may be understated because they do not incorporate the effects of bonus depreciation, which allows half of investment in equipment to be expensed (deducted when acquired). Bonus depreciation further accelerates deductions and reduces the effective tax rate on equipment by about 40%, so that the rate for equipment would be around 14%.[25] It also does not include the effects of the research and experimentation tax credit, which would produce a negative tax rate for R&D intangibles.[26] These two provisions have currently expired, although the R&D credit has been in place since 1981.[27] These provisions may be extended again.[28]

Effects of Capital Cost Recovery Provisions

This section examines the effects of base broadening achieved by slowing the deductions for investments. The capital cost recovery provisions have differential effects for different assets and thus are also shown for all 32 assets. **Table 8** shows the effective tax rates for these assets from moving to the alternative depreciation system, which has longer periods over which deductions must be taken and uses a slower depreciation method.[29] (This system uses a straight line method that allows deductions in equal amounts in each year rather than an accelerated method.) It affects both equipment and structures, but not intangibles. The table also shows the effects of recovering investments in research and development and in advertising over a 10-year period using the straight line method.

Focusing on assets affected by the alternative depreciation system, a number of assets (equipment, including public utility structures, and farm structures) that currently have tax rates about a third below the statutory rate are now much closer or even above the statutory tax rate. Nonresidential

[25] See CRS Report R43432, *Bonus Depreciation: Economic and Budgetary Issues*, by Jane G. Gravelle.

[26] Assuming an effective 11.3% credit rate, the effective tax rate for R&D intangibles investment is -57%.

[27] See CRS Report RL31181, *Research Tax Credit: Current Law and Policy Issues for the 114th Congress*, by Gary Guenther for further discussion.

[28] For a discussion of these provisions that expire and have been renewed, generally a year or two at a time, see CRS Report R43898, *Tax Provisions that Expired in 2014 ("Tax Extenders")*, by Molly F. Sherlock.

[29] The alternative depreciation system (ADS) is the baseline against which tax expenditures for depreciation are measured. The rate is straight-line (equal amounts in each period rather than accelerated with high shares in earlier periods) and the lives are longer. ADS lives can be found in Appendix B of IRS Publication 946, at http://www.irs.gov/pub/irs-pdf/p946.pdf.

structures, excluding public utilities and farm structures, are not affected, although residential structures are.

The tax rates on intangible assets are increased significantly, to slightly above the statutory rate for intangibles created by research and significantly above for advertising, where estimated depreciation rates are large (suggesting that the return on advertising is generally short lived).

H.R. 1 (113th Congress), which proposed the amortization of intangibles, also proposed making the R&D credit permanent.[30] If both were included, the effective tax rate would be estimated at 4.4%.

[30] The credit is formally named the research and experimentation (R&E) credit.

Table 8. Effective Tax Rates by Asset Type, with Capital Cost Recovery Provisions, Firm-Level Equity Investments

Asset Type	Corporate Business (%)	Noncorporate, Business (%)
Autos	37	29
Office/Computing Equipment	37	29
Trucks/Buses/Trailers	26	20
Aircraft	28	21
Construction Machinery	27	21
Mining/Oilfield Equipment	38	30
Service Industry Equipment	35	28
Tractors	34	26
Instruments	38	30
Other Equipment	37	29
General Industrial Equipment	34	27
Metalworking Machinery	32	25
Electric Transmission Equipment	30	24
Communications Equipment	31	24
Other Electrical Equipment	41	33
Furniture and Fixtures	34	27
Special Industrial Equipment	33	25
Agricultural Equipment	32	25
Fabricated Metal	37	29
Engines and Turbines	34	27
Ships and Boats	33	26
Railroad Equipment	27	21
Mining Structures	11	9
Other Structures	33	26
Industrial Structures	36	28
Public Utility Structures	30	23
Commercial Structures	34	27
Farm Structures	30	23
Residential Structures	31	24
Intangibles, R&D	38	30
Intangibles, Advertising	63	54
Intangibles, Other	0	0

Source: Congressional Research Service. See **Appendix B** for method of computation and assumptions.

Table 9 provides aggregated effective tax rates after base broadening through changes in capital cost recovery provisions. The estimates indicate that equipment overall would have a tax rate close to the statutory rate but slightly below it, since the rate is lower by about a percentage point due to the production activities deduction. Rates on various structures are slightly lower, although, as shown in **Table 8**, buildings have rates slightly higher than equipment (with the aggregated rate for other nonresidential structures reduced by the lower tax rates on mining and farm structures).

Table 9. Weighted Average Effective Firm-Level Tax Rates, With Capital Cost Recovery Provisions (Assuming No Debt)

Asset Type	Corporate (%)	Noncorporate (%)
Equipment	33.5	26.3
Public Utility Structures	30.3	23.3
Other Nonresidential Structures	31.1	24.2
Residential Structures	31.4	24.3
Intangibles		
R&D Intangibles	38.0	30.0
Advertising Intangibles	63.0	54.0
Other Intangibles	0	0

Source: Congressional Research Service. See **Appendix B** for method of computation and assumptions.

Note: Equipment reflects a weighted average of the first 22 rows of **Table 8**. Other nonresidential structures reflect a weighted average of rows 23-25 and 27-28.

Overall Effect of Base-Broadening Options

The other tax changes (the production activities deduction, disallowing interest deductions that reflect inflation, and changing individual effective tax rates through restricting itemized deductions) do not result in effective tax rates that vary substantially across assets. They are presented, along with the capital cost recovery provisions, for the overall tax system. In addition to firm-level taxes on equity investment that can be compared to the statutory rate, these numbers also provide an overall tax rate that includes the effects of other elements in the tax system: shareholder-level taxes (dividends and capital gains) on corporate equity investments, as well as the tax benefits of borrowing and deducting nominal interest at the firm's rate while only part of this interest is taxed to the creditor. Because of this effect, debt-financed investment tends to be taxed at negative rates or very low rates for many assets and the overall tax rate is lower than the firm-level rate on equity.

Table 10 shows current effective tax rates and the effects of various base-broadening provisions. Accounting for taxes paid by stockholders, the deductibility of interest by the firm, and the taxation of interest by the creditors reduces the current effective tax rate from 22.3% to 12.8% for the corporate sector and from 20.8% to 11.9% for the noncorporate sector. This is a reduction in the tax rate of 43%. The relatively low total tax rate under current law is due to two factors: the rapid cost recovery allowed for many types of investments, and the benefit of deducting nominal interest at the firm's tax rate, while most of that interest (80%) is not taxed to the creditors. This effect is more pronounced because the nominal interest rate includes inflation.

Table 10. Effective Tax Rates Under Alternative Base-Broadening Provisions

Present Law and Proposals	Corporate Equity, Firm Level (%)	Overall Corporate (Debt and Equity with Shareholder and Creditor Taxes) (%)	Noncorporate Equity (%)	Overall Noncorporate (Debt and Equity with Creditor Taxes) (%)	Overall Total (%)
Present Law	22.3	12.8	20.8	11.9	12.4
No Production Activities Deduction	23.2	13.2	20.9	12.0	12.7
Alternative Depreciation	26.7	17.8	23.7	15.7	17.0
Capitalize R&E	26.1	17.2	21.5	12.8	15.2
Capitalize Advertising	24.0	14.7	21.1	12.3	13.4
Eliminate Deduction for Inflation Portion of Interest	22.3	16.1	20.8	14.5	15.4
Repeal State and Local Itemized Deduction	22.3	13.1	22.2	12.9	13.0
Repeal all Itemized Deductions	22.3	13.2	22.9	13.3	13.1

Source: Congressional Research Service. See **Appendix B** for methodology and data.

Notes: The overall tax rate includes the effects of shareholder taxes on dividends and capital gains, deductibility of nominal interest by the firm, and taxation of nominal interest by creditors.

It may also be of interest to compare the effective tax rates in **Table 10** with the rates that would exist without the benefits that lower effective rates. These rates are calculated by adjusting the formulas in **Appendix B**. The rates are calculated assuming economic depreciation and no production activities deduction (which makes effective firm-level taxes equal to the statutory rate). They also assume all passive income (interest, capital gains, and dividends) are taxed, but retain the lower tax rates on capital gains and dividends. With these changes, the overall tax rate for the corporate sector would be 39.7%. This number reflects a share of income taxed at the creditor's rate of 22.0%, the rate on equity of 35.0% at the corporate level, and additional taxes on capital gains and dividends that result in a combined 44.5% tax rate for corporate equity. For the noncorporate sector, the rate would be 25.6%, between the creditor's rate of 22.0% and the firm's rate of 27.0%. These rates are reduced to 30.0% and 21.6% if the exclusions of most interest, capital gains, and dividends are taken into account. The remaining effects that lower effective tax rates arise from the provisions addressed by the base-broadening provisions considered below: accelerated cost recovery, deducting the inflation portion of interest, and the production activities deduction. Each provision is discussed in turn.

Production Activities Deduction

As noted earlier, this provision reduces the effective statutory rate by approximately one percentage point (0.9) for corporate equity but has a 0.2 percentage point effect on noncorporate equity. Eliminating the production activities deduction increases the tax on equity investment but reduces it on debt-financed investment by increasing the rate at which interest is deducted. Overall, the deduction reduces the total tax rate by 0.3 percentage points.

Accelerated Depreciation

The most significant base-broadening provision overall, and in the case of any measure of the effect on the effective tax rate, is the move to the alternative depreciation system (third row of **Table 10**), increasing the overall tax rate by 4.6 percentage points. The effects are somewhat smaller for the noncorporate sector because its share of affected assets is smaller.

Like other capital assets, research and development and advertising create a stream of income in the future. For example, patented innovations allow the firm to be the sole producer for many years. Advertising creates brand identification which affects consumer choice into the future. Both of these create intangible assets that have longevity, and deducting the costs over time is consistent with measuring income. Depreciating research expenses over 10 years has the third-largest effect of any of the provisions considered, increasing effective tax rates by 2.8 percentage points. Although this asset is not a large part of the capital stock, its tax rate is changed significantly. Depreciating advertising expenses over 10 years results in a one-percentage-point increase in the effective tax rate; it is a relatively small part of the capital stock,[31] although its tax rate increased substantially.

These changes affect the tax rates of both debt-financed and equity-financed capital.

Indexing Interest for Inflation

The second-largest provision in terms of the effect on effective tax rates is indexation of interest for inflation (i.e., disallowing the portion of the nominal interest rate that reflects inflation as a deduction and not taxing it to the recipient). It increases the overall tax rate by three percentage points. Given the values used in the calculations (see **Appendix B**), a nominal interest rate of 7.5% and an inflation rate of 2%, 27% (2/7.5) of interest deductions would be disallowed. It affects only debt-financed capital.

Limiting Itemized Deductions

Disallowing the state and local tax deduction or disallowing itemized deductions has the largest effect on noncorporate equity investment for any provision other than adopting the alternative depreciation system. These two changes increase the overall tax rate by 0.6 to 0.7 percentage points, respectively. These effects are smaller than most of the other provisions, but larger than the production activities deduction.

It may be useful to compare these effects of itemized deduction limits to the effect of *lowering* the statutory corporate tax rate, which is one of the objectives of tax reform. Lowering the statutory corporate rate by five percentage points decreases the effective corporate equity rate to 18.6% and the overall corporate effective rate to 10.7%, while reducing the overall effective rate to 11.2% for a 1.2-percentage-point difference. Thus the effects of itemized deductions are the equivalent of

[31] Advertising produces an asset (such as brand name) that has value and is durable in some cases, and so can be treated as an asset to the firm.

2.5-to-2.9-percentage-point changes in the corporate rate, suggesting the importance of considering these provisions in measuring the effects of tax reform on the rate of return on investment.

Effects of Base-Broadening Changes on the Capital Stock

How these alternative policies affect the capital stock depends on the user cost of capital, or the rental price of capital, the sum of the required pre-tax return, and the economic depreciation rate. The user cost of capital is the price of using capital as an input into production. It might be thought of as the amount to be paid to a third party for the lease of an asset. An increase in the effective marginal tax rate through base broadening will increase, holding the after-tax rate of return fixed, the required pretax return to capital and thus the user cost. The user cost of capital is R/(1-t)+d where the tax rate, t, is shown in the last column of **Table 10**. The depreciation rate, d, is estimated to be 9.2% overall, and the after-tax return, R, is 6.2% (see **Appendix B**). Again, this measure holds the after-tax return constant, although changes in that return will be allowed in measures of the long-run effect on the capital stock.

Table 11 shows the increases in the cost of capital for each of the provisions considered (without accounting for feedback effects from the economy if investment changes).

Table 11. Increase in the User Cost of Capital with Alternative Base-Broadening Provisions

	User Cost of Capital (% of Asset Value)	Percent Increase in User Cost
Present Law	16.30	
No Production Activities Deduction	16.33	0.15
Alternative Depreciation	16.69	2.41
Capitalize R&E	16.54	1.44
Capitalize Advertising	16.38	0.50
Eliminate Deduction for Inflation Portion of Interest	16.55	1.54
Repeal State and Local Itemized Deduction	16.35	0.30
Repeal All Itemized Deductions	16.36	0.35

Source: The depreciation rate, d, is estimated to be 9.2% overall and the after-tax return, R, is 6.2%. The user cost of capital is R/(1-t)+d, where the tax rate, t, is shown in the last column of **Table 10**.

Table 12 estimates the effects in the long run for the capital stock.[32] These effects depend on two measures of behavioral response: the ease with which capital and labor can be substituted in the production function (the factor substitution elasticity, S) and the responsiveness of the savings rate to the after-tax rate of return (the savings elasticity, E). **Table 12** reports results with two-factor substitution elasticities: a value of one, which is commonly used, and a value that appears more consistent with recent empirical studies.[33] Estimates are done with values of E ranging from 0.2 to

[32] The long run is when the capital stock fully adjusts. Assuming the lower savings responses, it would like take many years to approximate the steady state.

[33] For a review of the literature on this measure, see Jennifer Gravelle, "Corporate Tax Incidence: Review of General

0.4, which reflects the range of estimates used by the Congressional Budget Office, the Joint Committee on Taxation, and the Treasury Department.[34] The table also shows the effects for an infinitely elastic savings function that contracts the capital stock until the after-tax return is restored to its original value.

Table 12. Estimated Long-Run Reductions in the Capital Stock Under Alternative Assumptions (%)

	S=1, E=0.2	S=1, E=0.4	S=1, E= Infinity	S=0.5, E= 0.2	S=0.5, E= 0.4	S=0.5, E= Infinity
No Production Activities Deduction	0.07	0.11	0.22	0.05	0.07	0.11
Alternative Depreciation	1.07	1.63	3.41	0.82	1.10	1.70
Capitalize R&E	0.65	0.99	2.08	0.50	0.67	1.04
Capitalize Advertising	0.23	0.36	0.74	0.18	0.24	0.37
Eliminate Deduction for Inflation Portion of Interest	0.70	1.07	2.23	0.53	0.72	1.11
Repeal State and Local Itemized Deduction	0.14	0.21	0.45	0.11	0.14	0.22
Repeal All Itemized Deductions	0.14	0.25	0.52	0.12	0.17	0.26

Source: Congressional Research Service calculations, see **Appendix C**.

Notes: S is the factor substitution elasticity and E is the savings elasticity.

The effects on changing tax variables on the capital stock are limited by the small part the tax plays in the cost of capital. Even repealing the most important provision, alternative depreciation, only reduces the capital stock by around 1%. The effects of limiting itemized deductions that are generally not taken into account, nevertheless, have effects (outside of infinite elasticities) up to 0.25%. By comparison, the five-percentage-point decrease in the corporate rate (discussed earlier to compare with the effects of itemized deduction restrictions) would be estimated to increase the capital stock under the unitary factor substitution elasticity by 0.28% under the 0.2 savings elasticity and by 0.43% under the 0.4 elasticity. For a factor substitution elasticity of 0.5, the effects of a five percentage point decrease are 0.21% and 0.29%. (For infinite elasticities they are 0.89% and 0.45%.) The effects of limiting itemized deductions offset half or more of this effect.

These findings indicate that tax reform that affects savings and investment is unlikely to have significant effects on growth in capital. Under reasonable assumptions about elasticities, for

Equilibrium Estimates and Analysis," *National Tax Journal*, Vol. 66, no. 1, March 2013.

[34] See Table 3 in CRS Report R43381, *Dynamic Scoring for Tax Legislation: A Review of Models*, by Jane G. Gravelle.

example, a five-percentage-point reduction in the corporate rate would increase the capital stock by 0.2% to 0.4%. A 10 percentage point corporate rate reduction, the tax rate reduction proposed in The Tax Reform Act of 2014 and a common target for proposed tax reforms, would increase the capital stock by 0.4% to 0.8%. Even the larger rate cut would be more than offset by a move to the alternative depreciation system, a contraction in the capital stock from 0.8% to 1.7%. Moreover, changes in the individual tax rates through disallowing itemized deductions for state and local taxes or eliminating itemized deductions altogether, which have not been taken into account in prior macroeconomic studies, offset 20% to 30% of the 10-percentage-point rate reduction.

Conclusion

The analysis in this report shows that provisions that broaden the base can offset in part or more than offset effects of changing tax rates. Some of the effects analyzed, primarily those increasing the marginal effective tax rate on capital income, are commonly considered in macroeconomic analyses of tax reform. Others, such as the itemized deduction restrictions, may not be incorporated but can significantly offset the effects of lower statutory rates on both labor and capital income.

The analysis also suggests that the goal of increasing economic growth as part of a revenue and distributionally neutral tax reform may not be easily attainable, a view consistent with the findings of economists considering growth effects of the Tax Reform Act of 1986. This finding does not mean that tax reform cannot achieve other goals. For example, an important goal of tax reform is to reduce the distortions differential tax treatment causes (such as favoring investment in equipment compared to structures, or encouraging too much spending on housing). These distortions cause the economy to use its resources in a less than optimal way. This efficiency gain is different from growth and unlikely to have more than a negligible effect on measured output. Another potential goal of revenue-neutral tax reform is to simplify the tax system, which may reduce the costs of taxpayer compliance as well as direct costs of tax administration.

Appendix A. Data and Methods for Calculating Individual Marginal Effective Tax Rates

The data used in the analysis to estimate individual tax rates and changes due to changes in itemized deductions are the 2008 Internal Revenue Service (IRS) Statistics of Income (SOI) Public Use File. The Public Use File is a nationally representative sample of tax returns for the 2008 tax year. To protect the identity of individual taxpayers while preserving the character of the data, the IRS made changes to the data. Consequently, while reliable aggregate information can be obtained, individual taxpayer records in the data may or may not contain information from just one tax return. The unit of analysis is the tax return for a taxpayer, and IRS-provided sample weights are used throughout the analysis. The analysis sample contains information for 139,651 taxpayers (representing 142.6 million taxpayers).

The measure of taxable income used in this analysis departs from that used in the 2014 tax code. Specifically, above-the-line deductions (that have the effect of lowering taxable income) are not included in this analysis. Thus the measure of taxable income is total income minus personal exemptions and the value of itemized deductions.

Current law tax parameters were adjusted to 2008 levels using the Consumer Price Index for All Urban Consumers (CPI-U) and are reported for married filing jointly in **Table A-1**. (Parameters were different for other filing statuses.)[35]

Table A-1. 2014 Married Filing Jointly Tax Brackets, Deflated to 2008 Levels

Tax Rate	Modified Taxable Income (2008)
	at least
10%	—
15%	$16,506.78
25%	$67,118.48
28%	$135,353.80
33%	$206,312.03
35%	$368,2424.09
39.6%	$416,170.98

Source: CRS calculations. See text.

Tax liabilities were calculated using a tax module prepared by the authors based upon the 2014 IRS form 1040 as well as other forms and schedules of the regular income tax. The resulting tax liabilities generated do not take into account the Alternative Minimum Tax, phase in/outs, or any tax credits. As the focus of the analysis is on limitations on itemized deductions, all non-itemizers are dropped from the analysis, although non-itemizers are subsequently added back to compute the overall effects.

Effective marginal tax rates for taxpayers that choose to itemize deductions are calculated by first calculating an initial tax liability. Second, an additional $1,000 in ordinary income is allocated to each taxpayer. In addition to increasing taxable income, this additional income can increase the

[35] Parameters for the remaining filing statuses are available from the author to congressional clients upon request.

value of itemized deductions for state and local taxes and charitable giving (based on observed shares of income). A second tax liability is calculated using these figures. These calculations reflect the rate structure and other tax aspects depending on filing status. The difference between the second and first tax liabilities is then divided by $1,000 to arrive at the effective marginal tax rate. This effective marginal tax rate is then weighted by the shares of income realized by itemizers (versus non-itemizers) and the distribution of income within itemizers. These individual marginal tax rates are then averaged across modified taxable income deciles. Break points for the deciles are listed in **Table A-2**.

Table A-2. Decile Break Points

Decile	Maximum Modified Taxable Income
Lowest	$12,730
Second	$21,952
Third	$30,971
Fourth	$39,771
Middle	$50,760
Sixth	$63,147
Seventh	$79,537
Eighth	$102,772
Ninth	$154,071
Highest	—

Source: CRS analysis of 2008 SOI Public Use File.

Using these deciles, average effective marginal tax rates are calculated for a base case and for each option to limit itemized deductions examined. These rates are displayed in **Table A-3**.

Table A-3. Average Effective Marginal Tax Rates

By Decile

	Base	Eliminate itemized deduction for state and local taxes	Eliminate itemized deduction for charitable contributions	Eliminate itemized deduction for state and local taxes and charitable contributions	Only claim standard deduction	Cap itemized deductions at $17,000	Cap itemized deductions at $25,000
Lowest	0.1106	0.1152	0.1125	0.1172	0.1288	0.1169	0.1114
Second	0.1433	0.1459	0.1445	0.1463	0.1530	0.1433	0.1396
Third	0.1500	0.1540	0.1510	0.1558	0.1668	0.1549	0.1484
Fourth	0.1785	0.1868	0.1821	0.1879	0.1953	0.1826	0.1764
Middle	0.1874	0.1902	0.1884	0.1909	0.1963	0.1865	0.1811
Sixth	0.1848	0.1929	0.1870	0.1972	0.2062	0.1913	0.1820
Seventh	0.2325	0.2450	0.2384	0.2458	0.2501	0.2356	0.2279
Eighth	0.2559	0.2563	0.2561	0.2565	0.2577	0.2499	0.2452
Ninth	0.2631	0.2669	0.2645	0.2681	0.2710	0.2627	0.2563

	Base	Eliminate itemized deduction for state and local taxes	Eliminate itemized deduction for charitable contributions	Eliminate itemized deduction for state and local taxes and charitable contributions	Only claim standard deduction	Cap itemized deductions at $17,000	Cap itemized deductions at $25,000
Highest	0.3254	0.3302	0.3271	0.3315	0.3341	0.3278	0.3223

Source: CRS analysis of 2008 SOI Public Use File.

A composite marginal effective tax rate is created to simplify the analysis.[36] In this composite, the share of income earned by each decile is used to allocate each decile's effective marginal tax rate to the composite number according to the amount of ownership. The income shares for wage, capital gains, dividend, interest, and business income are presented in **Table A-4**.

Table A-4. Income Shares

By Decile

	Wage	Capital gain	Dividend	Interest	Business
Lowest	0.02	0.00	0.01	0.07	0.03
Second	0.03	0.00	0.01	0.07	0.02
Third	0.04	0.00	0.01	0.06	0.02
Fourth	0.05	0.00	0.01	0.06	0.02
Middle	0.06	0.00	0.01	0.07	0.03
Sixth	0.07	0.00	0.02	0.07	0.03
Seventh	0.09	0.01	0.02	0.07	0.04
Eighth	0.11	0.02	0.05	0.08	0.04
Ninth	0.15	0.07	0.13	0.10	0.10
Highest	0.39	0.90	0.71	0.35	0.67

Source: CRS analysis of 2008 SOI Public Use File.

Combining the information in **Table A-3** and **Table A-4** results in a single estimate of the effective marginal tax rate weighted by source of income. The resulting estimates are presented in **Table 1**. Differencing the current law effective marginal tax rate from the effective marginal tax rate for each policy option yields the difference in effective marginal tax rates faced by taxpayers that itemize. This, however, overstates the effective change for all taxpayers, as only taxpayers who chose to itemize can have limits placed on their itemized deductions. To account for this effect, the interim estimates are multiplied by the share of each income source earned by taxpayers who itemize. The resulting differences in effective marginal tax rates are presented in **Table 2**.

[36] This approach weights the marginal and initial tax rates rather than weighting the percentage changes both across and within categories. This averaging would slightly reduce the effects if the larger changes are overall associated with higher rates, but as long as the tax rates are reasonably close the differences are small.

Appendix B. Data and Methods for Measuring Tax Rates on Capital Income

This appendix provides the methodology and data for calculating the changes in effective tax rates arising from the various base-broadening provisions affecting savings and investment.

How to Calculate Effective Tax Rates

The basic formula for calculating the effective firm-level tax rate is (r-R)/r, where *r* is the pre-tax return, or internal discount rate for an investment with no taxes, and *R* is the after-tax discount rate that discounts all flows to the cost of the investment with taxes.

For a corporate depreciable investment, the relationship between r and R, with R the firm's real discount rate, derived from an investment with geometric depreciation and continuous time, is from the standard user cost formula:

(1) $r = (R+d)(1-uz)/(1-u)-d$

where u is the corporate tax rate, d is the economic depreciation rate, and z is the present discounted value of tax depreciation deductions (discounted at the nominal rate, that is, the real rate plus the inflation rate).

For a noncorporate business taxed at an effective statutory tax rate t, the pre-tax return is:

(2) $r = (R(1-v) +d)(1-tz)/(1-t)-d$

In this formula, v is the effective tax rate on capital gains and dividends in the corporate sector. The discount rates differ between corporate and noncorporate firms given the assumption that the noncorporate investor's opportunity cost is investment in the corporate sector, net of shareholder taxes. Thus the R for the noncorporate sector is the corporate discount rate reduced by the taxes on capital gains and dividends. These shares are subject to special tax rates and are adjusted for the extent of earnings that are not subject to tax in an overall economy-wide portfolio because some capital gains are not realized and some earnings on corporate stock are exempt because they are held in pension funds and retirement accounts.

The effective tax rate is determined in part by the effective statutory rate and in part by how quickly costs are recovered (the value of z) and any credits. Without the production activities deduction, the tax rate is equal to the statutory rate when z equals the present value of economic depreciation (d/(R+d)). More rapid depreciation decreases the effective tax rate.

The formula in (1) is applied to obtain firm-level tax rates in **Table 6** through **Table 9**. To calculate the total sectoral tax rate, which would account for the deductibility of interest by the firm and the taxation of interest, dividends, and capital gains to creditors and stockholders, the firm's discount rate used in equation (1) is adjusted to include debt finance. For the corporate sector:

(3) $R_d = f(i(1-u)-p)+(1-f)R$

with R_d a weighted average of the after-tax real interest rate (i(1-u)-p) where f is the share of investment financed by debt, i is the nominal interest rate, p is the inflation rate, and R is the required real return on equity before individual tax.

For the noncorporate sector,

(4) $R_d = f(i(1-t)-p)+(1-f)R(1-v)$

The pretax return on total investment is estimated by substituting R_d for R in equations (1) and (2). The tax rate is calculated using that r as $(r-R_i)/r$, where R_i is the final after-tax return to investors:

(5) $R_i = f(i(1-ati)-p)+(1-f)R\ (1-v)$

where t_i is the tax rate of creditors, a is the share subject to tax, and v is the effective tax rate on corporate equity.

Data on Assets and Depreciation

To provide overall effective tax rates that cover a broad category of investments, the pre-tax returns estimated for each of 32 different types of assets are weighted by asset share to provide an overall pre-tax return. The estimates reflect equipment, structures, and intangible assets used in business. They exclude land (which is relatively fixed in quantity and where taxes tend to be capitalized in prices) and inventories, which are small and relatively unresponsive to taxes on the cost of interest. Assets are assigned to the corporate or the noncorporate sector.

Table B-1 lists the asset values and economic depreciation rates for the assets, including 22 types of equipment assets, 7 types of structures, and 3 types of intangibles.

The value of z depends on how quickly costs are recovered for tax purposes, which is a function of the tax life and whether the recovery is straight-line (equal amounts in each year) or accelerated (larger amounts in earlier years). For tax lives, depreciation methods, and depreciation formulas, see Jane G. Gravelle, *The Economic Effects of Taxing Capital Income*, Cambridge, MA, MIT Press, 1994. The alternative lives simulated in the report are available to congressional clients upon request. For mining structures, largely oil and gas, based on data from the Independent Petroleum Association of America,[37] 57.7% of costs are expensed either through intangible drilling costs of dry holes, 16.7% recovered through depletion, 1.9% over seven years, and the remainder over five years.

Table B-2 provides data on the share of assets held in the corporate and noncorporate sectors, combining the equipment assets and nonresidential structures outside of sets; summarizes this data; and provides a distribution by share of the capital stock that combines the equipment assets and the structures assets outside of public utilities in summary estimates.

[37] Available at http://www.ipaa.org/wp-content/uploads/downloads/2012/09/USPS-2012.pdf.

Table B-1. Asset Values and Depreciation Rates for Equipment, Structures, and Intangibles

Asset Type	Stock of Assets ($billions, 2013)	Economic Depreciation Rates (%)
Autos	183.5	33.33
Office/Computing Equipment	179.6	28.00
Trucks/Buses/Trailers	417.9	17.25
Aircraft	352.8	6.60
Construction Machinery	174.4	15.50
Mining/Oilfield Equipment	103.0	15.00
Service Industry Equipment	166.8	16.50
Tractors	121.5	15.00
Instruments	554.0	13.50
Other Equipment	325.8	14.73
General Industrial Equipment	591.3	10.72
Metalworking Machinery	259.5	12.25
Electric Transmission Equipment	464.7	5.00
Communications Equipment	601.0	11.00
Other Electrical Equipment	325.8	18.34
Furniture and Fixtures	316.9	13.75
Special Industrial Equipment	333.8	10.31
Agricultural Equipment	122.3	11.79
Fabricated Metal	160.6	9.17
Engines and Turbines	112.5	5.16
Ships and Boats	76.2	6.11
Railroad Equipment	139.1	5.89
Mining Structures	1,346.0	4.50
Other Structures	1,451.9	2.25
Industrial Structures	1,411.2	3.14
Public Utility Structures	2,419.8	2.24
Commercial Structures	3,680.1	2.50
Farm Structures	320.2	2.39
Residential Structures	3,338.6	1.40
Intangibles, R&D	1,786.7	17.00
Intangibles, Advertising	271.8	60.00
Intangibles, Other	1,577.5	38.00

Source: Data on assets other than advertising and other intangibles from U.S. Commerce Department, Bureau of Economic Analysis, National Income and Product Accounts, Table 2.1. Stocks of advertising and other intangibles imputed based on relative proportions in Carol Corrado, Charles Hulten, and Daniel Sichel, "Intangible Capital

and U.S. Economic Growth," *Review of Income and Wealth*, Vol. 55, no. 3, September 2009, pp. 661–685, http://econweb.umd.edu/~hulten/WebPageFiles/Intangible%20Capital%20and%20U.S%20Economic%20Growth.pdf. Depreciation rates on assets other than intangibles from Bureau of Economic Analysis, BEA Depreciation Rates, http://bea.gov/national/FA2004/Tablecandtext.pdf. Depreciation rates on R&D intangibles from *R&D Depreciation Rates in the 2007 R&D Satellite Account*, Bureau of Economic Analysis/National Science Foundation, 2007 R&D Satellite Account Background Paper, by Charles Ian Mead, http://faq.bea.gov/papers/pdf/Mead_RD_Paper_wp.pdf. Depreciation rates on advertising and other intangibles from Corrado, Hulten, and Sichel.

Table B-2. Corporate Share of Business Assets in the Economy, 2013

Asset Type	Share Corporate (%)	Share of Total Assets in Economy (%)
Equipment	69.3	13.6
Nonresidential Structures	60.9	29.0
Public Utilities	85.0	5.7
Other	55.0	23.3
Residential Rental Structures	5.6	7.8
Inventories	66.9	5.4
Intangibles	85.6	11.8
Land	52.2	32.3
Total	60.6	100.0

Source: Assets other than land based on the U.S. Commerce Department, Bureau of Economic Analysis National Income and Product Accounts (NIPA), Tables 2.1, 4.1, and 5.1. Land is estimated from the Federal Reserve Flow of Funds Data, 2014. Intangibles deriving from research and development are also from the NIPA, but additional intangibles arising from advertising or worker training are based on estimates by Carol Corrado, Charles Hulten, and Daniel Sichel, "Intangible Capital and U.S. Economic Growth," *Review of Income and Wealth*, Vol. 55, no. 3, September 2009, pp. 661-685, http://econweb.umd.edu/~hulten/WebPageFiles/Intangible%20Capital%20and%20U.S%20Economic%20Growth.pdf. R&D intangibles are 49% of total intangibles. These intangibles are allocated in the same ratio as research and development intangibles.

Notes: The NIPA data include Subchapter S corporations in the corporate sector; a reallocation was made to assign a share of corporate assets to the noncorporate sector based on the ratio of income earned by Subchapter S and C corporations as reported in the Internal Revenue Service Statistics of Income data.

Values Used

In addition to the data used above, data are needed for the rates of return (R and i), the inflation rate, the share of debt finance, and the tax rates. Note that the effective tax rates are not very sensitive to real rates of return but are quite sensitive to the inflation rate.

The equity rate of return based on historical trends after corporate tax but before individual tax is set at 7%, allowing a 4% dividend rate and a 3% real growth rate. (The rate of growth in real GDP from 1965 to the last year before the recession, 2007, was 3.2%.) The nominal interest rate is set at 7.5%, and the inflation rate at 2%, reflecting recent experience with the Baa corporate bond rate and the GDP deflator before the recession (for a real interest rate of 5.5%).[38] Debt is weighted at 36% and equity at 64% based on data from the Flow of Funds Accounts.[39]

The statutory corporate tax rate is 35%, but it is reduced slightly by the production activities deduction. Based on claims as a percent of taxable income by manufacturing and non-

[38] See data in Economic Report of the President, March 2015, https://www.whitehouse.gov/sites/default/files/docs/2015_erp_appendix_b.pdf.

[39] See http://www.federalreserve.gov/Releases/Z1/Current/z1r-4.pdf.

manufacturing on corporate income tax returns and the distribution of equipment, structures, and intangible assets between those categories in the National Income and Product Accounts, the estimated rate for the three categories of assets (equipment, structures, and intangible assets) , respectively, is 34.12%, 34.29%, and 33.83%, with an overall rate of 34.14%, or approximately one percentage point lower that the corporate statutory rate.

The estimated statutory tax rate for unincorporated business income, using the public use file data, is 27%. Using the aggregate for individual returns and distributing it in the same proportions, the estimated tax rates for the three categories (equipment, structures, and intangible assets), including the production activities deduction, are 26.74%, 26.87%, and 26.56%, for an overall rate of 26.83%, a reduction of less than 0.2 percentage points. Disallowing itemized deductions for state and local taxes increased the rate by 1.69 percentage points, and disallowing all itemized deductions increased the rate by 2.5 percentage points.

The marginal rates for interest, dividends, and capital gains, respectively, are 22%, 14.6%, and 15.4%. These values were increased by 1.22, 1.68, and 1.7 percentage points if disallowing itemized deductions for state and local income taxes and by 1.93, 2.45, and 2.44 percentage points if disallowing all itemized deductions. A large fraction of interest and dividends paid do not appear on individual income tax returns, according to Tables 7.1 and 7.2 of the National Income and Product Accounts and IRS Statistics of Income. In previous years a direct reconciliation had been prepared, and the current amounts included, 19% and 25%, are slightly lower than in the past, but similar.[40] This same share for dividends is used for capital gains. The small share reported is largely due to the large share of assets in pension, retirement, and insurance plans. In addition, half of capital gains held privately is assumed to be untaxed because it is held until death.[41]

For the calculation that incorporates the research tax credit, firms may choose between two credits. One is a credit of 20% in excess of a rolling base that is unrelated to prior spending and thus has a marginal effective rate of 20%. The other is a credit of 14% in excess of 50% of the past three years of research expenditures. Because each dollar of research today increases the base in each of three future years (by 50 cents divided by 3) it reduces future credits, this offset must be taken into account. The credit is 14% times (1 minus 0.5 times the sum of $1/(1+R+p)$, $1/(1+r+P)^2$ and $1/((1+R+p)^3$ divided by 3). Given the weighted real discount rate of around 0.05, the result is an effective marginal rate of slightly more than half, or 7.9%. According to data on the research credit in the IRS Statistics of Income, the share claiming the 20% credit was 28%, leading to an average rate of 11.3%.

[40] The most recent reconciliation study was Mark Ledbetter, "Comparison of BEA Estimates of Personal Income and IRS Estimates of Adjusted Gross Income, New Estimates for 2005, Revised Estimates for 2004," *Survey of Current Business*, November 2007, https://www.bea.gov/scb/pdf/2007/11%20November/1107_pi_agi.pdf.

[41] Based on historical comparisons of realizations and accumulations. See CRS Report 91-250, *Limits to Capital Gains Feedback Effects*, by Jane G. Gravelle (available to congressional clients upon request).

Appendix C. General Equilibrium Effects of Tax Changes on Labor and the Capital Stock

This model uses a constant elasticity of substitution (CES) production function and, with the first-order conditions, obtains the following differentials, where dx/x is a percentage change for a small change:

(6) $dQ/Q = a(dK/K) + (1-a)(dL/L)$

where Q is output, K is the capital stock, L is labor, and a is the income share of capital and, thus, (1-a) is the share of labor income. The value of a is set at 1/3.

Every model has a "numeraire" or a fixed value since economic effects depend on relative, rather than absolute, values. The numeraire for this model is the overall price level, P.

(7) $dP/P = a(dC/C) + (1-a)(dW/W) = 0$

where P is the product price, C is the user cost of capital (the price of using capital inputs), and W is the wage rate. This equation allows the relationship between the change in the wage rate and the change in the cost of capital when price is fixed. The cost of capital is $R/(1-t_c) + d$, where R is the after-tax real return, t_c is the tax rate, and d is the rate of economic depreciation. The final wage links the relative demand for labor and capital to their relative prices

(8) $dL/L - dK/K = -S(dW/W - dC/C)$

where S is the factor substitution elasticity.

Short-Run Labor Supply Effects

In the short run, the capital stock is fixed, so $dK/K = 0$.

The labor supply function is

(9) $dL/L = (E_{LS} - E_{LI})\,(dW/W) - E_{LS}\, dt/(1-t))$

where E_{LS} is the substitution elasticity, E_{LI} is the income elasticity, and t is the tax rate on labor.

To measure the effect on W, the labor demand from (8) is equated to labor supply from (9) (using the price relationships in (7) to eliminate C) to solve for wages and then labor. The result is:

(10) $dL/L = ((E_{LS} - E_{LI})\, E_{LS} / (E_{LS} - E_{LI} + S/a)\, dt/(1-t) - E_{LS}\, dt/(1-t))$

Note that if the income and substitution elasticities are equal, the first term (which is the feedback effect on labor from wage increases) disappears. Using a typical income elasticity with an absolute value of 0.1, there would be no effect in the case of a substitution elasticity of 0.1 (the lower limit used in this study), and the effect would offset only about 6% of the effect using a 0.3 substitution elasticity, a value of S equal to 1, and a value of a equal to 0.33.

Long-Run Effects on Capital and Labor

For the long run, we specify a supply function for capital in the form of a savings rate, s

(11) $ds/s = E\,(dR/R)$

where R is the after tax return and E is the savings elasticity

Finally, in the steady state, savings equals investment,

(12) $gK = sQ$

where g is a constant exogenous growth rate of population and technology. Thus,

(13) $dK/K = ds/s + dQ/Q$

Combining these equations, the model can be solved for the change in capital and labor due to changes in the tax rate on labor income (t) and the tax rate on capital income (t_c).

(14) $dL/L = ((E_{LS}-E_{LI})\ (a/(1-a))((R/(1-tc))/c)(E/(E+S(R/(1-t))/c)(\ dt_c/(1-t_c)) - E_{LS}\ dt/(1-t))$

and

(15) $dK/K = -[(S/(1-a) +((E_{LS}-E_{LI})\ (a/(1-a)][(R/1-tc)/c][E//(E+S(R/(1-t))/c)\ )\ dt_c/(1-t_c) - E_{LS}\ dt/(1-t))$

In the calculations of the effect on the capital stock, E_{LS}-E_{LI} is assumed to be equal (labor does not respond to the wage rates). With no change in labor supply, in this case

(16) $dK/K = -[S/(1-a)\ ][(R/1-tc)/c][E//(E+S(R/(1-t))/c)\ )(\ dt_c/(1-t_c)$,

and its effect depends on the factor substitution elasticity.

Note that without a change in the tax rate on capital, no feedback effect changes wages in (14). That occurs because without a change in the savings rate, capital and labor, and therefore prices, continue in their same relative shares. As labor declines, the savings its income generates also declines to keep relative pretax prices of inputs the same.

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