Capital Tax Distortions after OBBBA: Evidence Across Assets and Industries

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Abstract

The One Big Beautiful Bill Act of 2025 substantially expanded immediate expensing for business investment, raising the question of how close the resulting tax system is to neutrality with respect to investment. I combine post-OBBBA asset-level marginal effective tax rates with C-corporation industry-by-asset capital stocks and convert the tax rates into proportional user-cost wedges. A standard nested capital-demand framework shows how the average wedge and its dispersion across industries and assets map into distinct margins of distortion and excess burden. Under the main specification, the average user-cost wedge is 5.1 percent, the between-industry standard deviation is 5.1 percentage points, and the within-industry standard deviation is 10.2 percentage points. A historical comparison indicates that the decline in both the level and dispersion of wedges from the pre-TCJA to the post-OBBBA regime is driven almost entirely by changes in tax parameters rather than by changes in capital-stock composition. Thus, although OBBBA moved important categories of investment toward expensing, substantial nonuniformity in the tax treatment of capital remains.

Keywords: capital taxation; marginal effective tax rates; user cost of capital; investment; tax distortions

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1 Introduction

The One Big Beautiful Bill Act of 2025 moved much of business investment toward immediate expensing. It made 100 percent bonus depreciation under section 168(k) permanent, restored immediate deductions for domestic research expenditures, and introduced full expensing for qualifying production structures under section 168(n). These changes substantially reduced marginal tax burdens on many forms of investment. But they did not apply uniformly across assets, leaving a tax system in which some investments are effectively expensed while others remain subject to substantially different treatment.

This raises a basic question: how close is the post-OBBBA tax system to neutrality with respect to investment? I consider two dimensions of that question. First, how large is the remaining average tax wedge on investment? Second, how much does tax treatment vary across assets and industries? The distinction matters because a low average tax burden need not imply a nearly neutral tax system. Even if the average wedge is small, differences in tax prices across investments can alter the allocation of capital across assets and industries.

To answer these questions, I measure tax distortions in the user cost of capital across assets and industries. The user cost of capital is the annual price of employing a unit of capital, reflecting the return required to supply the capital together with the economic depreciation of the asset. Taxes alter investment incentives by changing this price. I measure this distortion as the proportional difference between the taxed and untaxed user cost, the user-cost wedge. The average wedge captures the overall distortion to the cost of capital, while its dispersion across assets and industries captures differences in the tax treatment of alternative uses of capital.

Keightley and Gravelle (2025) calculate marginal effective tax rates across asset classes for post-OBBBA law. I use those estimates and the underlying parameters to calculate user-cost wedges and combine them with industry-by-asset capital stocks for nineteen industries in the C-corporation sector. A standard nested framework provides an economic interpretation of the result-

ing measures: the average wedge, dispersion in average wedges across industries, and dispersion in asset wedges within industries correspond to distortions in the aggregate quantity of capital, its allocation across industries, and the asset mix within industries, respectively.

The results show substantial dispersion despite a relatively modest average wedge. Under the main specification, which assumes mixed financing of corporate capital, the average user-cost wedge is 5.1 percent. Industry wedges range from approximately -1.5 percent in Professional and Technical Services to about 14 percent in Real Estate and Leasing, with a weighted standard deviation of 5.1 percentage points, as large as the average wedge itself. Dispersion within industries is larger still: the aggregate within-industry standard deviation of user-cost wedges is 10.2 percentage points, nearly twice the economy-wide average wedge. Excluding the Section 41 research credit as a sensitivity test for possible positive externalities from R&D reduces both dispersion measures, but leaves substantial variation both between and within industries.

A historical comparison places the current post-OBBBA system in longer-run perspective. I compare the pre-TCJA tax regime with post-OBBBA law, spanning the major changes in the taxation of business investment over roughly the past decade. Using an eight-category, equity-financed specification, moving from pre-TCJA to post-OBBBA law reduces the average wedge from about 20 percent to about 10 percent, the between-industry standard deviation from about 9 percent to about 5 percent, and the within-industry standard deviation from about 21 percent to about 12 percent. Changing the capital-stock year from 2016 to 2022 while holding tax law fixed changes each statistic by about half a percentage point. In this decomposition, the change in tax parameters therefore dominates the change in capital composition.

Finally, I construct a separate industry-by-asset matrix of current investment activity and use it to calculate flow-weighted METRs as a measure of the tax wedge on current investment. The economy-wide average is close to zero, but industry rates range from large negative values to more than 15 percent. Thus, the near-zero aggregate masks substantial differences in the tax

treatment of current investment across industries.

More broadly, OBBBA moved important categories of investment toward expensing while leaving substantial differences in tax treatment across other uses of capital. Measuring the distortions that remain after that shift provides a basis for asking what might be gained by extending the logic of expensing more uniformly across business investment.

While this paper is the first, to my knowledge, to compute user cost wedges by asset and industry under post-OBBBA law, the approach builds on an older literature measuring nonneutral capital taxation across assets and industries. Work by Auerbach and by Fullerton and coauthors in the 1980s developed disaggregated user-cost measures and studied how differential taxation of assets interacts with industry asset composition. Fullerton and Henderson (1989a), in particular, model substitution among multiple assets within industries and capital reallocation across industries.[1] Although these questions were prominent in the earlier capital-tax literature, relatively little recent academic work has revisited them. An important exception is CBO's CapTax model (Burnham and Carloni, 2022), which continues to calculate highly disaggregated costs of capital across assets and industries. The post-OBBBA tax system makes the older questions newly relevant: after a substantial expansion of expensing, how large are the remaining distortions, and how much nonuniformity remains across assets and industries?

Section 2 provides institutional background. Section 3 develops the framework, Section 4 describes the data, Section 5 reports the results, and the appendix provides additional construction details and results.

2 Tax Treatment of Business Investment

The tax treatment of investment depends importantly on when firms may deduct the cost of acquiring capital. Under conventional income-tax deprecia-

[1] Other contributions to this literature include Auerbach (1983, 1989), Fullerton and Lyon (1986), and Fullerton and Henderson (1989b). McKenzie et al. (1998) provide a later application that reports measures of dispersion in marginal effective tax rates across assets and industries.

tion, the cost of a capital asset is recovered through deductions spread over its tax life. Accelerated depreciation and bonus depreciation move some of those deductions toward the date of acquisition, increasing their present value. Full expensing is the limiting case: the entire acquisition cost is deducted immediately. Because future deductions are worth less than current deductions, moving deductions forward reduces the tax-induced cost of investment. Other features of the tax system, including financing rules and tax credits, can still affect the marginal tax burden even when an asset is fully expensed.

The Tax Cuts and Jobs Act of 2017 substantially expanded immediate cost recovery. Under prior law, qualifying equipment and other property with recovery periods of 20 years or less generally received 50 percent bonus depreciation in 2017, but that allowance was scheduled to phase down to 40 percent in 2018 and 30 percent in 2019 before expiring. The TCJA increased the bonus allowance to 100 percent for qualifying property. The 100 percent allowance was itself temporary and was scheduled to phase down beginning after 2022. The TCJA also reduced the corporate tax rate from 35 to 21 percent, reducing the marginal tax burden on corporate assets that were not fully expensed.

TCJA moved the treatment of research expenditures in the opposite direction. Effective beginning in 2022, the TCJA required domestic research expenditures to be capitalized and amortized over five years rather than deducted immediately. Beginning in 20022, the tax system therefore combined full or accelerated cost recovery for much equipment and software with substantially different treatment of research, long-lived structures, land, and inventories.

The One Big Beautiful Bill Act of 2025 moved substantial categories of investment further toward immediate expensing. It made 100 percent bonus depreciation under section 168(k) permanent, restored immediate deductions for domestic research expenditures, and introduced, at least temporarily, immediate deductions under section 168(n) for qualifying production structures. Nevertheless, substantial categories of capital remain outside full expensing. Land, inventories, and many structures continue to receive different treatment, while tax credits and financing provisions create additional differences in marginal tax burdens across assets.

The effects of these provisions on marginal investment incentives are often summarized by marginal effective tax rates. A marginal effective tax rate, or METR, measures the tax wedge between the pretax return that a marginal investment must earn and the after-tax return received by investors, expressed as a fraction of the pretax return. It therefore measures the tax burden on an investment that just breaks even at the margin rather than the tax paid on the average investment. Keightley and Gravelle (2025) calculate METRs by asset class under post-OBBBA law and alternative financing assumptions and provide comparable estimates for pre-TCJA law. I use these METRs as the tax-law inputs for both the current-law and historical analyses below.

3 User-Cost Wedges and Their Economic Interpretation

The objective of the empirical analysis is to measure the tax wedges that enter a standard excess-burden calculation for capital taxation. This section shows that, under a standard nested model of capital demand, the resulting welfare loss can be decomposed into three components associated with the average tax-induced change in the price of capital, differences in that price across industries, and differences across assets within industries. The welfare importance of these components depends on the corresponding behavioral responses: changes in the aggregate quantity of capital, substitution across industries, and substitution among assets within an industry. I measure the three components but do not estimate or calibrate the behavioral elasticities. I first develop the measures and then show how they enter the excess-burden calculation.[2]

[2]The framework follows the standard user-cost approach to capital taxation; see, for example, Auerbach (1983) and Fullerton and Henderson (1989a). For a modern application of highly disaggregated cost-of-capital analysis, see Burnham and Carloni (2022).

3.1 User-Cost Wedges

Investment decisions depend on the cost of using capital. The standard measure of that cost is the user cost of capital: the cost of employing a unit of an asset for a period. For a rented asset this would be reflected in its rental price. For an asset that a firm owns, there is no observed rental payment, but there is an analogous economic cost: the capital must earn the return required by investors, and the asset loses value through economic depreciation. The user cost is the implicit rental price incorporating these costs. Taxes distort investment by changing this price.

Let m_a denote the marginal effective tax rate on asset a, ρ_a the real pretax return required for a marginal investment, and s the real after-tax return required by savers, assumed to be common across assets and industries:

$$m_a = \frac{\rho_a - s}{\rho_a}, \qquad \text{so that} \qquad \rho_a = \frac{s}{1 - m_a}.$$

If δ_a is the economic depreciation rate, the untaxed and taxed user costs of one dollar of asset a are

$$c_a^0 = s + \delta_a \qquad \text{and} \qquad c_a^T = \rho_a + \delta_a.$$

The proportional tax-induced change in user cost is therefore

$$z_a \equiv \frac{c_a^T - c_a^0}{c_a^0} = \frac{s}{s + \delta_a} \frac{m_a}{1 - m_a}. \tag{1}$$

The user-cost wedge z_a is therefore the proportional change in the price of using asset a caused by the tax system.

Equation (1) also shows why a marginal effective tax rate and a user-cost wedge need not be the same. A METR measures the tax-induced difference between the pretax and after-tax returns, while investment depends on the full cost of using the asset. Because economic depreciation is part of that cost, a given change in the required return represents a smaller proportional change in user cost for a rapidly depreciating asset than for a long-lived asset. The

empirical analysis therefore converts the published asset-level METRs into user-cost wedges before comparing or aggregating them.

3.2 Average and Dispersion of User-Cost Wedges

To measure the three price distortions described above, the asset-level wedges must be aggregated within industries and across the economy. Because the user cost is a price per unit of capital services, the corresponding weights are shares of capital-service costs rather than shares of capital stocks alone. Let K_{ia} denote the stock of asset a employed in industry i. The capital-service share of asset a within industry i is

$$\alpha_{ia} = \frac{(s + \delta_a)K_{ia}}{\sum_b (s + \delta_b)K_{ib}}.$$

Thus an asset receives greater weight when it accounts for a larger share of the annual cost of the industry's capital services.

The capital-service-weighted average wedge in industry i is

$$Z_i = \sum_a \alpha_{ia} z_a.$$

Define total untaxed capital-service cost in industry i and in the economy as

$$B_i = \sum_a (s + \delta_a)K_{ia}, \qquad B = \sum_i B_i,$$

and let

$$\phi_i = \frac{B_i}{B}$$

denote industry i's share of aggregate capital services. The economy-wide average user-cost wedge is then

$$\bar{z} = \sum_i \phi_i Z_i.$$

The average wedge measures the overall tax-induced change in the price

of capital. The other two objects measure nonuniformity in that price. Differences in average wedges across industries are summarized by

$$\mathcal{V}_B^z = \sum_i \phi_i (Z_i - \bar{z})^2, \tag{2}$$

while differences among asset wedges within industries are summarized by

$$\mathcal{V}_W^z = \sum_i \phi_i \sum_a \alpha_{ia} (z_a - Z_i)^2. \tag{3}$$

The empirical results report $\bar{z}$ and the square roots of these two variance measures. They therefore describe, respectively, the average tax-induced change in the price of capital, dispersion in that price change across industries, and dispersion across assets within industries. These three measures can be calculated from the tax parameters and capital stocks without specifying behavioral responses. The next subsection shows how, under a standard nested capital-demand structure, each measure corresponds to a distinct margin of adjustment. Combining those responses then yields the excess-burden decomposition used to interpret the results.

3.3 Capital-Demand Responses

There are three margins along which capital can respond to the wedges measured above. Firms can change the mix of assets used within an industry, capital can be reallocated across industries, and the aggregate quantity of capital can change. A standard nested demand structure makes these responses explicit.

Consider first asset choice within an industry. Let the different asset types form a CES capital aggregate,

$$K_i = \left[\sum_a \beta_{ia}^{1/\sigma} K_{ia}^{(\sigma-1)/\sigma} \right]^{\sigma/(\sigma-1)},$$

where σ is the elasticity of substitution among asset types. The corresponding

unit cost of the industry capital aggregate is

$$P_i = \left[\sum_a \beta_{ia} c_a^{1-\sigma} \right]^{1/(1-\sigma)}.$$

Cost minimization gives

$$d \ln K_{ia} = d \ln K_i - \sigma \left(d \ln c_a - d \ln P_i \right).$$

For a small tax wedge, $d \ln c_a = z_a$ to first order. By the envelope theorem, the first-order proportional change in the unit-cost index is the capital-service-share-weighted change in the prices of the underlying assets:

$$d \ln P_i = \sum_a \alpha_{ia} d \ln c_a = Z_i.$$

Hence

$$d \ln K_{ia} - d \ln K_i = -\sigma (z_a - Z_i). \tag{4}$$

Equation (4) shows why within-industry dispersion matters. An asset's effect on the industry's capital mix depends on its wedge relative to the average wedge on the other assets used in that industry. Assets with above-average wedges contract relative to the industry capital aggregate, while assets with below-average wedges expand. The dispersion measured by $\mathcal{V}_W^z$ is therefore the set of relative price distortions to which the within-industry substitution elasticity σ applies.

The second margin is the allocation of capital across industries. Let the industry capital aggregates form an economy-wide CES aggregate,

$$K = \left[\sum_i \gamma_i^{1/\eta} K_i^{(\eta-1)/\eta} \right]^{\eta/(\eta-1)},$$

where η is the elasticity of substitution across industries. The corresponding

unit-cost index is

$$P = \left[\sum_i \gamma_i P_i^{1-\eta} \right]^{1/(1-\eta)}.$$

Cost minimization implies

$$d \ln K_i - d \ln K = -\eta \left(d \ln P_i - d \ln P \right).$$

By the same argument, the first-order proportional change in the aggregate unit-cost index is

$$d \ln P = \sum_i \phi_i d \ln P_i = \bar{z}.$$

It follows that

$$d \ln K_i - d \ln K = -\eta (Z_i - \bar{z}). \tag{5}$$

Thus an industry's capital stock responds to its average wedge relative to the economy-wide average. Industries facing above-average wedges contract relative to industries facing below-average wedges. The between-industry dispersion $\mathcal{V}_B^z$ measures the relative price distortions to which the across-industry elasticity η applies.

The third margin is the aggregate quantity of capital. Let ε denote the compensated elasticity of aggregate desired capital with respect to the aggregate user cost. Then

$$d \ln K = -\varepsilon \bar{z}.$$

The economy-wide average wedge is therefore the price distortion to which the aggregate capital-demand elasticity applies.

Combining the three margins gives

$$d \ln K_{ia} = -\sigma (z_a - Z_i) - \eta (Z_i - \bar{z}) - \varepsilon \bar{z}. \tag{6}$$

The three terms correspond directly to the three features of the tax system measured above: differences in wedges among assets affect asset choice within industries, differences in average wedges among industries affect the allocation of capital across industries, and the average wedge affects the aggregate

quantity of capital.

3.4 Excess Burden

These three margins of adjustment imply a corresponding decomposition of the welfare cost of capital taxation. The dollar tax wedge on one unit of asset a is

$$c_a^T - c_a^0 = c_a^0 z_a.$$

For a small distortion, the standard Harberger approximation to excess burden is

$$EB \approx -\frac{1}{2} \sum_i \sum_a (c_a^T - c_a^0) dK_{ia}.$$

Because

$$\alpha_{ia} = \frac{c_a^0 K_{ia}}{B_i} \qquad \text{and} \qquad \phi_i = \frac{B_i}{B},$$

this can be written as

$$\frac{EB}{B} \approx -\frac{1}{2} \sum_i \sum_a \phi_i \alpha_{ia} z_a \, d \ln K_{ia}.$$

Substituting equation (6) and using the definitions of $\bar{z}$, $\mathcal{V}_B^z$, and $\mathcal{V}_W^z$ yields

$$\frac{EB}{B} \approx \frac{1}{2} \left[\varepsilon \bar{z}^2 + \eta \mathcal{V}_B^z + \sigma \mathcal{V}_W^z \right]. \tag{7}$$

The decomposition gives the economic interpretation of the three empirical measures. The term $\varepsilon \bar{z}^2$ is the welfare cost associated with the response of the aggregate capital stock to the average wedge. The term $\eta \mathcal{V}_B^z$ captures the additional cost associated with reallocating capital across industries in response to differences in industry wedges, while $\sigma \mathcal{V}_W^z$ captures the cost associated with substitution among assets within industries in response to differences in asset wedges. A uniform user-cost wedge eliminates both dispersion terms but leaves the aggregate-capital distortion.

The empirical analysis does not estimate ε, η, or σ and therefore does not report a calibrated excess-burden estimate. Instead, I report the average

wedge and the two dispersion measures, which provide the tax-side inputs to the excess-burden calculation.[3]

4 Data and Measurement

The empirical analysis requires two principal inputs: asset-level user-cost wedges z_a and industry-by-asset capital stocks K_{ia}. Together they determine the capital-service shares α_{ia} and ϕ_i, and hence the average wedge $\bar{z}$ and the within- and between-industry dispersion measures $\mathcal{V}_W^z$ and $\mathcal{V}_B^z$. The stock-based analysis is restricted to C corporations, for which the tax parameters and capital-stock measures can be matched on a consistent basis. This section describes the construction; the methodology appendix provides the sources, mappings, and measurement conventions in greater detail.[4]

4.1 Asset-Level Tax Wedges

The asset-level METRs $\{m_a\}$ are taken from Keightley and Gravelle (2025), who report rates by asset type under alternative tax laws and financing assumptions. I convert each METR into the user-cost wedge z_a using equation (1), together with the saver return and economic depreciation rates underlying the METR calculations.

The main specification uses the post-OBBBA mixed-finance corporate schedule and thirteen asset categories. Because the historical CRS estimates needed for the pre-TCJA comparison are available on a comparable basis only for equity-financed investment and a smaller set of asset categories, the historical analysis uses equity finance and collapses the assets to eight categories.

[3]The second-order welfare approximation is formally expressed using capital-service shares in the undistorted allocation. The observed stocks reflect investment choices under the existing tax system. Tax-induced changes in the shares are first-order in the user-cost wedges, while the squared-average and variance terms entering excess burden are second-order. Replacing the counterfactual shares with observed shares therefore changes the excess-burden expression only at third order.

[4]The scripts and data for producing all of the figures and tables in the paper are available at: capital_tax_scripts.

4.2 Industry-by-Asset Capital Stocks

I construct K_{ia} for nineteen NAICS industries using current-cost capital stocks for C corporations. Equipment, software, structures, and research and development are taken from the Bureau of Economic Analysis detailed fixed-asset accounts. The BEA data cover all legal forms, so I first use BEA estimates of corporate shares by broad asset class and industry and then use Statistics of Income balance-sheet data to isolate C corporations.

The restriction to C corporations reflects the difficulty of matching tax parameters and capital stocks consistently for pass-through businesses. The CRS noncorporate estimates combine partnerships, S corporations, and proprietorships using average tax parameters. Those rates therefore cannot be cleanly matched to industry-by-asset stocks for particular pass-through legal forms, whose marginal tax treatment can depend on owner- and entity-specific attributes.

Inventories and land are taken directly from Statistics of Income corporate balance sheets, with C corporations measured as all corporations less S corporations. Land is reported at historical cost, so I use alternative controls for its aggregate current value; because that adjustment is uncertain, the main results report alternative land valuations. Corporate residential structures are taken from the BEA residential fixed-asset accounts.

The resulting stocks are valued at untaxed user costs to construct the capital-service shares defined in Section 3. The current-law estimates use 2022 C-corporation stocks.

4.3 Historical Comparison

To distinguish changes in tax law from changes in the composition of the capital stock, I cross 2016 and 2022 C-corporation capital stocks with pre-TCJA and post-OBBBA tax parameters. Holding the stock year fixed isolates the change associated with the tax parameters, while holding the tax law fixed isolates the change associated with capital-stock composition. As noted above, this comparison uses equity-financed METRs and eight common asset

categories because those are the rates available on a consistent basis across the two tax regimes.

4.4 Investment Flows and Flow-Weighted METRs

I separately construct an industry-by-asset investment-flow matrix to describe the tax treatment associated with current investment activity. Depreciable property is measured from Form 4562 data on property placed in service, research and development from the National Science Foundation's business research survey, and inventories and land from year-to-year changes in Statistics of Income balance-sheet stocks.

Let

$$w_{ia}^{I} = \frac{I_{ia}}{\sum_b I_{ib}}$$

denote the share of industry i's measured investment flow devoted to asset a. I aggregate the asset-level METRs using

$$M_i^I = 1 - \frac{1}{\sum_a w_{ia}^I/(1-m_a)}.$$

This aggregation preserves the definition of the METR: it averages the pretax returns required on the underlying assets, $\rho_a = s/(1-m_a)$, using investment-flow shares and converts the resulting average return back into a marginal effective tax rate.

The flow-weighted METR summarizes the tax treatment associated with an industry's current investment activity. It is a complementary descriptive measure rather than the price distortion governing capital demand or excess burden. These data are therefore used only for the flow-weighted results reported in Section 5.3; they do not determine the capital-service weights or user-cost wedges used in the analysis above.

The flow data do not have exactly the same legal-form coverage as the capital-stock data. The inventory and land measures are constructed for C corporations, while the depreciation and research data have broader or somewhat different coverage. The flow results should therefore be viewed as a separate

Table 1: Illustrative Asset-Level User-Cost Wedges

Asset	METR (m_a)	Depreciation (δ_a)	User-cost wedge (z_a)
R&D	−47.2%	17.5%	−7.8%
Software	1.8%	51.0%	0.2%
Equipment	3.3%	12.6%	1.0%
Res. structures	17.7%	1.4%	17.2%
Land	22.4%	0	28.9%
Inventories	24.9%	0	33.2%

Notes: METRs and depreciation inputs are from CRS. User-cost wedges are calculated using equation (1). The full set of thirteen asset categories is reported in Appendix Table 4.

descriptive exercise rather than as an alternative C-corporation implementation of the stock-based analysis. The methodology appendix describes the source-specific coverage and construction in greater detail.

Finally, the flow measures combine gross acquisitions of depreciable assets and research with net changes in inventories and land. Gross acquisition flows also place relatively more weight on short-lived assets and can vary substantially from year to year. Flow-weighted METRs should therefore be interpreted as measures of the tax treatment associated with current investment activity rather than as measures of the allocation of the installed capital stock.

5 Results

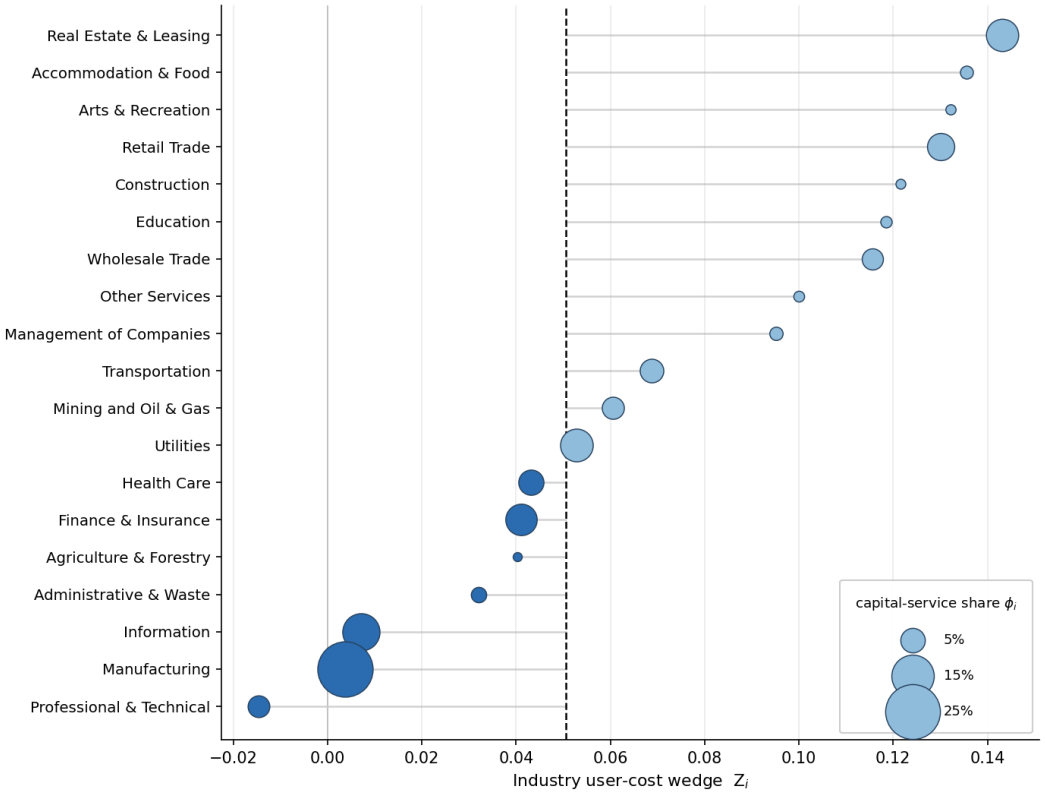
5.1 Current-Law User-Cost Wedges

Table 1 illustrates the transformation from the CRS METRs to the user-cost wedges using equation (1). Because depreciation is a large component of user cost for R&D, software, and equipment, their user-cost wedges are much smaller in magnitude than their METRs. For long-lived assets, the same transformation attenuates the METR much less. For land and inventories, which have zero depreciation, $z_a = m_a/(1-m_a)$, so the user-cost wedge exceeds the METR. Appendix Table 4 reports all thirteen categories.

Figure 1 shows variation in average user-cost wedges under post-OBBBA

law across industries, Z_i, together with each industry's capital-service share, ϕ_i. The economy-wide average wedge is 5.1%, but there is substantial dispersion across industries. Industry wedges range from about 14% for real estate to approximately -1.5% for professional and technical services, a spread of about 16 percentage points. Manufacturing, the largest sector with $\phi_i = 25\%$, has a wedge of 0.4%. The capital-service-weighted standard deviation of industry wedges is $\sqrt{\mathcal{V}_B^z} = 5.1$ percentage points.

Figure 1: Industry User-Cost Wedges, post-OBBBA



Note: Dashed line indicates the capital-service-weighted economy-wide average, $\bar{z} = 5.1\%$. Dot area is proportional to the industry capital-service share, ϕ_i. The weighted standard deviation is $\sqrt{\mathcal{V}_B^z} = 5.1$ percentage points.

Figure 2 shows the corresponding variation in user-cost wedges within industries. Each bar gives the composition of the industry's capital services across assets, with assets ordered by their user-cost wedge from the negative

R&D wedge on the left to the large positive wedges on land and inventories on the right. The number at the end of each bar is the capital-service-weighted standard deviation of asset wedges within that industry, the square root of the corresponding within-industry term in $\mathcal{V}_W^z$ before weighting by ϕ_i.

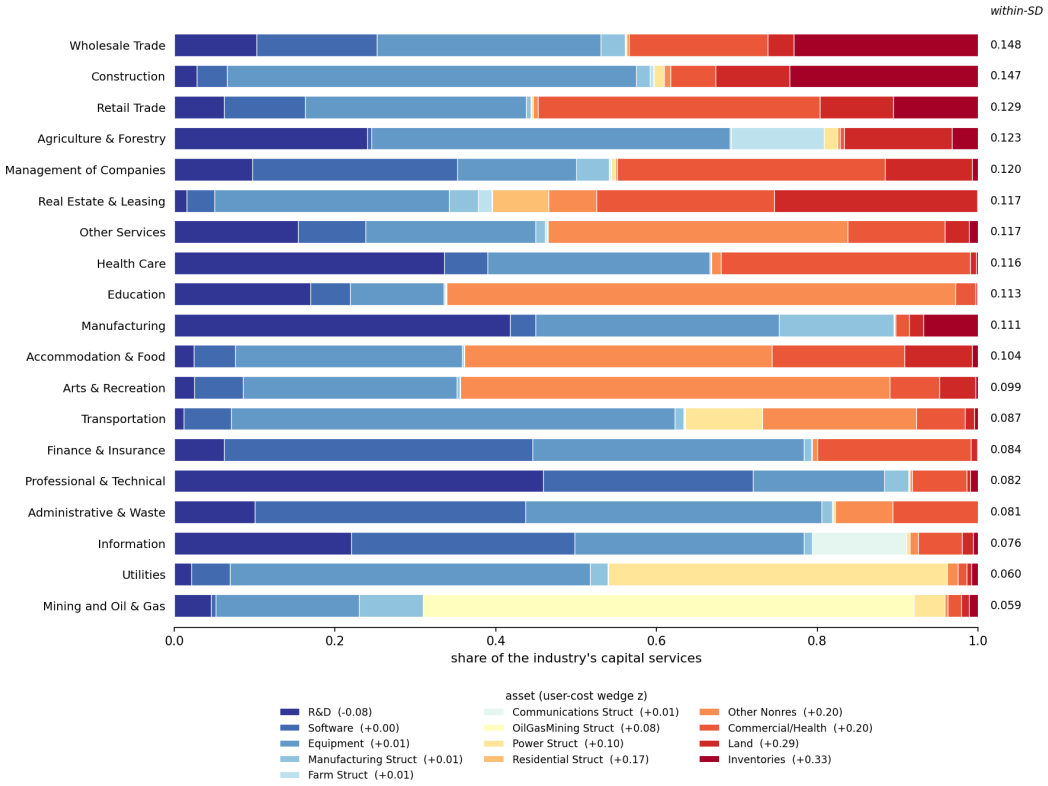
Within-industry dispersion is substantial throughout the economy. It ranges from about 6 percentage points in Utilities and Mining and Oil & Gas to 15 percentage points in Wholesale Trade and Construction. The largest values occur in industries that combine substantial holdings of low-wedge assets such as equipment with substantial holdings of high-wedge assets such as inventories, land, or commercial structures. Thus, even an industry's average wedge Z_i can conceal large differences in the tax treatment of the assets it employs.

Table 2 summarizes the aggregate wedge and the two components of dispersion and shows their sensitivity to the valuation of land, which is reported at historical cost in the underlying SOI data. Using the total-real-estate control in the bottom row, the average user-cost wedge is 5.1%, while the between-industry standard deviation is 5.1 percentage points and the within-industry standard deviation is 10.2 percentage points. Thus, although dispersion in average wedges across industries is substantial, dispersion among assets within industries is considerably larger. The welfare importance of the two forms of dispersion depends on the corresponding substitution elasticities, η and σ, as shown in equation (7).

The valuation of land affects the levels but not this conclusion. Moving from SOI book value to the total-real-estate control raises land's capital-service share from 1.2% to 4.3%, increasing the average wedge from 4.3% to 5.1% and the between-industry standard deviation from 4.5% to 5.1 percentage points. The within-industry standard deviation changes much less, from 9.7 to 10.2 percentage points.

Because R&D may generate positive externalities not reflected in private returns, I also recalculate the results excluding the Section 41 research credit as a sensitivity test for the treatment of R&D. Under this specification, $\bar{z}$ rises from 5.1% to 6.7%, while $\sqrt{\mathcal{V}_B^z}$ falls from 5.1 to 4.1 percentage points and $\sqrt{\mathcal{V}_W^z}$ falls from 10.2 to 9.0 percentage points. Thus, excluding the Section 41 credit

Figure 2: Asset Composition and Within-Industry Wedges, post-OBBBA



Note: Each bar shows the composition of an industry's capital services by asset, with segment width equal to the asset's capital-service share α_{ia}. Assets are ordered from lowest to highest user-cost wedge, z_a, as indicated in the legend. Industries are ordered by within-industry dispersion. Numbers at right report the capital-service-weighted standard deviation of asset wedges within each industry.

reduces both components of measured dispersion, but substantial variation remains both between and within industries.

5.2 Tax Law and Capital-Stock Composition

To place the post-OBBBA results in longer-run perspective, I compare the pre-TCJA and post-OBBBA regimes, asking how much the tax treatment of capital changed and how much of the difference reflects changes in the composition of the capital stock. Table 3 addresses these questions using a

Table 2: User-Cost Wedge Dispersion and Alternative Land Valuations

Land valuation	$\bar{z}$	$\sqrt{\mathcal{V}_B^z}$ (p.p)	$\sqrt{\mathcal{V}_W^z}$ (p.p)	Land share
SOI book value	4.3%	4.5	9.7	1.2%
Nonresidential RE control	4.7%	4.8	10.0	2.8%
Total RE control	5.1%	5.1	10.2	4.3%

Notes: The rows differ in the valuation of corporate land. The first uses land at its SOI book value. The other two preserve the SOI distribution of land across industries but rescale the aggregate land stock to current-value controls constructed by subtracting the current-cost value of structures from corporate real-estate value. The controls differ in whether the real-estate measure is restricted to nonresidential real estate or includes total real estate. $\bar{z}$ is reported in percent; the two standard deviations are reported in percentage points.

2×2 design: it evaluates both the 2016 and 2022 capital stocks under both pre-TCJA and post-OBBBA tax law.

The change in tax law dominates the change in capital composition. Holding the stock year fixed, moving from the pre-TCJA to the post-OBBBA system reduces the average user-cost wedge from about 20% to about 10%, the between-industry standard deviation from about 9 to about 5 percentage points, and the within-industry standard deviation from about 21 to about 12 percentage points. By contrast, moving from the 2016 to the 2022 capital stock while holding the tax system fixed changes each statistic by about half a percentage point. Thus, in this decomposition, the large decline in both the level and dispersion of user-cost wedges is attributable almost entirely to the change in tax parameters rather than to the change in capital-stock composition.

5.3 Flow-Weighted METRs

The preceding results weight asset-level wedges by the capital services embodied in the installed stock, as required by the structural analysis. As a separate descriptive exercise, Figure 3 instead aggregates asset-level METRs using the composition of current investment flows. These flow-weighted rates describe how the tax treatment associated with current investment activity

Table 3: Tax Law and Capital-Stock Composition

Stock year	Tax law	$\bar{z}$	$\sqrt{\mathcal{V}_B^z}$ (p.p)	$\sqrt{\mathcal{V}_W^z}$ (p.p)
2016	Pre-TCJA	19.4%	8.8	20.8
2016	Post-OBBBA	9.6%	5.1	11.9
2022	Pre-TCJA	19.7%	9.0	21.3
2022	Post-OBBBA	9.6%	5.2	12.1

Notes: Each stock-year matrix is evaluated under both the pre-TCJA and post-OBBBA tax systems. The calculations use equity financing and the eight asset categories available on a consistent basis under both tax systems. The levels therefore are not directly comparable to the thirteen-category mixed-finance current-law estimates reported above. $\bar{z}$ is reported in percent; the two standard deviations are reported in percentage points.

varies across industries.[5]

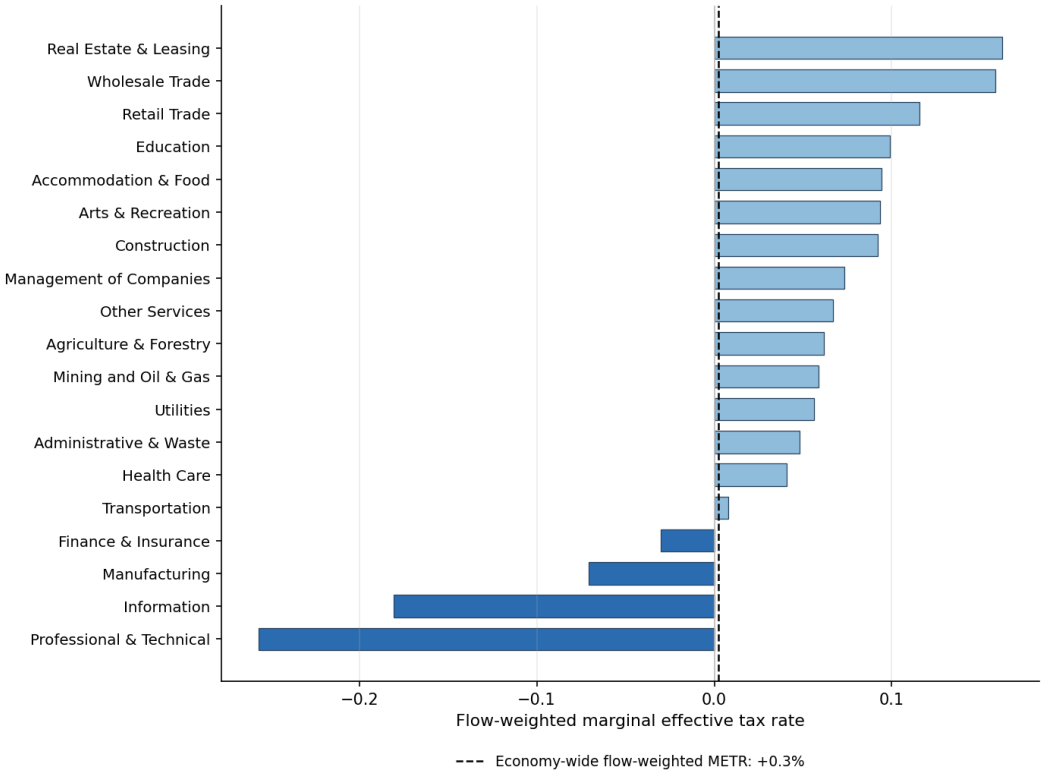
Flow-weighted METRs vary sharply across industries. Professional and Technical Services, Information, Manufacturing, and Finance and Insurance have negative rates, reflecting the importance of R&D and other tax-favored investment, while Real Estate and Leasing and Wholesale Trade have rates above 15 percent. The economy-wide flow-weighted METR is approximately zero, despite this wide cross-industry dispersion. The near-zero aggregate therefore reflects offsetting positive and negative rates rather than uniform tax treatment of investment.

6 Conclusion

OBBBA substantially expanded the use of immediate expensing for business investment. The natural question is how close the resulting system is to neutrality with respect to investment, both on average and across uses of capital. This paper addresses those questions by converting asset-level marginal effective tax rates into user-cost wedges and combining them with industry-by-asset

[5]Depreciable property and R&D are measured as gross investment, whereas land and inventory flows are measured as positive net changes in balance-sheet stocks. Negative net changes are set to zero and the remaining industry flows are renormalized; Appendix A.5 provides details. Excluding land and inventories gives an economy-wide flow-weighted METR of -6.0%.

Figure 3: Industry Flow-Weighted METRs under Post-OBBBA Law



Note: Bars report industry METRs aggregated using current investment-flow shares. The dashed line indicates the economy-wide flow-weighted METR, 0.3%. Land and inventory flows are measured as positive net changes in balance-sheet stocks; Appendix A.5 provides details.

capital stocks.

The post-OBBBA estimates show that the remaining distortion is substantially nonuniform. The capital-service-weighted average user-cost wedge is 5.1 percent, but the weighted standard deviation of average industry wedges is 5.1 percentage points and the within-industry standard deviation is 10.2 percentage points. Industry averages therefore conceal large differences in the tax treatment of the assets used within the same industry. The basic pattern is robust to alternative valuations of land and remains when the Section 41 research credit is excluded as a sensitivity test for the treatment of R&D.

The historical comparison puts these current-law results in perspective. On a common equity-financed basis, moving from pre-TCJA to post-OBBBA tax parameters reduces the average wedge from about 20 percent to about 10 percent, the between-industry standard deviation from about 9 percent to about 5 percent, and the within-industry standard deviation from about 21 percent to about 12 percent. Changing the capital-stock year from 2016 to 2022 while holding tax law fixed has very little effect. Thus, the large decline in both the level and dispersion of user-cost wedges reflects changes in the tax system rather than changes in the composition of the capital stock. A separate flow-weighted calculation reaches a related descriptive conclusion: its economy-wide METR is close to zero even though industry rates differ sharply.

The welfare consequences of the remaining nonuniformity depend on behavioral responses that are not estimated here. In the excess-burden decomposition, between-industry dispersion is weighted by the elasticity of substitution across industries and within-industry dispersion by the elasticity of substitution among assets. I therefore report the wedge and dispersion measures rather than impose a calibration of excess burden. These statistics identify the tax-price differences to which those behavioral responses apply.

More broadly, OBBBA has already moved much of business investment toward immediate expensing. The results here suggest that what remains is not simply an aggregate tax burden but substantial differences in tax treatment across uses of capital. This raises the question whether there is much to be gained from preserving those distinctions rather than extending the logic of expensing more uniformly. A cash-flow tax represents the natural endpoint of that approach: investment would be deducted when made, eliminating many of the asset-specific distinctions that generate the dispersion measured here.

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A Data Construction and Measurement Details

This appendix provides additional detail on the construction of the asset-level user-cost wedges, the industry-by-asset capital stocks, and the investment-flow matrix described in Section 4.

A.1 Asset-Level Inputs

The asset-level METRs are taken from Keightley and Gravelle (2025). Equation (1) converts each published METR into the proportional user-cost wedge z_a using the real after-tax return required by savers, s, and economic depreciation, δ_a. The depreciation rates and the parameters used to construct s are taken from the same CRS model, so that the three inputs are internally consistent.

The saver return is matched to the financing basis of the METR schedule. The main current-law specification uses the mixed-finance saver return with the mixed-finance METRs; the historical comparison uses the corresponding all-equity quantities.

Inventories. CRS assigns inventories a zero economic depreciation rate but models their tax treatment using a holding period rather than geometric depreciation. For purposes of equation (1), inventories therefore have

$$z_{\text{inv}} = \frac{m_{\text{inv}}}{1 - m_{\text{inv}}}.$$

The CRS holding-period calculation determines the annual pretax return ρ_{inv} embodied in the published METR. Its expression for the gross amount for which inventory must sell includes recovery of the acquisition cost and is therefore not the annual rental price relevant to the capital-demand model. Treating inventory as working capital instead gives an untaxed annual opportunity cost s and a taxed cost ρ_{inv}, which yields the expression above. Land also has $\delta_a = 0$ and therefore satisfies the same relation.

Aggregate depreciation rates. Most depreciation rates correspond directly to CRS asset categories. Three are constructed aggregates, computed as stock-weighted means of the underlying Table A-2 rates rather than assumed. Equipment is assigned 0.126, the stock-weighted mean across the equipment types CRS reports separately; results are insensitive to values between 0.10 and 0.18. Software is assigned 0.510, the stock-weighted mean of pre-packaged software (0.708) and custom software (0.381); the corresponding 2016 value is 0.493. The eight-category historical comparison collapses several nonresidential structure categories and assigns the resulting category 0.027, against a stock-weighted value of 0.0266 in both 2016 and 2022. Appendix A.3 shows when aggregation is exact for the average wedge and quantifies the small approximation introduced by the historical nonresidential-structures category.

Section 41 credit. The baseline uses the published R&D METR, including the Section 41 credit. Because R&D may generate positive externalities not reflected in private returns, I also recalculate the results excluding the credit as a simple sensitivity test for the treatment of R&D. With expensing retained but the credit removed, the required pretax return is r, so that

$$m_{\text{RD}}^{\text{no credit}} = \frac{r - s}{r}.$$

This construction reproduces the published METRs for other fully expensed assets that do not receive the research credit. The exercise does not attempt to estimate the socially optimal R&D subsidy or to adjust the tax wedge for R&D spillovers.

A.2 Industry-by-Asset Capital Stocks

The matrix $\{K_{ia}\}$ contains current-cost capital stocks for nineteen NAICS sectors and thirteen asset categories on a C-corporation basis.

Produced assets. Equipment, structures, software, and research capital are taken from the Bureau of Economic Analysis detailed nonresidential fixed-

asset estimates, which report current-cost net stocks by detailed asset and industry. Detailed asset codes are mapped into the thirteen categories used in the analysis.

Legal form. The detailed BEA estimates cover all legal forms, so I make two adjustments to isolate C corporations. First, BEA Table 4.1 is used to calculate corporate shares for three broad industry groups—farms, manufacturing, and other nonfarm businesses—and three asset classes—equipment, structures, and intellectual property. These shares are applied to the corresponding detailed BEA stocks.

Second, the resulting corporate stocks include both C and S corporations. I convert them to a C-corporation basis using industry-specific Statistics of Income balance-sheet data. Complete Report Table 5.1 reports assets of all corporations and Table 6.1 reports S corporations; their difference provides the C-corporation amount. The C-corporation share of depreciable assets within each industry is used to scale the BEA produced-asset stocks.

Some cells in these tables are withheld for disclosure. Because the C-corporation figure is a difference, a withheld S-corporation cell read as zero overstates the C-corporation amount one for one. Depreciable assets and total assets are published for every sector in each year used here, so the conversion of produced-asset stocks is unaffected; land and inventories are not. The All Industries column is published even where sector cells are not, so the withheld total is known, and it is allocated across the affected sectors in proportion to each sector's S-corporation share of total assets applied to the all-corporation amount, scaled so the estimates sum to that residual. Allocating in proportion to the all-corporation distribution of the item alone would impose a common S-corporation share on every sector and would substantially overstate sectors that are almost entirely C-corporation.

Land, inventories, and residential structures. Land and inventories are taken directly from the Statistics of Income corporate balance sheets, with C-corporation values calculated as Table 5.1 less Table 6.1. Inventories are used

at reported book value, which provides an appropriate current-cost measure. Land presents a larger problem because the SOI balance sheets report land largely at historical cost, which can differ substantially from current value.

I therefore use the SOI data to determine the *distribution* of land across industries but consider alternative measures of its aggregate value. Let L_i^{SOI} denote reported C-corporation land in industry i. The SOI data determine the industry shares

$$\lambda_i = \frac{L_i^{SOI}}{\sum_j L_j^{SOI}}.$$

For the current-value specifications, I replace the aggregate SOI book value with an external estimate of the current value of corporate land, L^{CV}, and assign that total across industries according to the SOI shares:

$$L_i^{CV} = \lambda_i L^{CV}.$$

Thus, the adjustment rescales the aggregate amount of land while preserving its SOI distribution across industries; it is not an inflation adjustment to individual land values.

The current-value controls are constructed residually. Financial Accounts data provide estimates of the current market value of corporate real estate, while BEA provides the current-cost value of structures. Subtracting structures from real estate gives an implied current value of land. I use two such controls, one based on nonresidential real estate and one based on total corporate real estate. Because these residual estimates can be unstable from year to year, the scaling factor implied by the 2022 control is also applied to the earlier stock year. The results therefore report three land valuations: unadjusted SOI book value, a current-value control based on nonresidential real estate, and a current-value control based on total real estate.

Corporate residential structures, which are not contained in the nonresidential detailed file, are taken from BEA Table 5.1 and assigned to Real Estate and Rental and Leasing.

A.3 Effects of Aggregation

The asset categories used here are aggregates of the more detailed asset types for which economic depreciation rates are reported. This raises the question of whether grouping assets biases the reported statistics. The answer differs for the average wedge and for the dispersion measures.

Consider a category c composed of detailed assets $a \in c$ to which the implementation assigns a common marginal effective tax rate m_c. The user-cost wedge on asset a is then

$$z_a = \frac{s}{s+\delta_a}\frac{m_c}{1-m_c},$$

and its dollar tax wedge in industry i is

$$B_{ia}z_a = (s+\delta_a)K_{ia}\frac{s}{s+\delta_a}\frac{m_c}{1-m_c} = s\frac{m_c}{1-m_c}K_{ia}.$$

Thus economic depreciation cancels between the capital-service weight and the user-cost wedge.

Let

$$K_c = \sum_i \sum_{a\in c} K_{ia}$$

denote the aggregate stock in category c, and assign the category the stock-weighted arithmetic mean depreciation rate

$$\bar{\delta}_c = \frac{\sum_i \sum_{a\in c} \delta_a K_{ia}}{\sum_i \sum_{a\in c} K_{ia}}.$$

The capital-service weight of the aggregate category is then

$$B_c = (s+\bar{\delta}_c)K_c = \sum_i \sum_{a\in c} (s+\delta_a)K_{ia}.$$

Its user-cost wedge is

$$z_c = \frac{s}{s+\bar{\delta}_c}\frac{m_c}{1-m_c},$$

so

$$B_c z_c = (s + \bar{\delta}_c) K_c \frac{s}{s + \bar{\delta}_c} \frac{m_c}{1 - m_c} = s \frac{m_c}{1 - m_c} K_c = \sum_i \sum_{a \in c} B_{ia} z_a.$$

Thus, when the detailed assets are assigned a common METR, aggregation preserves both the category's total capital-service weight and its contribution to the economy-wide average wedge exactly, provided the aggregate depreciation rate is the corresponding stock-weighted mean. Because $s/(s+\delta)$ is convex in δ, one might otherwise expect aggregation to understate the average pass-through; the cancellation above shows why it does not under capital-service weighting. This exactness does not generally hold if assets are weighted by investment flows or by capital stocks alone.

Where a category pools assets with different marginal effective tax rates, aggregation is no longer exact. The most consequential case is the eight-category schedule used for the historical comparison, which combines nonresidential structures that receive different tax treatment. Evaluating that block at its component rates and depreciation rates gives an average wedge of 19.2 percent, compared with 19.1 percent using the single published category rate. The unrounded difference is approximately 0.05 percentage point on a category accounting for roughly one-quarter of aggregate capital service. Aggregation of rates therefore does not materially affect the reported average wedge.

Aggregation does, however, lose information relevant to the within-industry dispersion measure, and it does so in two distinct ways. First, grouping detailed assets into a single category suppresses variation in user-cost wedges among the assets in that category. Define the category's capital-service share within industry i as

$$\alpha_{ic} = \sum_{a \in c} \alpha_{ia},$$

and its within-industry capital-service-weighted mean wedge as

$$\bar{z}_{ic} = \frac{\sum_{a \in c} \alpha_{ia} z_a}{\alpha_{ic}}.$$

If each aggregate category were assigned $\bar{z}_{ic}$, the law of total variance would

imply

$$\mathcal{V}^z_{W,\text{detail}} = \mathcal{V}^z_{W,\text{grouped}} + \sum_i \phi_i \sum_c \alpha_{ic} \operatorname{Var}_{a|i,c}(z_a),$$

where

$$\operatorname{Var}_{a|i,c}(z_a) = \sum_{a \in c} \frac{\alpha_{ia}}{\alpha_{ic}} (z_a - \bar{z}_{ic})^2.$$

The grouped measure would therefore be a lower bound on the fully disaggregated within-industry variance under this construction.

Second, the implementation assigns each category a single depreciation rate common to all industries, whereas the industry-specific counterpart is

$$\bar{\delta}_{ic} = \frac{\sum_{a \in c} \delta_a K_{ia}}{\sum_{a \in c} K_{ia}},$$

the stock-weighted mean over the detailed assets that industry actually holds. For a category whose detailed assets are assigned the same METR,

$$B_{ic} z_c = s \frac{m_c}{1 - m_c} K_{ic}, \qquad K_{ic} = \sum_{a \in c} K_{ia},$$

for any assigned depreciation rate. Thus the common-depreciation-rate approximation affects the allocation of capital-service weights across industries rather than the category's dollar tax wedge.

Its quantitative importance is small. Equipment, the largest aggregated category, has industry-specific depreciation rates ranging from 0.065 in Utilities to 0.160 in Finance and Insurance, compared with the common rate of 0.126. Recomputing the reported statistics using industry-specific depreciation rates changes the average wedge by 0.02 percentage points and the reported between- and within-industry standard deviations by 0.05 percentage point, although individual industry wedges move by as much as one percentage point.

There is also little hidden dispersion arising from depreciation heterogeneity within equipment. Conditional on applying the published CRS equipment METR to the detailed equipment types, their user-cost wedges differ only through the pass-through factor $s/(s + \delta_a)$. Across those detailed types, the

resulting wedges range from 0.3 to 1.0 percent. The omitted within-equipment variance arising from depreciation heterogeneity is less than 0.02 percent of the reported $\mathcal{V}_W^z$. Aggregation therefore removes some fine-grained dispersion without materially affecting the reported measures.

A.4 Historical Comparison

The historical exercise crosses capital stocks from 2016 and 2022 with pre-TCJA and post-OBBBA tax parameters. The two stock matrices are constructed using the same procedures described above. Because BEA Table 4.1 begins in 2017, the 2016 calculation uses the 2017 corporate shares when converting the detailed BEA stocks by legal form.

Comparable historical METRs are available only on an equity-financed basis and for eight common asset categories. The thirteen asset categories are therefore collapsed to eight for this exercise, and the same equity-finance saver return is used under both tax laws. The resulting levels should not be compared directly with the thirteen-category mixed-finance current-law estimates; the purpose of the exercise is to compare tax laws and stock compositions on a common basis.

A.5 Investment-Flow Matrix

The flow-weighted METRs reported in the text use a separate industry-by-asset matrix of current investment activity. Depreciable property is taken from Form 4562 tabulations of the basis of property placed in service, with recovery periods mapped to asset categories. Research expenditure is taken from the National Science Foundation's business research survey. Inventory and land are measured as year-to-year changes in the Statistics of Income corporate balance sheets, with C corporations again calculated as all corporations less S corporations.

The sources differ in whether they report gross acquisitions or changes in stocks. Depreciable property and research are gross investment measures, whereas inventory and land are net changes and can therefore be negative.

When a net-flow cell is negative, it is set to zero and the remaining positive flows within the industry are renormalized.

These flow weights describe the composition of current investment rather than the composition of the installed capital stock. Gross acquisition measures also give greater weight to assets with high depreciation or turnover rates. The flow-weighted METRs are therefore reported as a complementary description of current acquisition activity rather than as inputs to the structural user-cost analysis.

A.6 Limitations

Several measurement limitations bear on the results. First, the excess-burden expression is a local quadratic approximation. Consistent with that approximation, the capital-service shares are constructed from observed stocks rather than counterfactual undistorted stocks; as noted, the resulting difference enters only at third order. Because some estimated user-cost wedges are sizable, higher-order effects may nevertheless matter.

Second, current land values are not directly observed by industry. The current-value specifications therefore combine the SOI distribution of land across industries with alternative aggregate land-value controls, motivating the range of valuations reported in the results.

Third, converting BEA corporate stocks to a C-corporation basis uses the C-corporation share of depreciable assets within each industry for the detailed produced-asset categories.

B Full Asset-Level Table

Table 4: Asset-Level User-Cost Wedges

Asset	METR (m_a)	Depreciation (δ_a)	User-cost wedge (z_a)
Equipment	3.3%	12.6%	1.0%
Software	1.8%	51.0%	0.2%
R&D	−47.2%	17.5%	−7.8%
Inventories	24.9%	0	33.2%
Land	22.4%	0	28.9%
Manufacturing structures	1.8%	3.1%	1.2%
Communications structures	1.8%	2.4%	1.3%
Farm structures	1.8%	2.4%	1.3%
Commercial/health structures	22.1%	2.5%	19.7%
Other nonres. structures	22.6%	2.7%	19.6%
Oil, gas, and mining structures	12.2%	4.5%	7.7%
Power structures	11.6%	2.1%	9.5%
Residential structures	17.7%	1.4%	17.2%

Notes: METRs and depreciation rates are based on CRS inputs. User-cost wedges are calculated using equation (1). Construction of the aggregate depreciation rates is described in Appendix A.1.