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CHAIRMAN'S VIEWS

Putting Innovation at the Center of Pro-Growth Tax Policy

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CHAPTER 5: PUTTING INNOVATION AT THE CENTER OF PRO-GROWTH TAX POLICY

With little expected growth in the labor force, productivity improvement through innovation is the main remaining margin to expand the economic tax base. Tax policy shapes the incentives to innovate, and current policy can be reformed to be more effective. The foundational principle is to "broaden the base and lower the rate," as a complicated non-neutral tax code favors incumbents, thereby preventing creative destruction. In the limited cases where targeted provisions are warranted, policymakers should take great care in correctly designing policy, ensuring that it promotes genuine innovation rather than merely transferring rents to politically favored incumbents.

We next summarize the pro-growth provisions in P.L. 119-21 (H.R. 1 in the 119th Congress, commonly known as the Working Families Tax Cuts), then describe the broader innovation imperative confronting U.S. tax policymakers.

P.L. 119-21 prevented a massive tax hike and extended and expanded pro-growth tax provisions

Many of the pro-growth tax provisions of the *Tax Cuts and Jobs Act of 2017* (TCJA) were to sunset at the end of 2025, which would have led to one of the largest tax hikes in American history. Hence, this Congress immediately began work on tax policy reform to maintain American economic dominance. P.L. 119-21 provided, on average, $3,818 of tax relief per filer in 2026 and a present value of tax relief through 2035 of $25,413.[277] The bill maintained

[277] These calculations discount 2026 through 2035 reductions to 2026 at a 5 percent annual rate. Garrett Watson, "US Taxpayers to See a Nearly $2,300 Average Tax Cut in 2026 Under the Big Beautiful Bill," Tax Foundation, February 24, 2026, https://taxfoundation.org/data/all/federal/obbba-average-tax-cuts-impact-map/; JEC calculations.

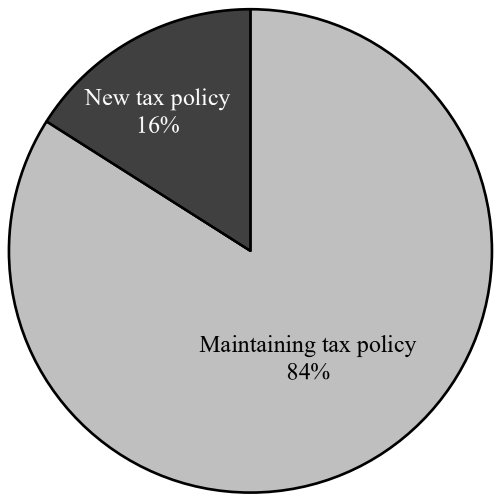
the expiring pro-growth tax provisions of the TCJA by making many of them permanent, a favorable outcome for business investment planning.[278] Figure 5-1 describes the share of the bill's revenue effects due to maintaining tax policy versus new tax policy, using estimates from the Joint Committee on Taxation (JCT).

Beyond preventing a major tax increase, P.L. 119-21 extended and expanded several provisions that directly lower the cost of domestic investment and innovation. The law restored immediate expensing of research and experimental (R&E) expenditures under Section 174. The restored expensing now applies only to research conducted within the U.S., creating an incentive to innovate in the U.S., not abroad. P.L. 119-21 also restored and extended full expensing for equipment investment (Section 168(k)), reducing the user cost of capital for a broad range of business investment. It also extended expensing to certain classes of real property investments under the Qualified Production Property provision (Section 168(n)), lowering the cost of domestic manufacturing investments. The law also expanded the Qualified Small Business Stock (QSBS) exclusion under Section 1202, a critical and effective pro-innovation tax provision that we discuss later in this chapter. Taken together, P.L. 119-21 did not merely cut taxes, it also tilted after-tax returns toward R&D, investment, and startups—critical factors that drive economic growth. Furthermore, because many tax parameters are now enacted in law

[278] That policy uncertainty can delay business investment is an important lesson from real options theory: Robert S. Pindyck, "Irreversibility, Uncertainty, and Investment," *Journal of Economic Literature* 29, no. 3 (1991): 1110–48, http://www.jstor.org/stable/2727613. TCJA provisions made permanent include: lower rates, increased standard deduction, expanded child tax credit, the home mortgage interest limitation, increased alternative minimum tax exemption, increased estate and lifetime gift tax exemption, domestic R&D expensing, 100 percent bonus depreciation on short-lived assets (for example, equipment and machinery), the Section 199A deduction for qualified business income, EBITDA rather than EBIT for interest deduction limitation, the New Markets Tax Credit, and Opportunity Zones.

without expiration dates, they provide the policy stability that firms need to justify large, irreversible investment commitments.

Figure 5-1: New Policy as a Share of OBBBA Provisions



Source: Joint Committee on Taxation;[279] JEC calculations

Looking ahead: the innovation imperative

P.L. 119-21, while a significant win, was mostly defensive—it prevented large impending tax hikes. This opens the opportunity for future tax reforms to pivot more to the offensive. In particular, we emphasize the critical need for pro-growth tax reforms.

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[279] Calculated by comparing current law ($4.475 trillion) baseline estimates and current policy ($0.715 trillion) baseline estimates from JCT. Joint Committee on Taxation, "Estimated Revenue Effects Relative to the Present Law Baseline of the Tax Provisions in 'Title VII – Finance' of the Substitute Legislation as Passed by the Senate to Provide for Reconciliation of the Fiscal Year 2025 Budget," JCX-35-25 (July 1, 2025), https://www.jvct.gov/publications/2025/jcx-35-25/; Joint Committee on Taxation, "Estimated Revenue Effects Relative to the Current Policy Baseline of the Tax Provisions in 'Title VII – Finance' of the Substitute Legislation as Passed by the Senate to Provide for Reconciliation of the Fiscal Year 2025 Budget," JCX-34-25 (July 1, 2025), https://www.jct.gov/publications/2025/jcx-34-25/.

The deteriorating U.S. fiscal position demands a change in trajectory. Correcting course requires both restraining spending and growing revenues. Growing revenues without raising already high tax rates means growing the tax base by growing the economy.[280] With labor force growth projected to slow substantially over the coming decades, the remaining margin for achieving faster economic growth is via labor productivity, the primary driver of which is innovation. We thus arrive at the *innovation imperative*: policy must allow, facilitate, and encourage widespread improvements in and adoption of technology. Federal tax policy is far from the only lever available to policymakers in this regard, but it plays a significant role in shaping the incentives for innovation, and tax reforms are available that can improve the economy's long-run trajectory.

The first and most important principle for facilitating innovation through tax reform is to eliminate narrow tax preferences and use the resulting revenue to lower overall statutory rates: "broaden the base and lower the rate."[281] Narrow tax preferences distort the allocation of resources. They often favor incumbent firms and established industries over potential entrants and disruptive technologies. Removing them accomplishes two objectives simultaneously: it levels the playing field so that market forces determine where resources flow, and it generates revenue that can finance lower tax rates. Some candidates for base-broadening that have been proposed by commentators include: the exclusion for employer-sponsored insurance, the capital gains exemption for

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[280] U.S. tax rates are already at or above international norms. For example, the U.S. combined federal-state corporate rate of approximately 25.63 percent is higher than the OECD average of approximately 23.85 percent, even after the TCJA. Christina Enache, "Corporate Tax Rates Around the World," Tax Foundation, December 17, 2024, https://taxfoundation.org/data/all/global/corporate-tax-rates-by-country-2024/.

[281] U.S. Department of the Treasury, Office of the Secretary, *Tax Reform for Fairness, Simplicity, and Economic Growth* (1984), https://home.treasury.gov/system/files/131/Report-Tax-Reform-v1-1984.pdf.

primary residences, the mortgage interest deduction, like-kind exchanges under Section 1031, the state and local tax deduction, premium tax credits for health insurance, the preferential rate on carried interest, the Work Opportunity Tax Credit, and no tax on tips and overtime, to name only a few.

"Broaden the base, lower the rate" remains the foundational pillar of pro-growth reform. When tax rates are uniform and low, resources naturally flow toward their highest-valued use, which in a market economy means toward high-growth opportunities. However, there is a well-established case, grounded in the economics of externalities, that certain forms of innovation may be systematically underprovided by private markets. Because innovators cannot fully capture the social returns to their discoveries, there is a potential role for well-designed tax preferences to bring private investment closer to the social optimum. The critical qualifier is "well-designed." Governments have a long and well-documented history of corrupting sound policy ideas into vehicles for rent-seeking and the subsidization of unproductive incumbents.[282] A very high bar should therefore be set for any departure from the foundational pillar.

With this background, the remainder of this chapter discusses the role of tax policy in affecting innovation. We proceed in four steps. First, we present the Schumpeterian growth framework, which demonstrates that taxes on innovative activity reduce not merely the *level* of output but its *growth rate*. Second, we argue that when fiscal support for innovation is desirable, tax credits are superior to direct appropriations. Within the class of tax credits, we further argue that nonrefundable credits are generally preferable to

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[282] Josh Lerner, *Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed—and What to Do About It* (Princeton University Press, 2009).

refundable ones. Third, we examine R&D taxation in light of international tax competition. Fourth, having established these general principles, we apply them in considering three existing or potential innovation-related policies: semiconductor manufacturing subsidies under the *CHIPS and Science Act*, the QSBS exclusion, and the extension of Section 199A qualified business income (QBI) deduction to business development companies (BDCs).

Creative destruction and R&D taxation

It is widely accepted in the study of economic growth that technological change is the primary factor driving growth in the long-run, especially in advanced economies such as the U.S. However, standard models of the economy used by various agencies and think tanks (for example Congressional Budget Office (CBO) and Tax Foundation), do not address this root cause of growth, focusing instead on the effects of capital accumulation—which, in these models, have only level effects on output in the long-run.

This disconnect became especially clear during the development of P.L. 119-21, where the standard models were unable to meaningfully clarify the growth effect ranking between R&D expensing, which is widely believed to be an effective way to reduce the effective tax rate on innovative activity, versus equipment expensing, which reduces the effective tax rate on capital investment.[283] To be clear, both policies are pro-growth and both were adopted in P.L. 119-21—a testament to the growth-

[283] Akusti Leino, "Improving Tax Treatment of R&D Would Boost Productivity and Growth," Tax Foundation, May 7, 2025, https://taxfoundation.org/blog/us-rd-tax-full-expensing/; Erica York et al., *Options for Navigating the 2025 Tax Cuts and Jobs Act Expirations*, Tax Foundation (May 2024), figure 2, https://taxfoundation.org/wp-content/uploads/2024/05/Options-for-Navigating-the-2025-Tax-Cuts-and-Jobs-Act-Expirations.pdf.

forward ambitions of this Congress. However, the inability of the standard models to effectively separate these two policies, similar in style but arguably very different in substance, raises concerns about their ability to adequately quantify the effects of other pro-innovation policies that are more controversial in policy discourse, such as the QSBS exclusion.

Coincidentally, these flaws in the standard models came to the forefront in the same year as the 2025 Nobel Prize in Economics was awarded in part to Philippe Aghion and Peter Howitt for foundational contributions to modeling economic growth through creative destruction.[284] Unlike most prior growth models, creative destruction models explicitly capture the efforts of entrepreneurs to overturn incumbents in concentrated markets via a competitive process in which winners earn economic profits. Creative destruction models capture formally the intuition that innovation occurs through new entry and the overturning of incumbent firms, or alternatively the overturning of incumbent processes within firms.

We present the math for the one-sector Schumpeterian growth framework in Box 5-1 (near the end of this chapter), with the addition of two types of taxes: taxes on R&D inputs, with example policy levers including R&D expensing and the Research and Experimentation (R&E) tax credit; and taxes on business profits, with example policy levers including the corporate (C-corporation) income tax (CIT) rate, the individual rates and brackets, the Section 199A QBI deduction, and the QSBS exclusion. Our model is adapted from the baseline Schumpeterian

[284] The Nobel Prize, "Press Release," October 13, 2025, https://www.nobelprize.org/prizes/economic-sciences/2025/press-release/.

model presented in chapter 4 of Philippe Aghion and Peter Howitt's book *The Economics of Growth* (2009).[285]

The model captures two important results. First, taxes on R&D inputs lower the growth *rate* of GDP, rather than having only long-run level effects. In particular, in the model, the relative reduction in the growth rate from a tax increase on R&D inputs is captured by the following formula,

$$\frac{\text{GDP growth rate with R\&D tax increase}}{\text{GDP growth rate without tax increase}} = \left(\frac{\text{R\&D user cost before tax increase}}{\text{R\&D user cost after tax increase}}\right)^{\frac{\sigma}{(1-\sigma)}}$$

where σ is a parameter capturing the sensitivity of innovation with respect to entrepreneurial R&D investments.

Second, the model teaches us that taxes on business profits are distortionary. This is counter to the traditional view of a pure profits tax as being non-distortionary.[286] In the model, taxes on business profits are distortionary because the entrepreneur cannot deduct their R&D expenditures when their venture fails. This distortion could be addressed through refundable tax credits for R&D spending, but doing so yields its own inefficiencies, some of which we discuss later in this chapter.

Returning to the first result, Section 174 R&D amortization was essentially a tax increase on R&D inputs; returning to full

[285] Philippe Aghion and Peter Howitt, "Chapter 4: The Schumpeterian Model" in *The Economics of Growth* (Cambridge, MA: MIT Press, 2009).
[286] "A tax on pure economic rent should not induce a business to change any of its activities or prices." Michael P. Devereux et al., *Taxing Profit in a Global Economy* (Oxford University Press, 2021), p. 27. The book also discusses models where this common intuition is violated.

expensing of R&D expenditure under P.L. 119-21 was therefore a tax cut.[287] Calibration of σ in the equation is nontrivial, but for illustration we will choose σ to match Tax Foundation's estimated GDP level effect of R&D expensing ten years after enactment; Box 5-1 provides mathematical details. Note that Tax Foundation uses a Solow framework to estimate this effect, and therefore, a tax cut on innovation only affects long-run levels of GDP in their model, not long-run growth rates. In the Schumpeterian model, R&D expensing affects long-run growth rates. This calibration yields an estimate $\sigma = 0.113$.

Table 5-1 shows the results of our illustrative calibration. The model is calibrated to match the Solow framework in year 10. In years 20, 30, and 50, the Solow (capital accumulation) growth model predicts almost no additional growth in GDP from the pro-innovation tax cut, while the Schumpeter (creative destruction) model predicts a continuously higher growth rate of GDP. It is the qualitative difference—levels versus growth—that is the major distinguishing feature of these two frameworks.

[287] R&D expensing enjoyed widespread support among JEC members, with at least half of current JEC membership sponsoring or cosponsoring bills to restore R&D expensing prior to its adoption in P.L. 119-21.

Table 5-1: Effects of R&D Expensing on the Level of GDP, Solow versus Schumpeter Model

	Solow (Tax Foundation)	**Schumpeter (Aghion-Howitt)**
Year 1	—	+0.01%
Year 5	—	+0.05%
Year 10 (calibrated to match)	+0.11%	+0.11%
Year 20	—	+0.22%
Year 30	—	+0.33%
Year 50	+0.13%[288]	+0.55%

Source: JEC calculations[289]

The core takeaway of the Schumpeterian model is that tax reform should prioritize cutting taxation on innovation. This includes reducing tax rates on entrepreneurial inputs through policies such as R&D expensing and the R&E tax credit. Also, lower business taxes reduce tax rates on economic profits and hence increase entrepreneurial effort. Policies lowering business taxes take the form of lower individual income tax rates, lower corporate income tax rates, and additional tax cuts for business income such as via the Section 199A QBI deduction. We discuss a natural pro-innovation extension of Section 199A later in this chapter. Those policies can also take targeted forms, such as the QSBS exclusion.

Empirical evidence on R&D, taxation, and economic growth

Economists often argue that private markets systematically underprovide R&D because innovators capture only a small fraction of the value they create. Congressional Research Service (CRS) researchers recently surveyed the empirical literature on R&D spillovers, finding that the total economic returns to R&D are typically estimated at two to four times the private return to

[288] Tax Foundation's Solow model converges to 0.13 percent greater GDP in the long run. Tax Foundation estimates are only available for years 10 and 50 (assumed to be long-run convergence).
[289] JEC calculations are detailed in Box 5-1.

firms.[290] In other words, for every $1 of total economic value generated by R&D investments, innovators capture only $0.50 or $0.25. These estimates are derived from empirical studies of the economic output effects of R&D. In other words, these spillovers manifest though economy-wide growth rates.[291] They do not account for the welfare effects of innovation that do not operate via increased measured economic output.[292] A full accounting of the welfare effects of innovation would likely imply much larger spillover estimates.

Time and again econometric decompositions suggest a significant share of economic growth is attributable to innovation. Robert M. Solow (1956) was an early contribution to this literature and attributed a large share of growth to "residual" factors, interpreted as technological change.[293] Modern estimates, often provided by the Bureau of Labor Statistics (BLS), benefit from decades of measurement improvements and attribute a larger share to capital accumulation, but the composition of that capital tells an interesting story. Table 5-2 displays BLS's estimate of labor productivity growth in the private nonfarm business sector from 1987 to 2023 decomposed by source. Capital intensity taken all

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[290] Jane G. Gravelle and Mark P. Keightley, *The Federal Research and Development (R&D) Tax Credit*, Congressional Research Service Report no. R48848 (February 6, 2026), https://www.congress.gov/crs-product/R48848.

[291] Spillover estimates are commonly based on models that use the real value of firm sales as the primary outcome measure. Thus, the estimates are based on measures of real output. Brian Lucking, Nicholas Bloom, and John Van Reenen, "Have R&D Spillovers Declined in the 21st Century?" *Fiscal Studies* 40 (2019): 561–90, https://doi.org/10.1111/1475-5890.12195.

[292] In the mid-1990s, Nordhaus famously found that economic output measures can massively understate the welfare effects of technological change, using the history of the cost of light as an example. William D. Nordhaus, "Do Real-Output and Real-Wage Measures Capture Reality? The History of Lighting Suggests Not," in *The Economics of New Goods,* ed. Timothy F. Bresnahan and Robert J. Gordon (University of Chicago Press, 1996): 27–70, http://www.nber.org/chapters/c6064.

[293] Robert M. Solow, "A Contribution to the Theory of Economic Growth," *The Quarterly Journal of Economics* 70, no. 1 (1956): 65–94, https://doi.org/10.2307/1884513.

together contributed 0.8 percentage points per year to the 2.0 percent annual growth rate. Of that 0.8, however, only 0.2 percentage points came from structures and other traditional capital. The remainder came from innovation-embodying capital. Combining that remainder with the 0.9 percentage points attributed directly to productivity (the "residual"), innovation and innovation-embodying investment together account for roughly 75 percent of U.S. labor productivity growth from 1987 to 2024, with traditional capital accumulation contributing only about 10 percent (0.2 out of 2.0 percentage points per year).[294]

Table 5-2: Sources of U.S. Labor Productivity Growth, 1987–2024

Source	Percentage points per year	Share of total labor productivity growth
Total labor productivity growth	**2.0**	**100%**
Total Factor Productivity (residual)	0.9	45%
Innovation-embodying capital *(IPE + R&D + IPP)*	0.6	30%
Labor composition *(education, experience)*	0.3	15%
Traditional capital *(structures, other equipment)*	0.2	10%

Source: Bureau of Labor Statistics[295]

Given the importance of R&D to economic growth, it is important to understand how policymakers can encourage it. Research indicates that U.S. tax policy has been highly effective at spurring R&D activity. CRS surveyed the empirical literature on the

[294] For more on the notion that innovation is often embodied in capital investment, see Benjamin F. Jones and Xiaojie Liu, "A Framework for Economic Growth with Capital-Embodied Technical Change," *American Economic Review* 114, no. 5 (2024): 1448–87, https://doi.org/10.1257/aer.20221180.

[295] Bureau of Labor Statistics, "Total factor productivity, 2025," Table B, March 19, 2025, https://www.bls.gov/news.release/prod3.nr0.htm. Private nonfarm business sector estimates reported. "Innovation-Embodying Capital" aggregates BLS sub-components: information processing equipment (IPE), research and development (R&D), and intellectual property products excluding R&D (IPP). "Traditional Capital" is the BLS residual category "capital input excluding IPP & IPE."

responsiveness of R&D investment to tax incentives and reports that early studies estimated an elasticity of around -1.0, but recent studies using more rigorous methods find considerably larger elasticities, ranging from -2.0 to -4.0.[296] At these higher elasticities, the R&E tax credit and expensing together increase R&D investment by an estimated 17 to 34 percent, and with the added benefits of debt financing, by 37 to 50 percent.[297] To put these figures in context, U.S. business sector own-source funded R&D totaled $635 billion in 2023,[298] so a 17 to 34 percent increase due to tax policy represents roughly $108 to $216 billion in additional research activity in the U.S., which is comparable to the entire annual R&D expenditure of the economies of Germany (about $143 billion) or Japan (about $145 billion).[299]

Combining the spillover estimates, which occur largely via economic growth effects, with the elasticity estimates suggests that R&D is currently under-subsidized in the U.S. This is despite R&D being "the most favored type of investment in the Federal tax code."[300] Based on CRS estimates, the current Federal R&E tax credit would need to be doubled or even tripled to fully internalize the gap between the benefits to society and the benefits captured by businesses and innovators.[301] Of course, there are

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[296] An elasticity of -1 means that a 1 percent reduction in the user cost of R&D causes a 1 percent increase in R&D spending.
[297] Gravelle and Keightley, *The Federal Research and Development (R&D) Tax Credit*.
[298] National Center for Science and Engineering Statistics, "Business R&D Performance in the United States Increases to $722 Billion in 2023," NSF 25-353 (September 29, 2025), https://ncses.nsf.gov/pubs/nsf25353.
[299] Gravelle and Keightley write "large industrialized economies with comparable levels of R&D spending include Japan (3.44%) and Germany (3.13%)." In 2023, the GDP of Germany was $4.56 trillion, and Japan's was $4.2 trillion. Gravelle and Keightley, *The Federal Research and Development (R&D) Tax Credit*; International Monetary Fund, "GDP, current prices," updated October 2025, https://www.imf.org/external/datamapper/NGDPD@WEO/OEMDC/ADVEC/WEOWORLD?year=2023.
[300] Gravelle and Keightley, *The Federal Research and Development (R&D) Tax Credit*.
[301] Gravelle and Keightley, *The Federal Research and Development (R&D) Tax Credit*.

alternative ways to provide preferential tax treatment for R&D besides the tax credit, some of which we discuss later in this chapter.

Advantages of (nonrefundable) tax credits over appropriations

The economic growth effects of R&D can justify preferential tax treatment, but policymakers should take great care in choosing the correct instruments. We argue that nonrefundable tax credits are, in general, the best instrument for the job.

The economic case for tax credits over direct appropriations rests on a simple but powerful information asymmetry: the government does not know which firms and technologies will prove productive, and the price system aggregates that dispersed private knowledge far more efficiently than any central allocator can. This is Friedrich Hayek's insight applied to innovation policy. Following Hayek's analogy, each entrepreneur is the "man on the spot," possessing unique knowledge no government official can observe. Tax credits use this private information to society's advantage by functioning as matching grants: because the subsidy lowers the marginal cost of R&D, only firms whose private information tells them a project is worthwhile will increase their own co-investment to claim the credit. Unproductive firms find it unprofitable to expand R&D even at a subsidized price, so the subsidy automatically flows toward its highest-value use. This intuition is captured in recent economic analysis by Ufuk Akcigit, Douglas Hanley, and Stefanie Stantcheva (2022), who study a dynamic mechanism design problem and find that a linear corporate income tax combined with a nonlinear R&D subsidy performs nearly as well as the theoretically unrestricted optimal policy.[302]

We argue that, by contrast, direct appropriations, such as providing grants to "champion firms," require the government to identify promising firms *ex ante*, something at which it tends to perform poorly. We present two illustrative models capturing these arguments in Box 5-2 (near the end of this chapter), which together formalize a layered argument for our preferred policy instrument, and the design historically favored in U.S. tax policy: nonrefundable tax credits.

The Pillar Two minimum tax threat

The U.S.'s use of superior nonrefundable credits as an innovation policy instrument, however, faces a threat from the Undertaxed Profits Rule (UTPR) of the Pillar Two global minimum tax framework. Because the Pillar Two framework treats nonrefundable and refundable credits asymmetrically in the computation of a jurisdiction's effective tax rate (ETR), it would have penalized nonrefundable credits.

Specifically, the proposed Pillar Two model rules compute the jurisdiction-specific ETR for a multinational enterprise by treating nonrefundable credits as a reduction in covered taxes, while treating (qualified) refundable tax credits as additional income. To formalize this, let Π denote pre-tax profits of the firm, and T denote covered taxes. For a nonrefundable credit of value C, the Pillar Two model rules calculated the ETR as,

[302] Ufuk Akcigit, Douglas Hanley, and Stefanie Stantcheva, "Optimal Taxation and R&D Policies," *Econometrica* 90, no. 2 (2022): 645–84, https://doi.org/10.3982/ECTA15445.

$$ETR_{\text{nonrefundable}} = \frac{T - C}{\Pi}$$

while for a refundable tax credit of the same value C, the credit is treated as additional income (effectively like a government grant), and thus,

$$ETR_{\text{refundable}} = \frac{T}{\Pi + \mathrm{C}}$$

In both cases, the tax credit reduces the firm's ETR, but it reduces it by much more in the nonrefundable case. This disadvantages the nonrefundable approach, which is the superior approach and, incidentally, an approach often taken in U.S. tax policy. A simple example illustrates the stakes. Consider a U.S. multinational with pre-tax profits of Π = $1 billion and covered taxes of T = $200 million, yielding a baseline ETR of 20 percent, comfortably above the Pillar Two minimum of 15 percent. Now suppose the firm claims a C = $100 million R&E credit. If the credit is nonrefundable, as in the U.S. case, the ETR falls to ($200 − $100) / $1,000 = 10 percent, well below the 15 percent minimum, triggering a 5 percentage-point top-up tax that foreign governments may collect via the UTPR. Hence, the U.S. innovation incentive is effectively being clawed back by *foreign* governments. If instead the identical $100 million credit were structured as a refundable credit, the ETR would be $200 / $1,100 ≈ 18.2%, safely above the 15 percent minimum, and no top-up tax would apply.

A nonrefundable credit is thus at a clear disadvantage under a global minimum tax regime. This extends beyond the R&E credit to several nonrefundable U.S. business credits, including the

Orphan Drug Credit and the Low-Income Housing Tax Credit, although the R&E credit is the most prominent example.[303]

This Congress responded decisively to this international threat through legislative efforts, culminating in Section 899, which was initially included in but ultimately removed before passage of P.L. 119-21. Despite Section 899 not being included in the law, the threat of its inclusion led to negotiations and a side-by-side agreement that corrected most of the disadvantage given to nonrefundable credits in Pillar Two. Especially critical in this regard were the efforts of Joint Economic Committee member Representative Ron Estes (R-KS).[304]

International competitiveness

Firms make R&D location decisions by comparing after-tax returns across countries. Considering this, the U.S. tax system's treatment of R&D is markedly less favorable relative to its major competitors. Moreover, the U.S. tax focus on origin-based business income taxation creates incentives for multinational enterprises to move both paper profits and real R&D activity offshore. A border adjustment can eliminate those incentives and strengthen U.S. international competitiveness. We discuss these issues of international competitiveness in this section.

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[303] For more on this issue, see Peter R. Merrill et al., *Where Credit Is Due: Treatment of Tax Credits Under Pillar 2*, TaxNotes Special Report (March 20, 2023), https://www.taxnotes.com/special-reports/credits/where-credit-due-treatment-tax-credits-under-pillar-2/2023/03/17/7g743.

[304] Ron Estes, "Taxing Countries That Are Targeting US Companies Isn't 'Revenge,'" *Bloomberg Tax,* June 17, 2025, https://news.bloombergtax.com/tax-insights-and-commentary/taxing-countries-that-are-targeting-us-companies-isnt-revenge.

U.S. tax treatment of R&D is less favorable than major international competitors

Because countries have a plethora of policies related to the tax treatment of R&D spending, it is difficult to make direct comparisons. To compare the generosity of R&D tax treatment across countries, Organisation for Economic Cooperation and Development (OECD) economists estimate an implied tax subsidy rate: the amount of pre-tax loss per dollar of R&D investment that a firm can sustain and still break even, given the full array of a country's tax provisions.[305] A higher value indicates more favorable treatment. This is not a perfect measure, but these estimates provide a useful point of comparison. Table 5-3 reports these estimates for the U.S. and four other countries for selected years.

Table 5-3: Implied R&D Tax Subsidy Rates for Large, Profitable Firms

Country	**2015**	**2019**	**2024**
United States	$0.06	$0.07	$0.03
China	$0.15	$0.23	$0.32
France	$0.45	$0.43	$0.36
United Kingdom	$0.10	$0.11	$0.18
Germany	–$0.02	–$0.02	$0.22
OECD Average	*$0.14*	*$0.15*	*$0.16*

Source: Organisation for Economic Cooperation and Development[306]

[305] Silvia Appelt, Fernando Galindo-Rueda, and Ana Cinta González Cabral, "Measuring R&D tax support: Findings from the new OECD R&D Tax Incentives Database," OECD Science, Technology and Industry Working Paper no. 2019/06 (October 2019), https://doi.org/10.1787/d16e6072-en.

[306] Larger values indicate more favorable R&D tax treatment. China is not an OECD member. Estimates are for a representative large, profitable firm with sufficient tax liability to fully utilize available credits, including nonrefundable credits such as the U.S. R&E credit. Organisation for Economic Co-operation and Development, "Implied tax subsidy rates on R&D expenditures," OECD Data Explorer, last updated November 25, 2025, https://data-explorer.oecd.org/vis?lc=en&df[ds]=dsDisseminateFinalDMZ&df[id]=DSD_RDTAX%40DF_RDSUB&df[ag]=OECD.STI.STP.

In 2024, a U.S. firm making an R&D investment could sustain a pre-tax loss of only 3 cents per dollar before the investment became unprofitable, far below the OECD average of 16 cents. The 2022 shift from immediate R&D expensing to five-year amortization under Section 174 reduced the U.S. implied subsidy rate from $0.07 to $0.03. Meanwhile, international competitors were aggressively moving in the opposite direction. Germany's implied subsidy rate increased by 24 percentage points between 2019 and 2024. China's has roughly doubled since 2015, driven by successive expansions of its "super deduction."[307]

P.L. 119-21's restoration of full R&D expensing was a critical correction that will improve the U.S. competitive position. However, even with expensing restored, the U.S. implied subsidy rate rises only to approximately $0.07, still well below the OECD average of $0.16, and a fraction of the rates offered by France, China, and Germany.

Earlier in this chapter, we mentioned estimates from CRS suggesting that estimated economic spillover effects from R&D imply a larger R&E tax credit could be beneficial on net. Interestingly, CRS estimates suggest an optimal implied subsidy rate close to the OECD average of $0.16.

Border tax adjustment would promote U.S. innovation

Border adjustment achieves several of the objectives of tariffs, but through a more growth-oriented framework.[308] One commonly

[307] Kevin Zolriasatain and Paul McVoy, "Lawmakers Introduce Bill to Retroactively Fix R&D 174 Expensing," KBKG, March 14, 2025, https://www.kbkg.com/feature/lawmakers-introduce-bill-to-retroactively-fix-rd-174-expensing.

[308] U.S. Congress Joint Economic Committee, "JEC Chairman Schweikert on SCOTUS Tariffs Ruling, Need for Border Adjustment Tax," February 20, 2026, https://www.jec.senate.gov/public/index.cfm/republicans/newsroom?ID=BBA3EF48-

overlooked benefit of border adjustment is its potential to improve U.S. innovation outcomes. Under the current source-based tax system, U.S. multinationals have strong incentives to locate their intangible assets, such as patents, in low-tax jurisdictions.[309] One conventional interpretation of this behavior is that it reflects only "paper" profit shifting, that is, firms are merely moving the legal ownership of patents offshore while keeping the "real" research activity in the U.S. However, this interpretation is likely mistaken.

Studies of pharmaceutical industry location decisions focusing on Puerto Rico under Section 936 and its phase-out provide strong evidence that intangible-asset-driven tax preferences generate large real effects on innovative activity and employment. Section 936, enacted in 1976 and amended in the 1980s, effectively exempted U.S. possessions income of U.S. corporations from Federal taxation, under certain conditions. This created, in the context of U.S. domestic tax law, something analogous to a zero-rate source-based jurisdiction under U.S. sovereignty but outside the U.S. tax system—a ripe opportunity for profit shifting.

The pharmaceutical industry was the overwhelming beneficiary of Section 936. Meng-Ting Chen and Zadia M. Feliciano (2024) study Puerto Rico and report that pharmaceuticals accounted for approximately 50 percent of all Section 936 tax credits awarded

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6C17-46AC-B3E5-76CB7C73D454; U.S. Congress Joint Economic Committee, "Border Tax Adjustment Would
Curtail Profit Shifting and Provide Other Benefits, With Limited Transition Effects," March 11, 2026, https://www.jec.senate.gov/public/index.cfm/republicans/2026/3/jec-brief-outlines-economic-benefits-of-border-adjustment-reforms-for-american-consumers-and-businesses.

[309] Scott Dyreng and Michelle Hanlon, "Tax Avoidance and Multinational Firm Behavior," paper presented at the Brookings Institution, December 19, 2019, https://www.brookings.edu/wp-content/uploads/2019/12/Dyreng-Hanlon-12.14.19.pdf.

and 20 percent of employment under the program.[310] They further estimate that the phaseout and elimination of Section 936 reduced survival rates of pharmaceutical and medical devices establishments by an additional 3.5 to 6.2 percentage points relative to other manufacturing. In other words, these were not paper effects, they were real losses in productive capacity and high-paying jobs in the Puerto Rican pharmaceutical and related sectors.

The current U.S. source-based tax system provides strong incentives for intangible-heavy multinationals to offshore their intellectual property. By removing imports and exports from the calculation of U.S. taxable income, and thereby curtailing these profit shifting opportunities, border adjustment would substantially weaken this incentive. As illustrated by the real effects of Section 936 in Puerto Rico, this would likely have more than paper effects. Thus, border adjustment is not only a revenue measure and a tool against profit shifting, it is also a pro-innovation reform.

Proposed and enacted pro-innovation preferential tax treatment

We now apply the lessons discussed thus far to three specific policies.

Semiconductor manufacturing subsidies

The *CHIPS and Science Act of 2022* created two parallel subsidy instruments for semiconductor manufacturing: $39 billion in direct grants administered by the Commerce Department's CHIPS Program Office, and the Advanced Manufacturing Investment Credit (AMIC) under IRC Section 48D, originally a 25 percent

[310] Meng-Ting Chen and Zadia M. Feliciano, "Intangible Assets, Corporate Tax Credits and Pharmaceutical Establishments," *Emerging Markets Review* 60 (2024): 101141, https://doi.org/10.1016/j.ememar.2024.101141.

refundable investment tax credit for qualified property placed in service at advanced manufacturing facilities.[311] Recent policy changes have moved the program toward the tax credit and away from the discretionary grants, exactly the direction our framework argues is superior. P.L. 119-21 raised the AMIC from 25 to 35 percent for property placed in service after December 31, 2025, although the deadline to begin construction for AMIC eligibility remains at the end of 2026.[312]

Meanwhile, the grants program has been met with increasing skepticism. The Trump Administration established an "Investment Accelerator" to renegotiate Biden-era awards, with Commerce Secretary Howard Lutnick calling some Biden-era grants "overly generous."[313] The Intel renegotiation presents a cautionary tale: the Biden Administration awarded Intel nearly $8 billion in grants, thereby picking a domestic champion in which private markets appeared to have little confidence (its stock had lost more than half its value over five years), and the Trump Administration renegotiated the grants into a 10 percent government equity stake.[314] The grants have also been used to pursue unrelated policy

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[311] McKinsey & Company, "The CHIPS and Science Act: Here's what's in it," October 4, 2022, https://www.mckinsey.com/industries/public-sector/our-insights/the-chips-and-science-act-heres-whats-in-it; Stephen Ezell, "U.S. Semiconductor Manufacturing Tax Credits Need To Be Extended and Broadened," Information Technology & Innovation Foundation, June 10, 2025, https://itif.org/publications/2025/06/10/us-semiconductor-manufacturing-tax-credits-must-be-extended-and-broadened/.

[312] Dylan Butts, "Chipmakers get larger tax credits in Trump's latest 'big beautiful bill,'" *CNBC,* July 2, 2025, https://www.cnbc.com/2025/07/02/chipmakers-get-bigger-tax-credits-in-trumps-latest-big-beautiful-bill.html.

[313] Aimee P. Ghosh et al., "Trump Launches $1 Billion Plus Investment Fast Track with New Executive Order," Pillsbury, April 4, 2025, https://www.pillsburylaw.com/en/news-and-insights/trump-launches-one-billion-plus-investment-fast-track-executive-order.html; "Trump Administration Reportedly Reconsiders CHIPS Act Subsidies, Touts TSMC as Model," *TrendForce News,* June 5, 2025, https://www.trendforce.com/news/2025/06/05/news-trump-administration-reportedly-reconsiders-chips-act-subsidies-touts-tsmc-as-model/.

[314] Annie Palmer and Chris Eudaily, "Lutnick says Intel has to give government equity in return for CHIPS Act funds," *CNBC,* August 19, 2025,

objectives, such as DEI hiring and access to childcare facilities for workers, which has been criticized as "everything bagel" policymaking.[315]

The AMIC's performance to date illustrates the matching-grant advantages at work. While much attention has been focused on the grants, the tax credit was "even more important, yet comparatively unsung,"[316] because companies knew they could claim the credit as soon as they placed qualifying property in service, without going through a bureaucratic process. The size of the AMIC reflects the substantial increase in investment. CBO originally projected the AMIC to cost $24.25 billion over five years, but Peterson Institute researchers estimated in March 2025 that if investments continued at prevailing levels, the credit's cost could exceed $73 billion, roughly triple the original projection.[317] Figure 5-2 illustrates the recent surge in U.S. semiconductor manufacturing investment through 2024. Given that only $6.72 billion in grants had been finalized by late 2024,[318] it is unlikely the grants were the primary factor behind this surge, rather, the AMIC has likely had a more meaningful effect.

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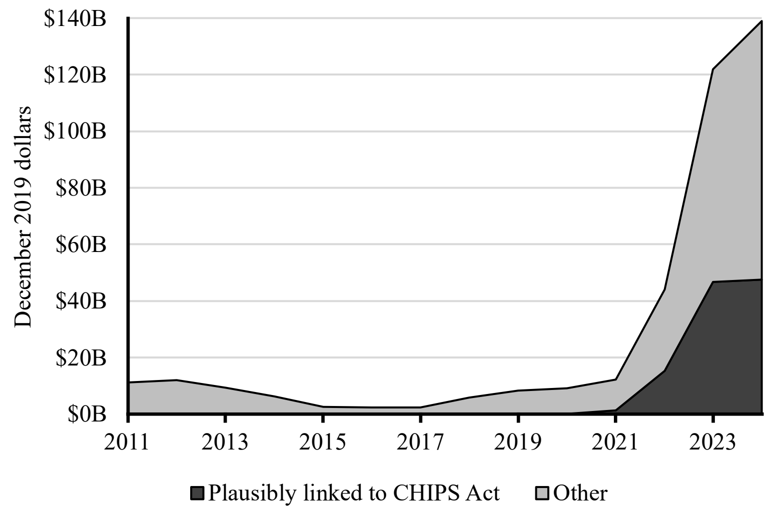
https://www.cnbc.com/2025/08/19/lutnick-intel-stock-chips-trump.html; Rishi Lyengar, "What to Know About Trump's Deal With Intel," *Foreign Policy,* August 27, 2025, https://foreignpolicy.com/2025/08/27/trump-intel-deal-ceo-tan-china-chips-act/.
[315] Ezra Klein, "The Problem With Everything-Bagel Liberalism," *The New York Times,* April 2, 2023, https://www.nytimes.com/2023/04/02/opinion/democrats-liberalism.html.
[316] Stephen Ezell, "U.S. Semiconductor Manufacturing Tax Credits Need To Be Extended and Broadened."
[317] Martin Chorzempa, "The CHIPS Act already puts America first. Scrapping it would poison the well for US investment," Peterson Institute for International Economics, March 27, 2025, https://www.piie.com/blogs/realtime-economics/2025/chips-act-already-puts-america-first-scrapping-it-would-poison-well.
[318] U.S. Department of Commerce, Office of Public Affairs, "Biden-Harris Administration Announces CHIPS Incentives Award with TSMC Arizona to Secure U.S. Leadership in Advanced Semiconductor Technology," November 15, 2024, https://www.commerce.gov/news/press-releases/2024/11/biden-harris-administration-announces-chips-incentives-award-tsmc.

Figure 5-2: U.S. Investment in Construction of Electronics Facilities



Source: Peterson Institute for International Economics[319]

AMIC is both predicted to be, and appears to have been, much more successful than the discretionary program. However, AMIC has a significant design flaw: its refundability. AMIC permits an "elective payment" election that allows any taxpayer, including entities with zero U.S. tax liability, to receive a direct cash payment from the U.S. Treasury equal to the credit amount.[320] On one hand, policymakers might argue that this is an important design choice since foreign manufacturers, such as TSMC, lack sufficient U.S. tax liability to use a nonrefundable credit. However, this is a poor argument, since unused general business credits can be carried forward for 20 years,[321] and if a foreign

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[319] Chorzempa, "The CHIPS Act already puts America first," Figure 1.
[320] Scott Mackay, Tom Fraase, and Susan Grais, "CHIPS Act final regs. offer many taxpayer-friendly provisions," The Tax Adviser, June 30, 2025, https://www.thetaxadviser.com/issues/2025/jun/chips-act-final-regs-offer-many-taxpayer-friendly-provisions/.
[321] Gravelle and Keightley, *The Federal Research and Development (R&D) Tax Credit*.

manufacturer indeed successfully produced highly profitable chips in the U.S.—as is the intent of the *CHIPS Act*—the firm would have sufficient U.S. tax liability to take advantage of the credits. Therefore, for a firm that successfully produces in the U.S. in the long run, it is only an issue of timing, and as we have argued earlier in this chapter, nonrefundability provides an important screening mechanism, ensuring the credits only go to companies that anticipate future U.S. tax liability. Indeed, those are exactly the companies that should take advantage of the incentives. A simple improvement would be to reform the credit and make it nonrefundable (and nontransferable). This could be done as part of a timeline extension.

Qualified Small Business Stock (QSBS) expansion and improvement

The Qualified Small Business Stock (QSBS) exclusion encourages investment in small startup businesses with high growth potential by allowing investors to exclude the capital gains from the sale of stock under certain conditions. The conditions include a gross asset limit at the time of stock issuance, C corporation form, and a holding period. P.L. 119-21 significantly expanded the QSBS exclusion under IRC Section 1202.[322] This makes QSBS meaningfully more generous for founders, early employees paid in equity, and other investors in startup C corporations.

The QSBS expansion has attracted criticism from an unusual coalition of experts. For example, researchers at the Washington Center for Equitable Growth and the American Enterprise Institute, describing themselves as "two tax experts from opposite

[322] Ryan Nance, "QSBS gets a makeover: What tax pros need to know about Sec. 1202's new look," ed. Michael J. Mondelli, The Tax Adviser, November 30, 2025, https://www.thetaxadviser.com/issues/2025/nov/qsbs-gets-a-makeover-what-tax-pros-need-to-know-about-sec-1202s-new-look/.

ends of the ideological spectrum," co-authored an article provocatively titled "Congress Should Have Eliminated, Not Expanded, the QSBS Exclusion."[323] The Tax Foundation argued that QSBS violates the principles of neutrality and simplicity.[324] Meanwhile, the Institute on Taxation and Economic Policy criticizes the policy for its distributional effects.[325]

These criticisms confuse policy objectives. The primary objective of QSBS is to channel investment toward high-risk domestic startups that will lead to economic growth, not achieve distributional goals. They also miss recent empirical evidence suggesting QSBS works, they miss its distinct advantage in its targeting of small C corporations, and they fail to make important international comparisons.

Starting with the empirical evidence, Jun Chen and Joan Farre-Mensa (2026) exploit the 2010 expansion of the QSBS exclusion to 100 percent and find that it increased new firm formation by 10 percent and patenting by 23 percent.[326] They also point out that the expansion increased startups' use of equity compensation, strengthening their ability to compete for talent against established incumbents. Indeed, their study highlights that one key way in which the QSBS startup tax preference affects real economic

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[323] Kyle Pomerleau and David S. Mitchell, "Congress Should Have Eliminated, Not Expanded, the QSBS Provision," *Tax Notes Federal* 189 (2025): 315–20, https://www.aei.org/wp-content/uploads/2025/10/2025tnf41-10-1.pdf.
[324] Aleksei Shilov, "Quite the Skewed Business Subsidy: QSBS Exclusion Is a Poor Way to Encourage Investment," Tax Foundation, December 11, 2025, https://taxfoundation.org/blog/qualified-small-business-stock-qsbs-exclusion/.
[325] Sarah Austin and Nick Johnson, "Quite Some BS: Expanded 'QSBS' Giveaway in Trump Tax Law Threatens State Revenues and Enriches the Wealthy," Institute on Taxation and Economic Policy, October 2, 2025, https://itep.org/qsbs-trump-tax-law-threatens-state-revenues-enriches-wealthy/.
[326] Jun Chen and Joan Farre-Mensa, "Capital Gains Tax Relief and Entrepreneurship: Evidence from the QSBS Exemption," HKU Jockey Club Enterprise Sustainability Global Research Institute Working Paper (2026), http://dx.doi.org/10.2139/ssrn.4482626.

activity is by making equity compensation relatively more valuable, which is a major resource startups use to bid scarce engineers and scientists away from incumbents. Prior research by Alexander Edwards and Maximilian Todtenhaupt found that the 2010 QSBS expansion increased investment in startup firms per funding round by 12 percent.[327] Finally, recent research by Murillo Campello and Guilherme Junqueira (2025) examine how the QSBS expansion affected venture capital (VC) risk-taking behavior, and found that VCs shifted their portfolios toward riskier, earlier-stage ventures in tax-eligible sectors.[328] The evidence suggests QSBS has real economic effects, and overall advantages high-growth startups over incumbents.

Now consider the C-corporation requirement, which some critics single out as a distortion, and others single out as inequitable.[329] This is a feature, not a bug. The empirical literature on startup growth finds a striking fact: firms organized as C corporations are dramatically more likely to achieve high growth than firms in other organizational forms. Catherine Fazio, Jorge Guzman, and Scott Stern (2020) report that startups founded as corporations are approximately 390 percent more likely to grow.[330] Jorge Guzman and Scott Stern (2015) find that corporations are more than six

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[327] Alexander Edwards and Maximilian Todtenhaupt, "Capital gains taxation and funding for start-ups," *Journal of Financial Economics* 138, no. 2, (2020): 549-571, https://doi.org/10.1016/j.jfineco.2020.06.009.
[328] Murillo Campello and Guilherme Junqueira, "Tax Incentives and Venture Capital Risk-Taking," CBT Doctoral Conference 2025, Saïd Business School, University of Oxford, working paper no. 2025-10 (2025), https://oxfordtax.sbs.ox.ac.uk/sitefiles/wp25.10-guilherme-junqueira.pdf.
[329] Shilov, "Quite the Skewed Business Subsidy: QSBS Exclusion Is a Poor Way to Encourage Investment;" Austin and Johnson, "Quite Some BS: Expanded 'QSBS' Giveaway in Trump Tax Law Threatens State Revenues and Enriches the Wealthy."
[330] Catherine Fazio, Jorge Guzman, and Scott Stern, "The Impact of State-Level Research and Development Tax Credits on the Quantity and Quality of Entrepreneurship," *Economic Development Quarterly* 34, no. 2 (2020): 188–208, Table 1, https://doi.org/10.1177/0891242420920926.

times more likely to grow than noncorporations.[331] These findings are not unexpected. Choosing the C-corporation form is not an arbitrary legal technicality, it is the legal structure that is built to scale. QSBS targets capital gains relief to exactly the legal form that the innovation literature identifies as the vehicle for transformative growth. Considering other research suggesting C corporations are potentially somewhat disadvantaged by the tax code,[332] QSBS's C-corporation focus is an appropriate targeting strategy.

Taking an international perspective, Canada, the United Kingdom, Australia, and Ireland all maintain similar capital gains preferences for early-stage business investment, despite different tax systems and political environments. Table 5-4 provides several facts about QSBS and similar programs across these countries. The U.S. is not an outlier in providing preferential tax treatment for startup investment.

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[331] These studies use state-level records to study business legal forms, and their data record only a corporation indicator variable and cannot formally distinguish C corporations from S corporations. However, it is practically impossible to imagine their results are being driven by S corporations, as S corporations face a strong set of legal constraints to growth. Jorge Guzman and Scott Stern, "Where Is Silicon Valley? Forecasting and mapping entrepreneurial quality," *Science* 347, no. 622 (2015): 606–609, https://doi.org/10.1126/science.aaa0201.

[332] Kyle Pomerleau, *Section 199A and "Tax Parity,"* American Enterprise Institute (September 12, 2022), https://www.aei.org/research-products/report/section-199a-and-tax-parity/.

Table 5-4: Early-Stage Equity Investment Tax Incentives in Select Countries

Country (Program)	Incentives provided	Qualification method	Holding period
United States (QSBS)	At exit	As-of-right	5 years (3-4 partial)
Canada (Lifetime Capital Gains Exemption)	At exit	As-of-right	2 years
United Kingdom (SEIS or EIS)	Both at investment and at exit	As-of-right	3 years
Australia	At exit	As-of-right	15 years (for full benefit)
Ireland (EIIS)	At investment	Discretionary	4 years

Source: Tax Foundation[333]

While QSBS is economically sound and pro-growth, there are clear opportunities for improvement. For example, the trust-multiplication strategies that allow well-advised taxpayers to exclude far more than the statutory cap are an abuse of the provision's intent and should be curtailed.[334] However, the case for reducing the tax burden on entrepreneurial risk-taking via QSBS is grounded in the economics of innovation and the specific QSBS policy is supported by the empirical evidence.

Extending IRC Section 199A to business development companies

The *Tax Cuts and Jobs Act of 2017* (TCJA) introduced the Section 199A qualified business income (QBI) deduction, permitting individual taxpayers to deduct up to 20 percent of pass-through business income. P.L. 119-21 made Section 199A permanent. In general, under Section 199A, qualified business income for

[333] Aleksei Shilov (Research Software Developer, Tax Foundation), in discussion with the author. QSBS information reflects P.L. 119-21 changes in 2025.
[334] Jesse Drucker and Maureen Farrell, "A Lavish Tax Dodge for the Ultrawealthy Is Easily Multiplied," *The New York Times,* December 28, 2021, https://www.nytimes.com/2021/12/28/business/tax-break-qualified-small-business-stock.html.

sufficiently low-income taxpayers qualifies for the deduction, as does qualified business income for high-income taxpayers not from a "specified service trade or business" (SSTB). SSTBs generally include labor-intensive businesses such as law firms, medical practices, and consulting. Non-SSTBs include relatively more capital-intensive businesses such as manufacturing, retail, construction, and real estate.

The Section 199A deduction is also provided for dividends received from Real Estate Investment Trusts (REITs), recognizing that REITs are analogous to pass-through entities for real estate investments. For example, REIT dividends often do not qualify for preferential qualified rates, and REITs are required to distribute at least 90 percent of taxable income.[335] However, a closely analogous class of firms was excluded: business development companies (BDCs). The *Small Business Investor Tax Parity Act of 2025* (H.R. 652), introduced by JEC member Representative Jodey Arrington (R-TX), would close this gap by extending Section 199A favorable tax treatment to BDCs.[336]

BDCs were created by Congress in 1980 through the *Small Business Investment Incentive Act*, which amended the *Investment Company Act of 1940* to channel public market capital to small and middle-market private companies underserved by traditional bank lending.[337] BDCs are designed to be small business analogues to REITs: they must invest at least 70 percent of their

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335 Chris Mangin Jr. and Nicole Kati Wong, "REIT All About It: One Big Beautiful Bill — Tax Updates for REITs," Paul Hastings, July 18, 2025, https://www.paulhastings.com/insights/client-alerts/reit-all-about-it-one-big-beautiful-bill-tax-updates-for-reits.

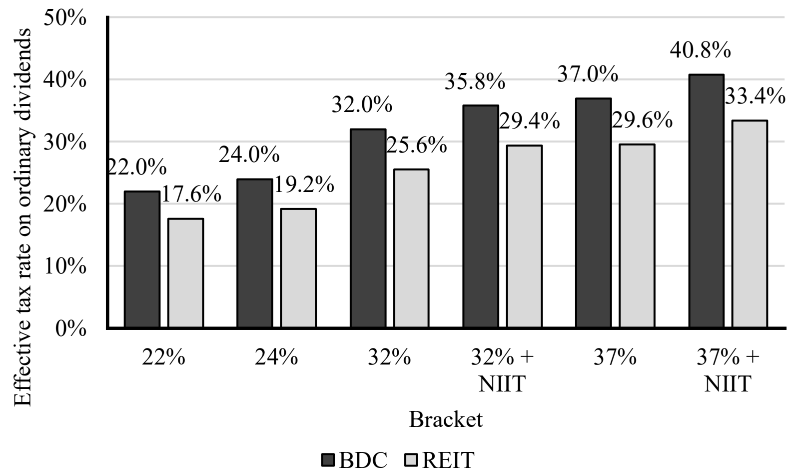
336 Small Business Investor Tax Parity Act of 2025, H.R. 652, 119th Cong. (2025); "House Bill Would Level Playing Field for BDC Investors," Small Business Investor Alliance, January 24, 2025, https://sbia.org/2025/01/24/sbia-expresses-support-for-bdc-tax-parity-bill-119.

337 "BDC Primer," BDC Reporter, accessed April 7, 2025, https://bdcreporter.com/bdc-primer/.

total assets in “eligible portfolio companies,” which are generally private U.S. firms, or public companies with small market capitalizations. BDCs must also offer managerial assistance to their portfolio companies. Moreover, most BDCs elect to eliminate entity-level taxation by distributing at least 90 percent of taxable income as dividends.[338] This structure is analogous to that of REITs: both are pass-through vehicles, and both distribute the vast majority of income. The primary material difference is the underlying asset class: real estate for REITs and private small business lending for BDCs. Not extending Section 199A to BDCs creates a substantial tax asymmetry. For example, at the top marginal individual income tax rate, REIT ordinary dividends are effectively taxed at approximately 29.6 percent after the Section 199A deduction, while BDC ordinary dividends face the full 37 percent marginal rate. Figure 5-3 shows the tax gap between dividends from the two investment firm types more broadly than the top marginal tax rates. The tax gaps at lower rates are relevant because both investment vehicles provide ample opportunities for middle-income retail investors to allocate their savings to these asset classes.

[338] Stuart E. Leblang, Michael J. Kliegman, and Amy S. Elliott, “Tax Bill’s Section 199A Expansion Would Boost BDCs,” Akin Gump Strauss Hauer & Feld LLP, May 23, 2025, https://www.akingump.com/en/insights/tax-insights/tax-bills-section-199a-expansion-would-boost-bdcs.

Figure 5-3: Tax Asymmetry Between Business Development Companies (BDCs) and REITs under Current Law (Section 199A)



Source: JEC calculations[339]

Extending Section 199A to BDCs is pro-innovation. BDC dividends derive from interest income on loans to operating small businesses, many of which are developing new products, expanding into new markets, or scaling operations. Indeed, recent academic research finds that "BDCs fill a niche that allows capital to reach middle-market firms—often firms with high growth opportunities and lack of sustainable funding sources—thereafter stimulating firm growth and innovation," and that "firms' access to BDC funding stimulates their employment growth and patenting activity."[340] Thus, the *Small Business Investor Tax Parity Act* is a pro-growth tax reform, and this Section 199A

[339] NIIT = 3.8 percent Net Investment Income Tax (IRC §1411), applies above $200K/$250K MAGI. Section 199A deduction reduces taxable income base by 20 percent; NIIT applies to full investment income (not reduced by Section 199A).
[340] Tetiana Davydiuk, Tatyana Marchukb, and Samuel Rosen, "Direct Lenders in the U.S. Middle Market," *Journal of Financial Economics* 162 (2024), https://doi.org/10.1016/j.jfineco.2024.103946.

extension to BDCs should be incorporated into future tax legislation.[341]

Box 5-1: Taxes in a Schumpeterian Growth Model

This box presents a one-sector Schumpeterian growth model, following Philippe Aghion and Peter Howitt (2009, Section 4.2).[342] The model illustrates how the taxation of R&D inputs can lead to lower long-run growth, and how the taxation of business profits can create a distortion that most likely also lowers long-run growth rates.

Final good production. A competitive sector produces a final good using labor L (fixed) and an intermediate good x_t via production function,

$$Y_t = L^{1-\alpha} A_t^{1-\alpha} x_t^{\alpha}$$

where A_t is the productivity of the intermediate good and $\alpha \in (0,1)$. Note that this production function is constant returns to scale in labor and the intermediate input.

GDP is final output net of intermediate inputs: $\text{GDP}_t = Y_t - x_t$. All prices are in units of the final good.

[341] While the House-passed H.R. 1 would have increased the Section 199A deduction rate to 23 percent and extended it to BDCs, the Senate version reduced this back to 20 percent and omitted the BDC extension. While a case could be made for a larger Section 199A tax deduction as a way to lower business income taxes, we argue that parity between BDCs and REITs is certainly justified. KPMG, *Passthrough tax provisions in "One Big Beautiful Bill Act,"* (May 2025), https://kpmg.com/kpmg-us/content/dam/kpmg/taxnewsflash/pdf/2025/05/kpmg-report-passthroughs-one-big-beautiful-bill-may-16-2025.pdf.

[342] Philippe Aghion and Peter Howitt, "Chapter 4: The Schumpeterian Model" in *The Economics of Growth*.

Intermediate good monopolist. Each period, the intermediate good is produced by a monopolist with quality (technology) A_t, using units of the final good as input on a one-for-one basis. The competitive final good producers pay the marginal product of the intermediate input, so the monopolist faces inverse demand,

$$p_t = \alpha(A_t L)^{1-\alpha} x_t^{\alpha-1}$$

Maximizing monopoly profit $\Pi_t = p_t x_t - x_t$ yields the monopolist's chosen intermediate quantity and equilibrium profit,

$$x_t^* = \alpha^{2/(1-\alpha)} A_t L$$
$$\Pi_t^* = \pi A_t L$$

where $\pi \equiv (1-\alpha)\alpha^{(1+\alpha)/(1-\alpha)}$ is a constant. Substituting back, GDP is proportional to technology A_t,

$$\text{GDP}_t = \alpha^{2\alpha/(1-\alpha)}(1-\alpha^2) A_t L \propto A_t$$

This is the key structural feature: GDP grows at the same rate as A_t. A_t grows through innovation, to be specified next.

Innovation. Each period, an entrepreneur attempts to replace the incumbent intermediate good monopolist through *drastic innovation* (that is, *creative destruction*). If successful, the productivity of the intermediate good rises to $A_t = \gamma A_{t-1}$, where $\gamma > 1$ is the innovation step size, and the entrepreneur displaces the monopolist for one period.[343] Otherwise, $A_t = A_{t-1}$.

[343] The entrepreneur is replaced the following period by a randomly drawn firm with access to the new technology, so there is no continuation value. This keeps the model simple.

The entrepreneur chooses how many units of the final good R_t to invest in research. The probability of successful innovation is assumed to be the following function,

$$\mu_t = \lambda\left(\frac{R_t}{\gamma A_{t-1}}\right)^{\sigma}$$

where $\lambda > 0$ is a productivity parameter and $\sigma \in (0,1)$ governs the elasticity of research output with respect to research input. Research spending is normalized by γA_{t-1} to prevent the increasing scale of the economy from mechanically increasing growth rates over time—this is a standard normalization in Schumpeterian models, used to yield a constant growth rate.

The entrepreneur's expected payoff is:

$$\mathbb{E}\left[\text{Profits}_{\text{Entrepreneur}}\right] = \lambda\left(\frac{R_t}{\gamma A_{t-1}}\right)^{\sigma} \pi\gamma A_{t-1}L - R_t$$

The first-order condition yields normalized research intensity $n^* \equiv R_t/(\gamma A_{t-1})$:

$$n^* = (\sigma\lambda\pi L)^{1/(1-\sigma)}$$

and the equilibrium innovation rate:

$$\mu^* = \lambda^{1/(1-\sigma)}(\sigma\pi L)^{\sigma/(1-\sigma)}$$

Economic growth. Since GDP is proportional to A_t, the expected growth rate of GDP equals the probability of innovation times the size of the multiplicative innovation step:

$$g = \mu^*(\gamma - 1) = \lambda^{1/(1-\sigma)}(\sigma\pi L)^{\sigma/(1-\sigma)}(\gamma - 1)$$

The economy's growth rate is *endogenous*. Any policy that changes the incentives to invest in research will in general affect the growth rate.

Taxing R&D inputs. Now suppose the government levies a tax at rate τ on research inputs. To purchase R_t units of research inputs, the entrepreneur must pay $(1+\tau)R_t$. The entrepreneur's problem becomes:

$$\mathbb{E}\left[\text{Profits}_{\text{Entrepreneur}}\right] = \lambda\left(\frac{R_t}{\gamma A_{t-1}}\right)^{\sigma} \pi\gamma A_{t-1}L - (1+\tau)R_t$$

The first-order condition now gives:

$$n^*(\tau) = \left(\frac{\sigma\lambda\pi L}{1+\tau}\right)^{1/(1-\sigma)}$$

The innovation rate becomes:

$$\mu(\tau) = \lambda^{1/(1-\sigma)}\left(\frac{\sigma\pi L}{1+\tau}\right)^{\sigma/(1-\sigma)}$$

and the growth rate is:[344]

$$g(\tau) = \lambda^{1/(1-\sigma)}\left(\frac{\sigma\pi L}{1+\tau}\right)^{\sigma/(1-\sigma)}(\gamma - 1)$$

[344] With taxation of R&D inputs, GDP includes government tax revenue: $\text{GDP}_t = Y_t - x_t + \tau R_t$. Since $R_t = n^*(\tau)\gamma A_{t-1}$, tax revenue is proportional to A_{t-1} and thus grows at the same rate as A_t. The growth rate of GDP is therefore still equal to the growth rate of A_t.

The tax on R&D inputs unambiguously reduces the long-run growth *rate* of the economy. The growth rate with the tax relative to the growth rate without the tax is:

$$\frac{g(\tau)}{g(0)} = \left(\frac{1}{1+\tau}\right)^{\frac{\sigma}{1-\sigma}}$$

More generally, for a tax rate increase from τ to $\tau + \Delta\tau$,

$$\frac{g(\tau+\Delta\tau)}{g(\tau)} = \frac{\frac{g(\tau+\Delta\tau)}{g(0)}}{\frac{g(\tau)}{g(0)}} = \frac{\left(\frac{1}{1+\tau+\Delta\tau}\right)^{\frac{\sigma}{(1-\sigma)}}}{\left(\frac{1}{1+\tau}\right)^{\frac{\sigma}{(1-\sigma)}}}$$

$$= \left(\frac{1+\tau}{1+\tau+\Delta\tau}\right)^{\frac{\sigma}{(1-\sigma)}}$$

$$= \left(\frac{\text{R\&D user cost before tax increase}}{\text{R\&D user cost after tax increase}}\right)^{\frac{\sigma}{(1-\sigma)}}$$

the last expression is obtained by noting that in the model, the user cost for R&D investment is 1 (the price to the private sector) plus taxes paid.

The business income tax is not a pure profits tax. A common intuition in public finance is that a tax on pure economic profits (rents) is non-distortionary. Indeed, if the government takes a fixed share of a firm's net income (revenues minus all costs including normal rates of return to equity), the tax simply scales down the profit function without changing the profit-maximizing decision. This intuition fails in the Schumpeterian growth model. A straightforward way to capture this in the one-sector Schumpeterian model is to trace through the implications of the entrepreneur not being able to deduct the cost of research investment R_t against its profits when the venture fails.[345]

If the entrepreneur wins (probability μ), the startup becomes the monopolist, the R&D costs are on the firm's books, and the entrepreneur earns after-tax profit $(1-\tau)(\Pi_t^* - R_t)$, where τ is the business tax rate. If the entrepreneur loses (probability $1-\mu$), the startup has no revenue. It has accumulated net operating losses (NOLs) equal to R_t, but these losses are largely stranded.[346] The entrepreneur's expected payoff therefore becomes,

$$\mathbb{E}\left[\text{Profits}_{\text{Entrepreneur}}\right] = \mu_t(1-\tau)(\Pi_t^* - R_t) + (1-\mu_t)(-R_t)$$

which is not proportional to the entrepreneur's expected profit without taxation. Therefore, the business income tax is not a pure profits tax: it distorts firm behavior. The actual distortion depends on parameter values. The most plausible effect is that the entrepreneur's research effort will be reduced, and therefore, economic growth will be lower due to business income taxation.

Calibrating taxing R&D inputs. To calibrate the taxing R&D inputs equation in the one-sector creative destruction model,

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[345] More broadly, entrepreneurial effort is not fully deductible, an additional asymmetry that also breaks the pure economic profits intuition.

[346] Internal Revenue Code Sections 269, 382, and 383 are designed to curtail the transferability of losses to profitable firms (including losses accumulated via tax credits). For a discussion of how these asymmetries disadvantage entrepreneurs, see *The Tax Code as a Barrier to Entrepreneurship*, *Testimony Before the U.S. House Committee on Small Business,* 115th Cong. (2017) (statement of Kyle Pomerleau, Director of Federal Projects, Tax Foundation), https://taxfoundation.org/testimony/tax-code-barrier-entrepreneurship/.

$$\frac{\text{GDP growth rate with R\&D tax increase}}{\text{GDP growth rate without tax increase}} = \left(\frac{\text{R\&D user cost before tax increase}}{\text{R\&D user cost after tax increase}}\right)^{\frac{\sigma}{(1-\sigma)}}$$

we first need estimates of R&D user costs before and after the tax increase. Using a recent CRS report,[347] we find R&D amortization shifted the user cost by the ratio of 0.2221/0.2125 = 1.045.[348] Because σ is difficult to calibrate, we choose σ to match Tax Foundation's estimate of the GDP level effects of R&D expensing in year 10, which is approximately 0.11 percent greater GDP.[349] With a baseline growth rate of $\bar{g}$ with expensing, the equation to match is therefore,

$$gap_{10} = 1 - \left(\frac{1 + \bar{g} \cdot \left(\frac{1}{1.045}\right)^{\frac{\sigma}{1-\sigma}}}{1 + \bar{g}}\right)^{10} = 0.0011$$

This sets the model-implied year-10 GDP loss from the amortization tax equal to Tax Foundation's estimate, with $\overline{g}$ given and σ as the unknown to solve for.

Supposing $\overline{g} = 0.02$ as the baseline growth rate,[350] this reduces to,

347 Gravelle and Keightley, *The Federal Research and Development (R&D) Tax Credit*.
348 The R&D credit "basis adjustment" provisions were also changed in TCJA and P.L. 119-21. We exclude the change from our analysis and consider the effects on the user cost of capital holding basis adjustment fixed at the pre-TCJA and post-P.L. 119-21 policy. This is consistent with the Tax Foundation's model.
349 Garrett Watson (Director of Policy Analysis, Tax Foundation), in discussion with the author. Their latest estimates for R&D expensing include a 10-year GDP effect of +0.11 percent, and a long-run effect of +0.13 percent.
350 This is close to CBO's baseline real GDP growth rate. Congressional Budget Office, *CBO's Current View of the Economy From 2025 to 2028* (September 2025), https:/www.cbo.gov/publication/61236.

$$gap_{10} = 1 - \left(\frac{1 + 0.02 \cdot \left(\frac{1}{1.045}\right)^{\frac{\sigma}{1-\sigma}}}{1 + 0.02} \right)^{10} = 0.0011$$

solving for σ yields,

$$\sigma = 0.113$$

We believe this is likely a conservative estimate for σ, and a higher estimate for σ would imply even greater growth effects from R&D expensing. However, this calibration exercise illustrates our argument: the creative destruction model implies R&D expensing has a long-run GDP growth effect, and thus the gap continues to increase in this model. By contrast, with the traditional Solow growth model, after the R&D expensing policy change, the economy converges to a fixed increased percent in GDP.

Box 5-2: The Advantages of (Nonrefundable) Tax Credits over Direct Appropriations

We argue that when government subsidies for innovation are warranted, tax credits are generally superior to direct appropriations. Moreover, within the class of tax credits, we further argue that nonrefundable credits are generally preferable to refundable ones. This box formalizes these arguments through two complementary illustrative models. The first model addresses the choice between *matching grants* (tax credits) and *picking winners* (direct appropriations). The second model addresses the choice between *refundable* and *nonrefundable* tax credits.

Model 1: Tax credits dominate picking winners

Consider a government that seeks to increase R&D output beyond the privately chosen level, motivated by the positive spillovers that innovative activity confers on the broader economy. The government has a fixed budget B to devote to this objective. We compare two policy instruments for deploying that budget.[351]

R&D tax credits (matching grants). The government subsidizes each dollar of private R&D expenditure at rate s. The subsidy rate is set so that total government expenditure equals the budget B. This instrument resembles policies such as R&D expensing, the Research and Experimentation (R&E) tax credit, and the Orphan Drug Credit.

Picking winners (appropriations). The government provides B dollars' worth of R&D inputs directly to a chosen "champion" firm. This instrument resembles programs such as the CHIPS for America grants, where large capital appropriations are allocated to specific firms for specific projects.

We compare these two instruments in two steps. Step 1 considers a single productive firm and shows that matching grants dominate lump-sum transfers even in this favorable case. Step 2 introduces a second, unproductive "low type" firm that the government may

[351] Recent work studies optimal R&D taxation, finding that linear corporate taxes combined with nonlinear R&D subsidies (for example, tax credits) can be close to optimal; see Akcigit, Hanley, and Stantcheva, "Optimal Taxation and R&D Policies." Arguments for and estimations of the gap between the private and social return to R&D (the $\alpha < 1$ in the model) have a long history; see Gravelle and Keightley, *The Federal Research and Development (R&D) Tax Credit*. The idea that government cannot effectively pick winners (the $p > 0$ in the model) also has a long history; see Josh Lerner, *Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed—and What to Do About It* (Princeton University Press, 2009).

accidentally select when trying to "pick winners," further strengthening the case for the tax credit approach.

Setup. A firm with productivity parameter θ chooses R&D input r to produce R&D social output $y = \theta \cdot 2r^{1/2}$. R&D inputs are supplied perfectly elastically at a cost of $1 per unit. Due to spillovers, the firm captures only fraction $\alpha < 1$ of the social value of its output, hence its profit function is $\pi = \alpha \cdot \theta \cdot 2r^{1/2}$. The government has budget B to spend on R&D subsidies. Throughout, we set $\alpha = 0.5$ and $B = 1$ for illustration.

Step 1: One firm. Consider a single "high type" firm with productivity $\theta = 1$. There are three cases:

1. **Laissez-faire:** the firm solves $\max_r 0.5 \cdot 1 \cdot 2r^{1/2} - r$, thus choosing $r^{LF} = 0.25$, and R&D social output is 1.
2. **Appropriations (lump sum):** the government gives the firm $B = 1$ units of r. Because an R&D input of 1 is on the downward sloping part of the firm's profit function (at such a high value of r, the revenue from a marginal increase in r falls short of the marginal cost of r), the firm employs that 1 unit and no more. R&D social output is 2.
3. **Matching grant:** the government provides a matching grant at rate s to the firm. The firm solves $\max_r \alpha \cdot 2 \cdot r^{1/2} - (1 - s)r$, and the government's budget constraint is $sr^* = B = 1$, where r^* is the firm's choice. For a given s, the firm's choice is $r^* = \frac{0.25}{(1-s)^2}$. Thus, s^* solves $s^* \frac{0.25}{(1-s^*)^2} = 1$, which yields $s^* = 0.61$. Thus $r^* = 1.64$, and social output is 2.56.

Clearly, with one firm, the optimal policy is a matching grant, that is, a tax credit for R&D.

Step 2: Two firms—one high type, one low type. When we add the possibility of appropriating funds to a low type firm, this strengthens the argument in favor of tax credits. To make this stark, we will assume the low type is completely unproductive $\theta_L = 0$ (for example, the government accidentally funds Solyndra or Crescent Dunes solar panel technology firms). The high type firm is as productive as in the one-firm case, $\theta_H = 1$. The low type firm will on its own accord choose to exit the market, that is, choose $r_L = 0$, and no matching subsidy (with $s < 1$) will change that because the low type will still lose money at any match rate. However, the existence of a convincing low type means that, with probability p, the appropriations lump sum will go to the low type and be completely wasted. Thus, the only change to the model is that, under appropriations, there is a p probability of the laissez-faire outcome (since the high type firm behaves as it would under laissez-faire), and a $(1 - p)$ probability of the one-firm appropriations outcome (when the appropriation goes to the high type firm). The expected social research output thus becomes $1 \cdot p + 2 \cdot (1 - p)$. If the government is very bad at picking winners, much of the government's budget can be wasted on low type firms.

We summarize the results of the theory in Table 5-5.

Table 5-5: R&D Social Output by Policy Instrument

Policy	**Research (social) output**	**Government budget cost**
Laissez-faire	1	0
Tax credit (matching grant)	2.56	1
Picking winners—1 firm	2	1
Picking winners—1 high type, 1 low type, omniscient government	2	1
Picking winners—1 high type, 1 low type, randomly choosing government	1.5	1

The key result is that matching grants do not require the government to identify productive firms *ex ante*. Instead, firms reveal their productivity through their response to the subsidy. This information revelation operates on two margins simultaneously. On the extensive margin, unproductive low type firms self-select out of the subsidy program entirely. On the intensive margin, productive firms expand their own R&D spending in proportion to their privately known returns, generating a co-investment multiplier that lump-sum transfers cannot replicate. Thus, among the interventions considered, the tax credit yields the highest R&D output per government dollar.

Model 2: The screening value of nonrefundable investment tax credits

Model 1 establishes that tax credits are superior to direct appropriations, but within the class of tax credits, there remains a further design choice: should the credit be refundable or nonrefundable? The conventional view, grounded in neutrality, holds that the subsidy rate should not depend on a firm's tax position, and thus favors refundability. The model in this section challenges this view by identifying an efficiency rationale for nonrefundability.

Nonrefundable tax credits for businesses function differently than nonrefundable tax credits for individuals. An individual taxpayer who lacks sufficient tax liability to use a nonrefundable credit (such as the nonrefundable portion of the Child Tax Credit) has essentially no recourse; options for restructuring are extremely limited, with marriage and filing jointly being a notable exception. Business entities, by contrast, are far more malleable. Through partnership structures, mergers, acquisitions, or consolidation into profitable conglomerates, businesses can often restructure to monetize credits that would otherwise be stranded. Various anti-abuse provisions under IRC Sections 269, 382, and 383 constrain these strategies, but the fundamental point remains that for business taxpayers, nonrefundability does not make credits inaccessible. Rather, it imposes a *transaction cost* that must be paid to access the credit value—the cost of transferring the credit-bearing asset into the hands of a firm that can use it, without running afoul of anti-abuse provisions.

This transaction cost is the key to the screening mechanism. In what follows, we present an illustrative model that shows how nonrefundability, operating through this transaction cost, can filter out unproductive investments that a refundable credit would subsidize indiscriminately. The model requires a departure from the neoclassical benchmark: the existence of some irrational market actors ("noise investors").

Setup. Motivated by the *CHIPS and Science Act*, we call projects "fabs" in this illustrative model.

Agents. There are three types of agents: (1) *noise investors*, who cannot distinguish good projects from bad and systematically overestimate fab values; (2) *smart investors*, who correctly identify and invest only in good fabs; and (3) a *buyer* with perfect information about fab quality, sufficiently high profits such that it can always use nonrefundable credits against its own tax liability, and willingness to acquire any fab at its true value net of transaction costs whenever this net value is positive.

Projects. There are two types of investment projects: (1) *good fabs*, which cost \$100 to build and have operating value $V_G = \$150$; and (2) *junk fabs*, which also cost \$100 to build but have operating value $V_J = \$0$.

Policy instrument. A 25 percent investment tax credit, worth \$25 per project (25 percent of the \$100 investment cost). The credit may be structured as either refundable or nonrefundable.

Transaction cost. Acquiring any fab requires the buyer to pay a transaction cost T.

Investor behavior. Noise investors build junk fabs because they mistakenly believe them to be good. Smart investors build only good fabs. Both types sell their completed fabs to the buyer.

Case 1: Refundable credit. Under a refundable credit, each investor receives \$25 directly from the government upon making a qualifying investment, regardless of tax liability. The noise investor builds a junk fab: it pays \$100, receives a \$25 refund, and holds an asset worth \$0, for a net loss of \$75. The investor builds anyway because it is a noise investor—it mistakenly expects the fab to be profitable. The smart investor builds a good fab: it pays \$100, receives \$25, and holds an asset worth \$150, for a net gain of \$75.

The critical feature is the government's expenditure: \$25 per project, *regardless of project quality*. The subsidy flows indiscriminately to both good and junk fabs.

Case 2: Nonrefundable credit. Under a nonrefundable credit, the noise investor still builds a junk fab—its overoptimism is unchanged—but it cannot use the credit directly, because it has no taxable profits to offset (and never will). The credit sits on the junk fab's books, unusable, unless a profitable buyer acquires the fab and thereby absorbs the credit. The buyer, however, must pay transaction cost T to complete the acquisition.

The buyer's valuation of each fab type is therefore:

Junk fab: operating value (\$0) + credit value (\$25) − transaction cost (T) = \$25 − T
Good fab: operating value (\$150) + credit value (\$25) − transaction cost (T) = \$175 − T

For any transaction cost in the range $\$25 < T < \$175$, the buyer acquires the good fab (which is worth acquiring on its operating merits alone) but *not* the junk fab (whose only value is the \$25 credit, which does not cover the transaction cost). Only the good fab's credit gets monetized, and the government is spared from subsidizing the junk fab. Nonrefundability thereby screens out unproductive investments while allowing productive ones to receive the full subsidy.

Table 5-6: Government Expenditure by Credit Design

	Refundable credit	**Nonrefundable credit ($\$25 < T < \$175$)**
Good fab subsidy	\$25	\$25
Junk fab subsidy	\$25	\$0

Policy implications. The screening mechanism depends on the transaction cost T falling in the right range. If transaction costs are too low ($T < \$25$), the buyer will acquire junk fabs purely for their credit value, and nonrefundability provides no screening. Transferable credits, such as those introduced in the *Inflation Reduction Act of 2022*, can be understood in this framework as nonrefundable credits with T driven close to zero—effectively refundable, with the screening benefit largely eliminated. At the other extreme, if transaction costs are too high ($T > \$175$), even good fabs cannot be transferred, and the credit becomes inaccessible to firms that lack their own tax liability. In this case, the credit fails to subsidize even productive investments.

The policy-relevant regime is the interior one, $\$25 < T < \$175$, where nonrefundability imposes a cost large enough to deter acquisition of worthless assets but small enough that the market can still transfer productive assets to their highest-valued use. The anti-abuse provisions of the Internal Revenue Code—IRC Sections 269, 382, and 383—can be understood as calibrating this transaction cost. They make it costly, but not impossible, for profitable firms to acquire and monetize credits from less profitable entities.