Who Benefits from R&D Tax Policy? Estimating the Present Value of R&D Tax Benefits in the United States*

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1 Motivation and the Puzzle

Research and Development (R&D) tax incentives are among the largest corporate tax expenditures in the United States. Through deductions under § 174 and incremental credits under § 41, the Federal government provides substantial tax-based support for innovative investment. Economic theory offers a clear rationale for these subsidies: knowledge spillovers generate positive externalities (Romer, 1990), and innovation-driven creative destruction is a key engine of long-run growth (Aghion and Howitt, 1992). As a result, subsidizing R&D investment has been a central objective of Federal policy toward innovation.

Despite the prominence of these incentives, relatively little is known about the extent to which statutory R&D tax provisions translate into realized tax benefits. While all firms face the same statutory schedule, the economic value of R&D deductions and credits can differ sharply across firms because these incentives are largely nonrefundable and subject to intertemporal carryback and carryforward provisions. Firms without sufficient current income or tax liability cannot fully utilize R&D tax benefits when investment occurs. Instead, unused deductions and credits become carryforwards, delaying utilization and reducing their present value. As a result, statutory R&D incentives may substantially overstate firms effective after-tax returns to innovation.

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Note: This analysis uses confidential IRS tax return data accessed through the Statistics of Income division. Detailed quantitative estimates will be made available upon clearance and publication.

This wedge between statutory and realized benefits is especially salient for the firms that innovation policy is designed to target. Young and small firms tend to be the most R&D-intensive, yet they frequently operate in tax-loss positions for extended periods. During these years, they generate large statutory R&D tax benefits but cannot realize them contemporaneously. Even after transitioning to profitability, accumulated carryforwards create queuing frictions: statutory first-in-first-out ordering rules require firms to exhaust old-vintage losses and credits before using newly generated R&D-related benefits. These delays push realization far into the future, substantially reducing present value. The resulting paradox is stark: firms that are most R&D-intensive may realize the lowest per-dollar tax benefits from R&D investment. Yet the magnitude of this wedge and its heterogeneity across firms remain largely unmeasured.

2 Literature Gap

A large literature recognizes that tax asymmetries and loss positions matter for investment incentives. Early user-cost analyses (Hall and Jorgenson, 1967; Auerbach and Poterba, 1987) emphasize how non-refundability and loss carryforwards affect the effective cost of R&D capital (Altshuler, 1988), while subsequent work (Shevlin, 1990) documents heterogeneity in firms tax positions and develops reduced-form approaches to measuring effective R&D incentives (Rao, 2016). More recent contributions incorporate firm-specific simulated marginal tax rates into user-cost calculations (Chodorow-Reich et al., 2024), highlighting that effective R&D incentives vary meaningfully across firms depending on their tax positions.

Despite these advances, no prior study directly measures the realized present value of R&D tax benefits using observed utilization behavior. Doing so requires firm-level longitudinal data that track not only the generation of deductions and credits but also their utilization over time, as well as the evolution of carryforward stocks. Crucially, it requires distinguishing between pre-existing and newly generated vintages of tax attributes and applying statutory FIFO ordering rules. Without vintage-specific tracking, utilization in profitable years is easily misattributed to current R&D investment, masking persistent delays caused by accumulated carryforwards. As a result, existing approaches rely on simulations or reduced-form discounting that cannot directly observe how statutory incentives translate into realized tax benefits.

The absence of direct measurement has important consequences. For policy evaluation, it remains unclear whether R&D tax incentives reach their intended beneficiaries. For revenue estimation, carryforward dynamics shape both the timing and magnitude of fiscal costs. For investment research, user-cost calculations based on statutory incentives may systematically overstate effective subsidies, particularly for firms that operate in losses.

3 Data, Institutional Setting, and Measurement

We address these gaps using confidential administrative data from the Internal Revenue Services Statistics of Income (SOI) division. Our analysis draws on a panel of corporate tax returns covering the universe of C corporations from 2012 to 2017. These data uniquely allow us to observe, at the firm-year level, the generation and utilization of R&D deductions and credits, as well as the evolution of net operating loss and general business credit carryforward stocks over a period when corporate tax rules remained relatively constant. The panel structure enables us to track firms dynamically, while universe

coverage ensures that we capture utilization patterns across the full distribution of firm size, age, and tax positions.

Institutional detail is central to our measurement. Under the deduction regime, R&D expenses contribute to net operating losses when firms are in loss positions. Prior to the 2017 tax reform (Public Law 115-97), losses could be carried back and forward subject to FIFO ordering rules that require older losses to be exhausted before newer ones. Under the credit regime, the R&D credit is incremental, nonrefundable, and subject to general business credit limitations, with relatively more strict FIFO ordering across credit vintages. These rules imply that firms may appear profitable yet remain unable to utilize new R&D-related benefits because of overhangs from prior years.

Our measurement strategy directly reflects these statutory rules. We first measure contemporaneous utilization of R&D deductions and credits in the year they are generated. For firms with incomplete first-year utilization, we track the evolution of carryforwards over time, separating pre-existing (old-vintage) stocks from newly generated (new-vintage) attributes and applying FIFO ordering to attribute utilization correctly. Only utilization of new-vintage attributes is credited to the present value of a given R&D outlay. Because many firms do not exhaust carryforwards within the sample period, we develop a transparent extrapolation procedure that projects future utilization based jointly on observed usage and loss histories, while preserving queuing dynamics. This approach yields firm-year measures of the realized present value of R&D tax benefits that can be aggregated into economy-wide benchmarks.

4 Main Findings

Our analysis yields four central findings. First, we document substantial incomplete utilization of R&D tax benefits at the aggregate level. While a majority of R&D deductions are used contemporaneously, a nontrivial fraction enters net operating loss carryforwards. Utilization of R&D credits is markedly lower: credits are applied after deductions and are frequently constrained by general business credit limitations, leading to widespread carryforward accumulation. As a result, there is a sizable wedge between the statutory value of R&D incentives generated in a given year and their realized present value, particularly for credits.

Second, this wedge exhibits stark heterogeneity across firms. Large, established corporations are typically profitable and realize most R&D tax benefits contemporaneously or after short delays, yielding realized present values close to statutory amounts. In contrast, small and young firms frequently operate in loss positions for multiple consecutive years, accumulating large stocks of carryforwards. When these firms eventually become profitable, statutory FIFO rules force them to work through accumulated queues before realizing new R&D-related benefits, resulting in severely delayed utilization and much lower present values.

Third, vintage-specific queuing frictions are first-order. The relevant margin is not simply whether a firm is currently profitable, but the size of its accumulated carryforward stock. We show that even after firms exit loss status, utilization of newly generated R&D benefits often remains incomplete for several years due to overhangs from prior vintages. Approaches that track only current tax status miss this persistent attenuation of effective incentives.

Finally, these patterns generate a sharp paradox. Firms that are most R&D-intensive—those for whom R&D constitutes a large share of total expenses—are often the ones that realize the lowest per-dollar tax benefits from R&D investment. The effective incidence of R&D tax policy is therefore tilted toward firms that are already profitable rather than toward young, innovative firms at the technological frontier.

5 Implications and Conclusion

Our findings have important implications for policy design, revenue estimation, and investment research. Current R&D tax policy disproportionately benefits corporations that are already profitable, while providing less effective support to young and innovative firms. Carryforward dynamics imply that the fiscal costs of R&D incentives are back-loaded and may differ substantially from statutory amounts if benefits are delayed or never realized. For empirical research, statutory incentives are an imperfect proxy for effective subsidies; user-cost calculations and elasticity estimates should incorporate incomplete and delayed utilization.

More broadly, our analysis demonstrates that tax asymmetries are not a technical detail but a central determinant of who benefits from investment incentives. Evaluating and reforming R&D tax policy requires focusing on realized present-value benefits, not statutory provisions.

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