THE ECONOMIC IMPACT OF R&D TAX INCENTIVES IN TEXAS

John W. Diamond, Ph.D.
Edward A. and Hermena Hancock Kelly Senior Fellow in Public Finance
Director, Center for Tax and Budget Policy
Baker Institute
Rice University

TEXANS for Innovation
Research & Development:
Driving Economic Growth, Creating Jobs

THE ECONOMIC EFFECTS OF R&D TAX INCENTIVES IN TEXAS

John W. Diamond
Edward A. and Hermena Hancock Kelly Senior Fellow in Public Finance
Director, Center for Tax and Budget Policy
Baker Institute
Rice University
jdiamond@rice.edu

Revised: November 1, 2024

This study was prepared for Texans for Innovation. The opinions expressed in this paper are those of the authors and should not be construed as reflecting the views of Texans for Innovation or any entity with which the author is affiliated, including Rice University and the Baker Institute.

EXECUTIVE SUMMARY

THE ECONOMIC EFFECTS OF R&D TAX INCENTIVES IN TEXAS

Research and development (R&D) activities of private businesses, universities, and the government are important for increasing innovation. Sustained increases in economic growth and the standard of living will be primarily driven by technological innovation in the near future; making it imperative that Texas act to increase R&D investments. One way to do this is by reforming, extending and increasing the R&D tax credit.

> **TEXAS HAS UNDERPERFORMED IN GENERATING R&D EXPENDITURES IN RELATION TO OTHER ECONOMIC CHARACTERISTICS OF THE STATE**

Texas has underperformed in generating R&D expenditures in relation to other economic characteristics of the state. The major reason for the lack of R&D expenditures is directly related to inefficient and ineffective tax policy in regards to innovation for a substantial part of the last two decades. During this period, Texas enacted incentives into law from 2000 to 2007 and from 2014 to 2026 but the magnitude, structure and temporary nature of the incentives are all potential reasons for the underperformance in R&D expenditures relative to other states.

> **THE LACK OF R&D EXPENDITURES IS DIRECTLY RELATED TO INEFFICIENT AND INEFFECTIVE TAX POLICY IN REGARDS TO INNOVATION**

In 2023, Texas ranked second in population at 9.1 percent of the total US population and second in gross state product (GSP) at \$2.6 trillion or 9.3 percent of the national output.

As of 2022, the latest data available, Texas ranked 5th in business-funded R&D expenditures at 4.3 percent of the total $608 billion funded by businesses in the US. California (36.2 percent), Washington (9.2 percent), Massachusetts (7.1 percent) and New York (4.9 percent) all rank ahead of Texas in terms of the share of total business-funded R&D expenditures. Texas ranks 33rd in terms of R&D expenditures as a percentage of GSP, with a ratio of 1.78, confirming that relative to the size of the Texas economy, R&D expenditures are below average.

2ND IN POPULATION (9.1% OF U.S. POPULATION)

5TH IN BUSINESS FUNDED R&D EXPENDITURES

33RD IN R&D EXPENDITURES AS PERCENTAGE OF GSP

The R&D tax credit examined in this report is roughly equivalent in magnitude to the current R&D incentives in Texas that have been in effect from 2014 to the present. The current incentives are small compared to incentives in other states after accounting for differences in GSP. The simulations in this paper demonstrate that enacting an R&D tax credit will increase the size of the Texas economy by more than enough to offset the cost of the policy. The implication is clear. The question is not whether Texas can afford to extend the R&D tax credit, but instead is whether Texas can afford not to extend the R&D tax credit.

> **THE QUESTION IS NOT WHETHER TEXAS CAN AFFORD TO EXTEND THE R&D TAX CREDIT, BUT INSTEAD IS WHETHER TEXAS CAN AFFORD NOT TO EXTEND THE R&D TAX CREDIT**

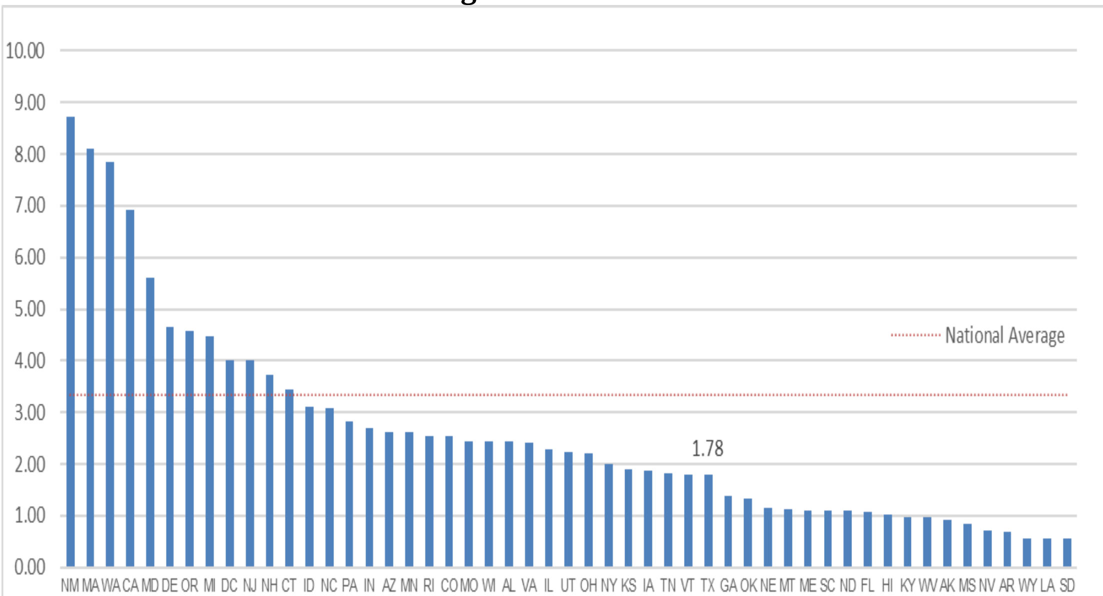
A larger incentive would of course yield a larger return and make Texas more competitive with other states for R&D projects. Extending the R&D tax credit at its current level is a first step, and it will definitely have a positive impact on the Texas economy, but a significant increase above the current level, whether now or in the future, is necessary if Texas wants to lead the nation in innovation and growth.

I. INTRODUCTION

Research and development (R&D) activities of private businesses, universities, and the government are important for increasing innovation. Sustained increases in economic growth and the standard of living have been driven by technological innovation, which is why the R&D tax credits and expensing of R&D have been important areas of economic research at the state and federal levels. Texas has underperformed in generating R&D expenditures in relation to other economic characteristics of the state. The major reason for the lack of R&D expenditures is almost certainly related to inefficient and ineffective tax policy in regards to innovation for a substantial part of the last two decades. During this period, Texas enacted incentives into law from 2000 to2007 and from 2014 to2026 but the magnitude, structure and temporary nature of the incentives are all potential reasons for the underperformance in R&D expenditures relative to other states.

In 2023, Texas ranked second in population at 9.1 percent of the total US population and second in gross state product (GSP) at $2.6 trillion or 9.3 percent of the national output. As of 2022, the latest data available, Texas ranked 5th in business-funded R&D expenditures at 4.3 percent of the total $608 billion funded by businesses in the US. California (36.2 percent), Washington (9.2 percent), Massachusetts (7.1 percent) and New York (4.9 percent) all rank ahead of Texas in terms of the share of total business-funded R&D expenditures. As shown in Figure 1, Texas ranks 33rd in terms of R&D expenditures as a percentage of GSP, with a ratio of 1.78.

Figure 1
R&D as a Percentage of Gross State Product in 2021



Source: National Center for Science and Engineering Statistics, National Patterns of R&D Resources (various years), data available as of April 2024; U.S. Bureau of Economic Analysis, Gross Domestic Product data (various years), data as of April 2024.

Relative to the size of the Texas economy, business-funded R&D expenditures are slightly less than average. Given the importance of R&D expenditures in promoting and sustaining economic growth it is imperative that the state continue to offer incentives to firms that increase their R&D expenditures in the future. At an absolute minimum, Texas should extend its current level of incentives for business-funded R&D. However, the real question should be how much should Texas increase the incentive beyond 2026. In addition, the incentives should be made permanent to reduce uncertainty and maximize the benefit of supporting business-funded R&D. The remainder of this paper analyzes the economic impact of extending the Texas franchise tax credit for R&D, including its impact on output, employment, income, and state and local budgets. The empirical literature and simulation results that follow clearly indicate that extending the Texas

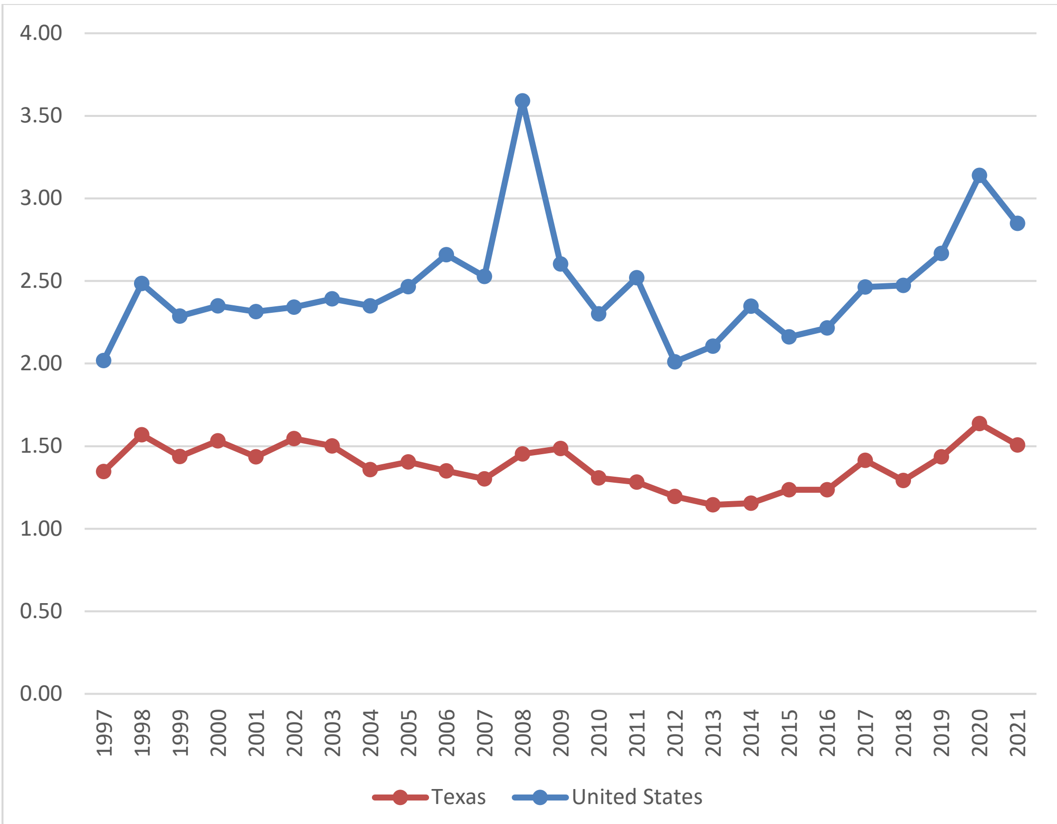
R&D tax credit will increase output, employment, and income, without creating fiscal problems at the state or local level.

Section II provides a brief discussion of the empirical literature on the R&D tax credit, which is used to check and confirm the size and pattern of the simulated economic effects of the policy. Section III provides a short description of the Diamond-Zodrow model, which is used to produce the simulation results. Section IV presents the economic results and the final section offers some concluding remarks.

II. A BRIEF LITERATURE REVIEW

Research on the federal R&D tax credit, which was initially enacted in 1981, is generally focused on (1) whether the credit led to greater levels of R&D expenditures, (2) how effective those expenditures are at increasing output and economic growth, and (3) more recently the mobility of R&D expenditures across locations. (For example, R&D tax credits, patents, and other issues related to intangible capital are important factors in determining the most efficient tax treatment of income from multinational corporations.) It is difficult to estimate how effective R&D tax credits are at increasing innovation because it is often impossible to know what led to a successful innovation. More recent findings indicate that the R&D tax credit is more effective at increasing expenditures relative to earlier estimates. This is likely due to better estimating procedures, changes in law that have increased the effectiveness of the policies, and the increasing importance of R&D expenditures in the economy. Figure 2 shows the increase in business-funded R&D expenditures as a share of private industry output from 1997 to2021. The national share increased from 2.12 percent in 1997 to 2.9 percent in 2021 (a 36.8 percent increase), while the share for Texas increased from 1.44 percent to 1.51 percent (a 4.9 percent increase). The fact that business-funded R&D expenditures as a share of private industry output have increased by more than a factor of seven (36.8 divided by 4.9) faster in the rest of the nation relative to Texas highlights the importance of promoting business-funded R&D expenditures by enacting a more robust incentive than the current incentive set to expire at the end of 2026.

Figure 2
Business Funded R&D as a Percentage of Private-Industry Output



SOURCE: National Center for Science and Engineering Statistics, Survey of Industrial Research and Development, Business R&D and Innovation Survey, Business Research and Development Survey, and Business Enterprise Research and Development survey (various years), data available as of November 2023; U.S. Bureau of Economic Analysis, Gross Domestic Product data (various years), data available as of April 2024.

Research on R&D tax credits at the state level has focused on the sensitivity of R&D expenditures to the after-tax price of R&D, often referred to as the user cost of capital by economists. In addition, state level research has focused on the types of businesses that benefit from different types of tax incentives, the mobility of R&D expenditures across states in response to tax incentives, and the economic impact of state tax incentives.

Wilson (2009) finds that the amount of R&D expenditures within a state is sensitive to the price of R&D. In particular, he estimates that a 10 percent decrease in the price of R&D capital results in a 25 percent increase in R&D expenditures. His estimates account for both in-state factors (including the impact of the R&D tax credit and business tax rates) and out-of-state factors (other states tax incentives and business tax rates) in determining the sensitivity of R&D expenditures to the price of R&D. The implication is that states without an R&D tax credit, or with less generous R&D credits or higher business tax rates, will be less likely to see growth in R&D expenditures. The end result is less economic growth and reduced gains in the standard of living. Figure 2 serves as a warning to Texas, given that its share of R&D expenditures is growing relatively slowly compared to the nation as a whole. Billings, Musazi, Volz, and Jones (2020) examine data from 2010 to 2013 and show that R&D spending by private businesses is positively related to the size of the R&D tax credit and that the strength of this effect increases with the overall tax burden. They point out that the more burdensome the state tax system the more valuable the R&D tax credit. Wu (2008) finds that R&D tax credits increase the number of high-technology companies in a state by roughly 1.4 percent on average.

Bartik (2017) discusses a new data set that is intended to help assess how state business tax incentives have impacted city and state economies. He argues that a lack of knowledge about the size, variance and location of state tax incentives makes it difficult to be informed about the economic impacts of such incentives. By creating this new data set, Bartik seeks to fill the knowledge gap and illuminate the economic impact of state tax incentives. He draws several key conclusions from this new database, including:

- In 2015, state business incentives are equal to about 30 percent of average state and local business taxes.
- Business tax incentives are poorly targeted and vary significantly across states.
- Growth of state business tax incentives was largest in the 1990s but they have grown more slowly since then.
- The most popular incentives are either job creation tax credits or property tax abatements.
- State business tax incentives need to be reformed due to high costs of incentives relative to economic benefits.

Bartik shows the different impacts on industry groups. In particular, he notes that manufacturing is more capital intensive, has a high R&D to output ratio, a high R&D to employment ratio, and offers higher wages on average to employees. Export industries are also above average in terms of capital intensiveness, R&D to output ratio, and R&D to employment ratio. Export industries offer the highest average wage and compensation. These types of industries will benefit most from an R&D tax credit.

Fazio, Guzman, and Stern (2019) find that having a state-level R&D tax credit is associated with a 7 percent increase in new business formation. Examining the impact across time shows that the immediate impact of enacting an R&D tax credit is negligible in the first few years, but that over time it increases entrepreneurship by about 2 percent a year and by 20 percent in terms of quantity and quality-adjusted quantity of entrepreneurship after 10 years. By comparison, they find that state-level investment tax credits have negative impacts on additions of new firms. They argue that state level investment credits benefit existing firms and thus make it harder for new firms to enter the market. These negative impacts build overtime and reduce new formations by 12 percent over 10 years. This implies that a state R&D tax credit will have a wider range of benefits across firms of different sizes.

Economic growth is the most important aspect of a healthy economy. Growth is what produces opportunity and improves living standards in each successive generation. R&D tax credits are a promising fiscal tool to grow the economy and allow for smaller, non-established businesses to compete in the marketplace. This is not a zero-sum game (within a state) because as smaller firms succeed and grow they produce external benefits that create new opportunities for others.

The Texas economy plays an important role in energy (both carbon-based and renewables), trade, healthcare, manufacturing, technology and more. It is critical that Texas move to the forefront on developing and implementing new ways of creating and making goods and services that will transform the economy in the years to come. One way to ensure we are on the right path is to boost the incentive for research and development expenditures by adopting a robust R&D tax credit.

III. DIAMOND-ZODROW MODEL

This section provides a brief description of the model used in this analysis; for more details, see Zodrow and Diamond (2013). The Diamond-Zodrow model is a dynamic, overlapping generations, computable general equilibrium (CGE) model of the U.S. economy that focuses on the macroeconomic, distributional, and transitional effects of tax reforms. For the purposes of this report the model has been calibrated to represent the Texas economy and, to simplify the analysis, this report is based on a single income group (within each age group) version of the model and thus ignores distributional effects across income groups. The model includes three consumer/producer sectors – a non-housing business sector (C), an owner-occupied housing sector (H), and rental housing (R) sector – all characterized by profit-maximizing firms and competitive markets.

On the consumption side, each household has an "economic life" of 55 years, with 45 working years and a fixed 10-year retirement period, and makes its consumption and labor supply choices to maximize lifetime welfare subject to a lifetime budget constraint that includes personal income (from wages and capital income), taxes (at the federal, state, and local level) and transfers, and a fixed "target" bequest.

State and local governments purchase fixed amounts of the composite goods at market prices and make transfer payments; they finance these expenditures with revenues from sales taxes, business taxes, and property taxes. The federal government purchases fixed amounts of the composite goods at market prices, makes transfer payments, and pays interest and principal on the national debt; it finances these expenditures with revenues collected from the corporate income tax, a progressive labor income tax, and flat rate taxes on capital income. All markets are assumed to be in equilibrium in all periods, and the economy must begin and end in a steady-state equilibrium, with all of the key macroeconomic variables growing at the exogenous growth rate, which equals the sum of the exogenous population and productivity growth rates. The model presents the real value of economic variables so all values are equivalent in terms of real purchasing power (which is because there is no inflation in the model), but relative prices of goods in the model are allowed to change and impact demand and supply. The next section describes the reform that is analyzed and presents the simulated economic effects of adopting the proposal relative to baseline economy under current law.

IV. MACROECONOMIC EFFECTS OF THE R&D TAX CREDIT

The macroeconomic effects of modifying and extending the R&D franchise tax credit are simulated assuming two different fiscal offsets to maintain a balanced budget: (1) the sales tax rate is held constant and government consumption changes in each period or (2) government consumption is held constant and the state sales tax rate is adjusted in each period. In other words, the simulation assumes revenue lost to the R&D franchise tax credit is offset by either (1) decreased government spending or (2) a higher sales tax rate. Overall, the direction, magnitude and pattern of the simulation results are consistent with the empirical estimates discussed in the previous section. Specifically, the R&D credit has a positive impact on R&D expenditures and business investment as discussed by Wilson (2019) and Billings, Musazi, Volz, and Jones (2020). In addition, the gradually increasing positive benefits of a permanent R&D credit are consistent with the findings in Fazio, Guzman, and Stern (2019).

The proposal examined allows a credit against Texas franchise tax equivalent to 8.722% of new qualified research expenditures (QREs) for research conducted in Texas, or 10.903% if the taxpayer contracts with a university for performance of the research. New QREs for research conducted in Texas is equivalent to (1) the amount of QREs reported by a taxpayer on Internal Revenue Service Form 6765 and incurred in Texas, minus (2) 50 percent of the average amount of QREs reported on Form 6765 and incurred in Texas during the three preceding tax years. The amount of the credit for a franchise tax report year may not exceed 50% of the franchise tax otherwise due for that year, and any excess credit may be carried forward to a future tax year (limited to 20 years). The initial revenue loss to the state associated with the proposal is $661.4 million in FY2026.

Table I shows the simulation results assuming that the sales tax rate is held constant and government consumption changes in each period. Note that the changes in variables are reported as percentage changes from the baseline value in the relevant year. (For example, a 0.1 percent change in output in year 2030 implies that output is 0.1 percent larger in 2030 after the reform relative to the baseline value of output in 2030 before the reform.) Table II shows the corresponding changes in millions of dollars. The net effect on Texas's Gross State Product (GSP) is positive, with GSP increasing by 0.01 percent in the year after reform, by 0.03 percent in 2030, by 0.06 percent in 2035, by 0.09 percent in 2045, and by 0.13 percent in the long run. Aggregate private consumption of goods and services decreases by 0.01 percent in the year after reform, and then begins to increase by 0.02 percent in 2030, by 0.05 percent in 2035, by 0.09 percent in 2045, and by 0.11 percent in the long run.

Total investment increases by 0.25 percent in the year after reform, by 0.3 percent in 2030, by 0.36 percent in 2035, by 0.38 percent in 2045, and by 0.35 percent in the long run. In the first five years after reform this is driven entirely by increases in non-housing capital, as investment in non-housing capital increases by 0.45 percent relative to the baseline level and investment in owner (rental) housing capital falls by about 0.18 (0.22) percent initially and by 0.03 (0.05) percent five years after reform. The total capital stock increases 0.02 percent in the year after reform, by 0.06 percent in 2030, by 0.12 percent in 2030, by 0.22 percent in 2045, and by 0.29 percent in the long run. The stock of non-housing capital increases by 0.46 percent in the long run, and the stock of owner-occupied and rental housing increases by 0.11 percent in the long run.

The increase in the capital stock raises the productivity of labor and leads to an increase in the wage rate of 0.14 percent in the long run. Total wage payments increase by $222 million in the year after reform, by $800 million five years after reform, and $1.459 billion 10 years after reform. In the tenth year after reform, this is equivalent to 19,451 jobs at an average salary of $75,000, which is roughly equal to the current median household income in Texas. At an average salary of $75,000, the sum of new jobs over the first ten years would be equal to 113,850, or $8.5 billion in total wages over this period. The total amount of tax credits paid out in the first ten years is $8.4 billion. The value of additional production (the new value of GSP minus the baseline level of GSP) for the first 10 years is $13.8 billion. Thus, the total net benefit after ten years would equal $100 million plus $13.8 billion (the value of additional production due to the R&D tax credit) minus any increase in taxes or decrease in government consumption to balance the budget. However, recall that the pattern of positive economic effects of this policy both in the model and estimated in the empirical literature indicate that the magnitude of the benefits grow overtime. For example, after 20 years, the total increase in wages is equal to $29.9 billion and the total value of tax credits paid out is $20.5 billion, a net gain of $9.4 billion. The value of additional output (output above the baseline level) is equal to $49.4 billion. This equals $58.8 billion in net benefits before considering the impact of the fiscal offset.

Table I shows that state and local tax revenues would decrease by 0.01 percent in the year after reform, and then start to increase (as the positive economic effects start to build) by 0.02 percent by 2030, by 0.06 percent by 2035, by 0.12 percent by 2045, and by 0.17 percent in the long run. Property tax revenues increase in every period relative to baseline property tax revenues, with a long run increase of 0.17 percent. Sales taxes and business taxes would both decrease initially, but the increase in economic activity results in an increase in both revenue sources, with sales tax revenues increasing by 0.11 percent in the long run and business taxes increasing by 0.06 percent in the long run. This implies a dynamic revenue offset (i.e., the change in the predicted revenue losses after considering how changes in economic activity would alter the static revenue estimate) that is more than 100 percent a couple of years after reform. Thus, the fiscal offset would add an additional benefit equal to $686.8 million over 10 years or $3.2 billion over 20 years.

Table III shows the simulation results assuming that government consumption is held constant and sales tax rates change in each period to balance the budget. The results are roughly the same as in Table I. The biggest differences occur when government expenditures are held constant (see the state and local taxes column since all revenues are assumed to fund expenditures) and the sales tax rate declines in the long run to 8.21 percent. In addition, personal consumption is slightly higher (by 0.01 percent ten years after the reform) as the sales tax burden is reduced. In this case, consumption increases by $289.8 billion in the first ten years, and by $17.1 billion in the first 20 years.

Table I

MACROECONOMIC EFFECTS OF R&D TAX CREDIT
FINANCED BY A CHANGE IN GOVERNMENT EXPENDITURES

(Percentage changes, relative to steady state values)

Variable % Change in Year:	**2026**	**2030**	**2035**	**2045**	**LR**
GSP	0.01	0.04	0.07	0.11	0.13
Total Consumption	-0.01	0.02	0.05	0.09	0.11
Total Investment	0.25	0.30	0.36	0.38	0.35
Non-Housing	0.45	0.45	0.49	0.48	0.46
Owner Housing	-0.18	-0.03	0.07	0.16	0.11
Rental Housing	-0.22	-0.05	0.06	0.16	0.11
Total Capital	0.02	0.06	0.12	0.22	0.29
Total Wages	0.01	0.04	0.07	0.11	0.13
State and Local Taxes	-0.01	0.02	0.06	0.12	0.17
Property Taxes	0.01	0.04	0.10	0.18	0.26
Sales Taxes	-0.01	0.02	0.05	0.09	0.11
Business Taxes	-0.09	-0.04	0.01	0.04	0.06

Table II

MACROECONOMIC EFFECTS OF R&D TAX CREDIT

FINANCED BY A CHANGE IN GOVERNMENT EXPENDITURES

(Changes in millions of dollars, relative to steady state values)

Variable $ Change in Millions:	**2026**	**2030**	**2035**	**2045**	**LR**
GSP	$259	$1058	$2176	$4224	$28774
Total Consumption	-$204	$349	$999	$2270	$16627
Total Investment	$973	$1242	$1643	$2183	$11940
Non-Housing	$1200	$1282	$1550	$1888	$10735
Owner Housing	-$165	-$26	$74	$227	$934
Rental Housing	-$62	-$14	$19	$68	$270
Total Capital	$1073	$3938	$8963	$20017	$160289
Total Wages	$222	$665	$1322	$2532	$17340
State and Local Taxes	-$18	$43	$133	$322	$2653
Property Taxes	$10	$37	$91	$214	$1804
Sales Taxes	-$9	$14	$41	$96	$734
Business Taxes	-$19	-$8	$1	$11	$115

Table III

MACROECONOMIC EFFECTS OF R&D TAX CREDIT

FINANCED BY SALES TAX REVENUE

(Percentage changes, relative to steady state values)

Variable % Change in Year:	**2026**	**2030**	**2035**	**2045**	**LR**
GSP	0.01	0.04	0.07	0.11	0.12
Total Consumption	-0.01	0.02	0.06	0.10	0.13
Total Investment	0.24	0.29	0.35	0.37	0.35
Non-Housing	0.44	0.44	0.48	0.47	0.46
Owner Housing	-0.18	-0.03	0.06	0.16	0.12
Rental Housing	-0.23	-0.05	0.05	0.16	0.11
Total Capital	0.02	0.06	0.12	0.21	0.29
Total Wages	0.01	0.04	0.07	0.11	0.13
State and Local Taxes	0.00	0.00	0.00	0.00	0.00
Property Taxes	0.01	0.04	0.09	0.18	0.26
Sales Taxes	0.01	-0.03	-0.10	-0.19	-0.29
Business Taxes	-0.09	-0.04	0.00	0.03	0.06

V. CONCLUSION

The R&D tax credit examined in this report is roughly equivalent in magnitude to the current R&D incentives in Texas that have been in effect from 2014 to the present. The current incentives are small compared to incentives in other states after accounting for differences in GSP. The simulations in this paper demonstrate that enacting an R&D tax credit that costs $661.4 million in 2025 and grows overtime with investment in new research and development will increase the size of the Texas economy by more than enough to offset the cost of enacting the policy. The implication is clear. The question is not whether Texas can afford to extend the R&D tax credit, but instead is whether Texas can afford not to extend the R&D tax credit. A larger incentive would of course yield a larger return and make Texas more competitive with other states for R&D projects. Given that Texas is currently below average in terms of R&D expenditures in relation to size of the population and economy, it is time for Texas to take bold action and strive to increase its leadership in this crucial area. Extending the R&D tax credit at its current level is a first step and it will definitely have a positive impact on the Texas economy, but a significant increase above the current level, whether now or in the future, is necessary if Texas wants to lead the nation in innovation and growth.

REFERENCES

Bartik, Timothy J. 2017. "A New Panel Database on Business Incentives for Economic Development Offered by State and Local Governments in the United States." Prepared for the Pew Charitable Trusts. https://research.upjohn.org/reports/225

Billings, B. Anthony, Buagu N. Musazi, William H. Volz, Deborah K. Jones, 2020. "Why Businesses Locate R&D in High Tax States: The Role of the States' R&D Tax Credit Effectiveness." In J. Hasseldine, ed., Advances in Taxation, vol. 28. Bingley, UK: Emerald Publishing.

Chirinko, Robert S., Daniel J. Wilson. 2023 "Fiscal Policies for Job Creation and Innovation: The Experiences of US States," Federal Reserve Bank of San Francisco, Working Paper 2023-01. https://doi.org/10.24148/wp2023-01

Fazio, Catherine, Jorge Guzman, and Scott Stern, (2019). "The Impact of State-Level R&D Tax Credits on the Quantity and Quality of Entrepreneurship," National Bureau of Economic Research, http://papers.nber.org/papers/w26099.

National Science Board. "R&D as a Percentage of Gross Domestic Product." Science and Engineering Indicators: State Indicators. Alexandria, VA: National Science Foundation. https://ncses.nsf.gov/indicators/states/indicator/rd-performance-to-state-gdp. Accessed on October 2, 2024.

National Science Board. "Business-Performed R&D as a Percentage of Private-Industry Output." Science and Engineering Indicators: State Indicators. Alexandria, VA: National Science Foundation. https://ncses.nsf.gov/indicators/states/indicator/business-performed-rd-to-private-industry-output. Accessed on October 2, 2024.

Wilson, Daniel J. 2009. "Beggar Thy Neighbor? The In-State, Out-of-State, and Aggregate Effects of R&D Tax Credits." Review of Economics and Statistics 91(2): 431–436.

Wu, Yonghong, 2008. "State R&D Tax Credits and High-Technology Establishments," Economic Development Quarterly, vol. 22(2), 136-148.

Zodrow, George R., and John W. Diamond, 2013. "Dynamic Overlapping Generations Computable General Equilibrium Models and the Analysis of Tax Policy." In Dixon, Peter B., and Dale W. Jorgenson (eds.), *Handbook of Computable General Equilibrium Modeling*, Volume 1, 743–813. Elsevier Publishing, Amsterdam, Netherlands.