

**PENNSYLVANIA**

# **RESEARCH AND DEVELOPMENT TAX CREDIT**

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An Evaluation of Program Performance



**January 2020**

**COMMONWEALTH OF PENNSYLVANIA  
INDEPENDENT FISCAL OFFICE**



## **About the Independent Fiscal Office**

The Independent Fiscal Office (IFO) provides revenue projections for use in the state budget process along with impartial and timely analysis of fiscal, economic and budgetary issues to assist Commonwealth residents and the General Assembly in their evaluation of policy decisions. In that capacity, the IFO does not support or oppose any policy it analyzes, and will disclose the methodologies, data sources and assumptions used in published reports and estimates.

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by the Act of Nov. 23, 2010 (P.L.1269, No.120).

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## INDEPENDENT FISCAL OFFICE

January 21, 2020

The Honorable Members of the Performance-Based Budget Board and Chairs of the House and Senate Finance Committees:

Act 48 of 2017 requires the Independent Fiscal Office (IFO) to review various state tax credits over a five-year period. For the second year, the IFO reviewed four tax credits: the Research and Development, Keystone Innovation Zone, Mobile Telecommunications Broadband Investment and Organ and Bone Marrow Donation Tax Credits. The act requires the IFO to submit tax credit reviews to the Performance-Based Budget Board and the Chairs of the House and Senate Finance Committees and to make reports available to the public on the IFO website.

This report contains the tax credit review for the Research and Development Tax Credit (RDTC). The IFO reviewed numerous studies on state research and development incentives, held discussions with various stakeholders and met with agency staff who administer the tax credit. Based on that research, the IFO submits this report to fulfill the requirements contained in Act 48.

Currently, 32 states offer an RDTC to firms with qualified research expenses. Most states provide a non-refundable credit equal to 10 to 20 percent of eligible expenses, which are generally a subset of all spending on research and development. Pennsylvania offers \$55 million in total credit awards, which ranks in the middle of states that have an RDTC. It is one of only three states that allow the tax credit to be sold and one of seven that has an annual dollar cap on total awards. Similar to other states, Pennsylvania follows the federal tax code to determine spending that qualifies as research and development.

The IFO welcomes all questions and comments on the contents of this report. Questions and comments can be sent to [contact@ifo.state.pa.us](mailto:contact@ifo.state.pa.us).

Sincerely,

MATTHEW J. KNITTEL  
Director

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# General Findings and Recommendations

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Act 7 of 1997 created the Research and Development Tax Credit (RDTC) that is available to firms that incur qualified expenses for research and development (R&D) in Pennsylvania. The annual cap on the tax credit was originally \$15 million but was subsequently raised to \$30 million (Act 46 of 2003), \$40 million (Act 116 of 2008) and the current cap of \$55 million (Act 26 of 2011), with an \$11 million set aside for small businesses. Eligible firms can apply a 10 percent credit rate to a subset of their qualified research expenses (QRE) or 20 percent if the firm is a small business (less than \$5 million of assets).

The **general findings** of this report are as follows:

- Thirty-two states offer an RDTC, but three states dominate awards: California (\$1.8 billion), Texas (\$660 million) and Massachusetts (\$242 million). Nine states award annual credits between \$40 to \$100 million, while the remainder award various amounts under \$40 million.
- Research finds that the tax credit incentivizes state R&D expenditures, but evidence of that effect cannot be seen using statewide jobs or R&D expenditure data. Many studies have found that \$1.00 of tax credit could incentivize between \$1.00 to \$1.50 of private R&D spending.
- As intended, the tax credit does flow to subsectors that are R&D intensive such as manufacturers, internet and data processing firms and certain professional service firms.
- For eligible firms, the RDTC can be an important incentive to offset a high statutory corporate net income tax (CNIT) rate (9.99 percent). Many firms that claim the RDTC are large multistate corporations that can shift R&D spending (mostly wages) between states. For many firms that regularly claim the credit, the data show that it significantly reduces their CNIT liability.
- Pennsylvania is one of three states that allows tax credits to be transferred or sold. Historical data show that one-fifth to one-quarter of tax credits are sold for 93 to 94 cents on the dollar. Brokers also receive a fee for their services that may range from four to six percent of the credit. The discount and fee represent leakage that does not incentivize R&D spending.
- The fiscal gross return on investment (ROI) to the state is 16 cents per tax credit dollar, while the net ROI is 12 cents. The gross ROI does not reflect the alternative use of the tax credit funds. On an annual basis, the tax credit creates or retains 915 full-time jobs at a typical annual wage of \$80,000 to \$95,000 for established firms.

The **recommendations** of this report are as follows. A more complete discussion of these points can be found in the final section of this report.

- The tax credit is oversubscribed, so that recent awards have been reduced by half, which greatly reduces the incentive impact. To alleviate that condition, the eligible QRE computation could be adjusted so that less QRE qualifies for the tax credit. This will also refine the targeting of the credit.
- The credit could use a tiered rate structure that offers a higher credit rate on eligible QRE up to a certain dollar threshold. A number of states currently use this mechanism.
- For 2018, awards that exceeded \$1 million comprised more than one-third of total awards. The tax credit could include a per firm dollar cap to reduce the impact from oversubscription.
- The tax credit should be made refundable for 95 cents on the dollar to eliminate tax credit brokers. This would simplify administration of the tax credit and encourage use by small firms.

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# Section 1: Introduction

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Act 48 of 2017 requires the Independent Fiscal Office (IFO) to review various state tax credits over a five-year period.<sup>1</sup> For the second year, the IFO reviewed four tax credits: the Keystone Innovation Zone, Mobile Telecommunications Broadband Investment, Organ and Bone Marrow Donation and Research and Development Tax Credits. The act requires the IFO to submit tax credit reviews to the Performance-Based Budget Board and the Chairs of the House and Senate Finance Committees and to make reports available to the public on the IFO website.

The act specifies that tax credit reviews shall contain the following content:

- The purpose for which the tax credit was created.
- Whether the tax credit is accomplishing its legislative intent.
- Whether the tax credit could be more efficiently implemented through other methods.
- Any alternative methods which would make the tax credit more efficient.
- The costs to provide the tax credit, including the administrative costs to the Commonwealth and local government entities within this Commonwealth.

The act also specifies that the IFO shall develop a tax credit plan for all tax credits subject to review. The plans should include performance measures, and where applicable, the measures should reflect outcome-based measures (including efficiency measures), measures of status improvements of recipient populations, and economic outcomes or performance benchmarks against similar state programs or similar programs of other states or jurisdictions. The IFO submits this report to fulfill these requirements.

This review contains four additional sections. **Section 2** discusses the administration of the tax credit and presents a simple tax credit computation and historical awards data. **Section 3** provides interstate comparisons for states that offer an R&D tax credit based on tax credit parameters and awards, R&D spending and employment in sectors that are R&D intensive. **Section 4** contains a brief literature review, a discussion of the factors that affect the economic return of the tax credit, and an economic impact analysis. **Section 5** concludes with the tax credit plan, as required by Act 48. A complete list of reports and data sources used for this review can be found in the Appendix, along with a brief summary of the recent Grand Jury report related to fraudulent R&D tax credit activity and agency responses. If submitted, written comments provided by stakeholders and affected agencies are also included in the Appendix.

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<sup>1</sup> Act 48 of 2017 is also known as the Performance-Based Budgeting and Tax Credit Efficiency Act. See the Appendix for the Tax Credit Review Schedule.

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## Section 2: R&D Tax Credit Overview

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Act 7 of 1997 enacted the Research and Development Tax Credit (RDTC). The tax credit is available to firms that incur qualified expenses for R&D in Pennsylvania. Qualified research expenses (QRE) eligible for the credit are equal to (1) the difference between current year QRE and the average of the prior four years or (2) 50 percent of current year QRE. A firm can apply for a tax credit for 10 percent of eligible QRE, or 20 percent if the firm is a small business.<sup>2</sup> The current annual cap on available tax credits is \$55 million, with \$11 million set aside for small businesses and \$44 million for other firms. The Department of Revenue (DOR) approves total credits awarded each fiscal year and can transfer amounts if any portion is unused by either group.

To qualify for the tax credit, a firm must document an increase in QRE over a base period (two simple examples appear on page 8). Pennsylvania follows the federal RDTC definitions for QRE, and firms must certify that their business activities satisfy the criteria defined in statute.<sup>3</sup> If these requirements are met, the credit can be applied against corporate net income tax (CNIT) and personal income tax (PIT). A firm can reduce their liability up to 100 percent and unused credits can be carried forward up to fifteen tax years. Recipients of the RDTC can also elect to sell the credit to other firms.<sup>4</sup>

This section begins with a general overview of the goals and purpose of the RDTC. It then discusses the administration of the tax credit, reviews a simple tax credit computation and presents program data for awards made from December 2013 to December 2018.

### Goals and Purpose

Act 48 of 2017 requires that all tax credit reviews published by the IFO shall discuss (1) the purpose for which the tax credit was created and (2) whether the tax credit is accomplishing its legislative intent. For this credit, the IFO reviewed the stated intent of the authorizing legislation and consulted with DOR and Department of Community and Economic Development (DCED) staff. Based on this input, the IFO determined the goals and purpose (i.e., legislative intent) of the RDTC as follows:

#### Goals

- Provide incentives to increase R&D spending in Pennsylvania.
- Attract new research and development firms to the Commonwealth.
- Support the growth and expansion of R&D intensive sectors.
- Promote technology clusters and economic agglomeration effects.<sup>5</sup>

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<sup>2</sup> Act 7 of 1997 defines a small business as a firm with less than \$5 million of assets.

<sup>3</sup> Public Law 99-514, 26 U.S.C. §41.

<sup>4</sup> Act 46 of 2003 created the R&D Tax Credit Assignment Program. The program allows firms with unused RDTC to sell those amounts. As noted by DCED, the original goal of the program was to “assist the growth and development of technology-oriented businesses, particularly small start-up businesses.” Firms can only sell unused RDTCs that exceed any collectible tax liability against which the credit may be applied. S corporations cannot apply to sell or assign any RDTC that has been passed through to shareholders. For more information and data on tax credit sales, see “The Research and Development Tax Credit Report to the Pennsylvania General Assembly,” Pennsylvania Department of Revenue (March 2019).

<sup>5</sup> A technology cluster is “a geographic concentration of interconnected businesses, suppliers and associated institutions. They may contain anchor institutions, small firms, start-ups, business incubators and accelerators.” Definition

## Purpose

- Expand economic activity (e.g., spending and sales) of R&D intensive sectors.
- Expand employment in R&D intensive sectors that pay above-average wages.
- Increase entrepreneurial activity as evidenced by the number of small, start-up firms that bring new products or services to market.

## Administration

The Pennsylvania DOR administers the RDTC and reviews applications. Applicants must submit RDTC applications electronically through the DOR website by September 15 of each year. The online application contains the following sections:

- Identification of qualified business
- R&D expenditures by location
- Description of the project and how it qualifies as R&D
- Listing of third party/subcontractor labor costs
- Prior year expenditures
- R&D credit calculation review
- Signature page
- Ownership information compliance check

Applicants must also submit the following forms via fax: (1) copy of federal Corporate Income Tax forms (federal Form 6765 or pro forma copy of federal Form 6765) for each year listed with expenditures, (2) Page 2 of REV-545A for each year listed with expenditures, (3) explanation of the difference between this year's expenditures and prior filings of REV-545A (if applicable) and (4) a copy of the balance sheet showing total assets less than \$5 million at the beginning or end of the year if filing as a small business. The DOR reviews applications and mails award letters for approved credits by December 15.

The DCED handles the application process for the sale and assignment of the RDTC. Purchased RDTCs can be used to offset up to 75 percent of the purchaser's tax liability and is non-refundable. Program guidelines and applications are available on DCED's website.<sup>6</sup> Completed applications must be submitted to DCED's Office of Technology and Innovation. DCED and DOR coordinate efforts to complete the RDTC assignment approval process within 90 days of receipt of an application.

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from "Clusters and Innovation Districts: Lessons from the United States Experience," The Brookings Institution (December 2017). Agglomeration effects are cost savings or synergies that may arise between firms due to close proximity. For example, multiple firms concentrated in a single area may attract more suppliers than a single firm. The firms might also share the same talent pool.

<sup>6</sup> See "Research and Development Tax Credit Assignment Program: Program Guidelines," Department of Community and Economic Development (January 2019).

For this report, DOR and DCED provided estimates for staff time and annual costs to administer and enforce the RDTC. For DOR, the estimates are:

- The estimated cost to administer the tax credit is \$685,000 per annum.
- Administration of the credit requires input from eight different bureaus or offices throughout DOR, with roughly 12,400 hours attributable to 37 employees. The full-time equivalent (FTE) is roughly six staff persons (1,950 hours per employee).

For DCED, the estimates are nominal. Sales of the RDTC are typically administered in tandem with sales of the Keystone Innovation Zone Tax Credit and do not require additional staff.

## Historical Data

This subsection presents historical data for RDTC awards from December 2013 to December 2018. Before the awards data are presented, **Table 2.1** provides two simple examples of the RDTC computation for a small and not small firm:

- The first example assumes that qualified research expenses (QRE) grow by five percent per annum for the prior four years and the current year. The average amount of QRE for the prior four years is \$107.8; \$100 four years prior and growing by five percent per annum. The amount of current year QRE eligible for the credit is the current year amount (\$121.6) less the greater of the prior four-year average or 50 percent of the current year QRE. In this example, the first constraint binds, and the QRE eligible for the credit is \$13.8 (\$121.6 - \$107.8). Small firms receive a 20 percent credit (\$2.8) while other firms receive 10 percent (\$1.4). However, because the credit is oversubscribed (discussed in next table), all awards made in December 2018 were pro-rated down to 68.2 percent (small) or 38.5 percent (not small). Therefore, the credit for small firms (\$1.9) is nearly four times larger than not small firms (\$0.5) and the effective credit rate is reduced significantly.
- In the second example, QRE is flat for three years (\$100), then increases by 25 percent in the prior year (\$125) and doubles in the current year (\$250). In this scenario, the 50 percent limit binds and \$125 of QRE is eligible for the credit.

**Table 2.1**  
**Computation of the Research and Development Tax Credit**

	Current Year QRE	Limitations		Computation of Tax Credit			
		50 Percent	4 Year Average	Eligible QRE	Tentative Credit	Pro-Rate Factor	Credit Award
<b>Steady Growth</b>							
Small	\$121.6	\$60.8	\$107.8	\$13.8	\$2.8	0.68	\$1.9
Not Small	121.6	60.8	107.8	13.8	1.4	0.39	0.5
<b>Flat, Then Large Gains</b>							
Small	250.0	125.0	106.3	125.0	25.0	0.68	17.1
Not Small	250.0	125.0	106.3	125.0	12.5	0.39	4.8

These simple examples demonstrate that even firms with predictable, steady growth in R&D expenditures can qualify for the RDTTC (first example). Hence, for many firms that receive awards, it is likely that much of the investment that qualifies for the credit was not truly incentivized by the credit. A significant challenge for governments that offer an RDTTC is an effective mechanism to identify and incentivize R&D spending that would not have otherwise occurred.

**Table 2.2** provides award detail for firms that received an RDTTC award from December 2013 to December 2018. Notable results include the following:

- The **number of firms** that received an award grew at an average rate of 12.8 percent per annum. Growth was very strong in 2016 and 2017 after the federal PATH made the federal RDTTC permanent.<sup>7</sup> That policy change increases the number of filers for the state credit because the state tax credit uses many federal conventions and applications must include copies of the federal return or a pro forma return.

**Table 2.2**  
**Research and Development Tax Credit Awards**

	Award Year					
	2013	2014	2015	2016	2017	2018
<b>Number of Awards</b>	<b>631</b>	<b>765</b>	<b>790</b>	<b>948</b>	<b>1,126</b>	<b>1,150</b>
Small	276	332	348	432	531	496
Not Small	355	433	442	516	595	654
<b>Current Year QRE</b>	<b>\$3,435</b>	<b>\$3,656</b>	<b>\$3,551</b>	<b>\$3,117</b>	<b>\$3,990</b>	<b>\$5,246</b>
Eligible QRE	\$898	\$821	\$784	\$762	\$967	\$1,222
Share	26.1%	22.5%	22.1%	24.4%	24.2%	23.3%
<b>All Firms</b>						
Tentative Credit	\$94.5	\$87.5	\$84.1	\$85.5	\$108.1	\$130.3
Credit Award	\$55.0	\$55.0	\$55.0	\$55.0	\$55.0	\$55.0
Pro-Ration Factor	58.2%	62.8%	65.4%	64.3%	50.9%	42.2%
<b>Small Firms</b>						
Tentative Credit	\$9.4	\$10.8	\$11.5	\$18.6	\$22.8	\$16.1
Credit Award	\$9.4	\$10.8	\$11.0	\$11.0	\$11.0	\$11.0
Pro-Ration Factor	100.0%	100.0%	95.5%	59.1%	48.3%	68.2%
<b>Not Small Firms</b>						
Tentative Credit	\$85.1	\$76.7	\$72.6	\$66.9	\$85.3	\$114.2
Credit Award	\$45.6	\$44.2	\$44.0	\$44.0	\$44.0	\$44.0
Pro-Ration Factor	53.6%	57.6%	60.6%	65.8%	51.6%	38.5%

Note: Millions of dollars. QRE is qualified research expenses.

Source: Data from Pennsylvania Department of Revenue. Computations by the IFO.

<sup>7</sup> The Protecting Americans from Tax Hikes (PATH) Act of 2015.



- **Current year QRE** for all firms increased at an average rate of 8.8 percent per annum, with significant growth in 2017 (28.0 percent) and 2018 (31.5 percent). Growth in current year QRE was very strong in 2018 largely due to a single firm. For 2018 awards, the majority of QRE (approximately 70 percent) represents wage/salary/benefit payments to employees who perform research. Payments to contract labor comprise approximately 15 percent while spending on supplies and equipment comprise the residual.<sup>8</sup>
- On average, the ratio of the **tentative credit** (equal to Eligible QRE times the applicable 10 or 20 percent rate) to current year QRE is roughly 2.5 percent. That is, the net effect of the two constraints (four-year average or 50 percent of current year QRE) combined with the applicable credit rate (10 or 20 percent) translates into an effective credit rate of roughly 2.5 percent of current year QRE.
- The **small firm set aside** is \$11 million. Recently, small firm awards have been oversubscribed (i.e., credits sought exceed amounts available) and all awards have been pro-rated down.
- **Large firms** can receive awards up to \$44 million. For most years, the pro-ration factor was between 50 to 60 percent. However, for awards made in 2018, the pro-ration factor was 38.5 percent due to an unusually large award to a single firm.

Most RDTC award recipients are C corporations. For 2018, **Table 2.3** shows that 36.1 percent of awards were made to C corporations that received 70.3 percent of total dollar awards. Those firms apply the tax credit against CNIT liability. The next largest entity group was S corporations, with 17.8 percent of total dollar awards. Those entities, along with other non-corporate entities, apply the tax credit against PIT.

If recipients cannot use the tax credit to offset tax liability, they may sell the credit to other firms. Historical data suggest that roughly one-fifth to one-quarter of tax credits are sold for an average of 93 to 94 cents per \$1 of tax credit. Purchasers must use the credit in the year purchased and can only offset up to 75 percent of their tax liability. Based on the conversations with R&D stakeholders, young firms lack sufficient tax liability to absorb the credit and use the proceeds from sale of the credit to reinvest back into the firm (e.g., employee salaries and technological investments).

**Table 2.3**  
**Research and Development Tax Credit by Entity Type (2018)**

	Receive Award		Dollar Award (000s)		Average Award
	Number	Share	Amount	Share	
C Corporation	415	36.1%	\$38,660	70.3%	\$93,200
S Corporation	535	46.5	9,798	17.8	18,300
LLC	135	11.7	4,445	8.1	32,900
LLP	61	5.3	2,092	3.8	34,300
Other	4	0.3	6	0.0	1,500
<b>Total</b>	<b>1,150</b>	<b>100.0</b>	<b>55,000</b>	<b>100.0</b>	<b>47,800</b>

Source: Pennsylvania Department of Revenue. Computations by the IFO.

<sup>8</sup> These percentages are very similar to those reported for the federal tax credit. For the federal tax data, see <https://www.irs.gov/statistics/soi-tax-stats-corporation-research-credit>. For contract research expenses, only 65 percent of expenditures qualify for the RDTC. For payments to a qualified research consortium, 75 percent of payments can be included.

**Table 2.4** provides detail on the sectors that received awards made in December 2018 (based on returns for tax year 2017). The manufacturing sector was, by far, the largest award recipient, receiving \$30.6 million (55.7 percent) of total awards. Of that amount, the Pharmaceutical and Medicine Manufacturing subsector received roughly one half. Other subsectors that received large awards include Engineering and Computer Design Services (\$8.9 million, 16.2 percent), Internet Data Processors (\$5.5 million, 10.0 percent) and Computer and Semi-Conductor Manufacturers (\$3.0 million, 5.5 percent).

**Table 2.4**  
**RDTTC Awards by Economic Sector and Subsector (2018)**

Sector	Number of Firms	Dollar Award (000s)	Average Award
Construction	79	\$2,073	\$26,200
<u>Manufacturing</u>			
Food Products	34	821	24,100
Paper Products	17	501	29,500
Pharmaceutical-Medicine	67	15,596	232,800
Plastics	42	927	22,100
Iron, Steel, Aluminum	19	851	44,800
Machinery	76	2,197	28,900
Computer and Semiconductor	58	3,010	51,900
Motor Vehicle	14	2,839	202,800
Medical Equipment	33	1,050	31,800
All Other	164	2,837	17,300
Wholesale Trade	83	1,854	22,300
Software Publishers	10	932	93,200
Internet and Data Processing	24	5,492	228,800
Engineering and Computer Design	277	8,900	32,100
All Other	<u>153</u>	<u>5,120</u>	<u>33,500</u>
<b>Total</b>	<b>1,150</b>	<b>55,000</b>	<b>47,800</b>

Source: Data from Pennsylvania Department of Revenue. Computations by IFO.

**Table 2.5** displays awards made in 2017 and 2018 across six groups based on the size of the award. For 2018, roughly one-third of total dollar awards were made to firms that received an award that exceeded \$1 million. That share is much higher than 2017 (22.3 percent) and it is unclear whether that trend will continue. By contrast, firms that received an award less than \$50,000 comprised approximately 85 percent of all recipients, but only one-fifth to one-quarter of total dollar awards.

**Table 2.5**  
**Tax Credit Awards by Size of Award (\$ Millions)**

Tax Credit Award			Awards Made in 2017				Awards Made in 2018			
Low	High		Number	Share	Amount	Share	Number	Share	Amount	Share
\$0	to	\$9,999	496	44.0%	\$2.1	3.8%	510	44.3%	\$2.2	4.0%
10,000	to	49,999	442	39.3	9.7	17.7	481	41.8	11.1	20.2
50,000	to	99,999	87	7.7	6.2	11.3	77	6.7	5.4	9.8
100,000	to	499,999	82	7.3	15.1	27.5	68	5.9	12.1	22.1
500,000	to	999,999	14	1.2	9.6	17.4	8	0.7	5.3	9.7
1,000,000	or	more	<u>5</u>	<u>0.4</u>	<u>12.3</u>	<u>22.3</u>	<u>6</u>	<u>0.5</u>	<u>18.8</u>	<u>34.2</u>
<b>Total</b>			<b>1,126</b>	<b>100.0</b>	<b>55.0</b>	<b>100.0</b>	<b>1,150</b>	<b>100.0</b>	<b>55.0</b>	<b>100.0</b>

Source: Data from Pennsylvania Department of Revenue. Computations by the IFO.

**Table 2.6** concludes the section with detail on awards made to small firms that declare assets under \$5 million. For 2018, 90 percent of small firms received an award under \$50,000. However, some small firms received awards that exceeded \$100,000. As noted, many small firms sell tax credits because they lack sufficient tax liability to absorb the credit. Firms must include the sale of the tax credit in taxable income, which will reduce its incentive effects if the firm has taxable profits because the federal and state governments effectively receive a portion of the tax credit that was sold via higher taxes.

**Table 2.6**  
**Small Business Awards (2018)**

Tax Credit Award		Number	Share	Total Awards	Share	Average	
Low	High	of Firms	of Total	(\$ millions)	of Total	Award	
\$0	to	\$9,999	217	43.8%	\$0.97	8.8%	\$4,460
10,000	to	24,999	147	29.6	2.43	22.1	16,560
25,000	to	49,999	81	16.3	2.70	24.5	33,280
50,000	to	99,999	34	6.9	2.40	21.8	70,450
100,000	or	more	<u>17</u>	<u>3.4</u>	<u>2.51</u>	<u>22.8</u>	<u>147,560</u>
<b>Total</b>			<b>496</b>	<b>100.0</b>	<b>11.00</b>	<b>100.0</b>	<b>22,180</b>

Source: Data from Pennsylvania Department of Revenue. Computations by IFO.

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## Section 3: State Comparison

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As of November 2019, 32 states and the federal government offered a tax credit to incentivize spending on research and development. Recently, some states eliminated or allowed these tax credits to expire. Those states include Alabama (repealed 2015), Montana (repealed 2019), North Carolina (repealed 2016), Oklahoma (repealed 2014) and West Virginia (expired 2014).

### Research and Development Tax Credit

**Table 3.1** provides a summary comparison of certain RDTC attributes across states. Nearly all state programs use the federal definition of qualified research expenses (QRE) in their credit calculation. To determine QRE that is eligible for a tax credit, eligible QRE is calculated using an incremental method or a fixed rate method. The incremental method subtracts a base spending amount from current year QRE and applies the credit rate. The fixed rate method simply applies a fixed percentage to current year QRE or a recent average QRE amount. Tax credits are applied to corporate net income and personal income taxes. New Mexico is the only state to permit credit application to payroll taxes.

Although Pennsylvania is one of three states that allows the transfer or sale of tax credits, the other two states (New Jersey and North Dakota) allow only small firms to sell/transfer credits. Historical credit data suggest that roughly one-fifth to one-quarter of Pennsylvania RDTCs are transferred or sold to firms other than the original recipient. For recent years, sellers have received an average of 93 to 94 cents per tax credit dollar. The entity that facilitates the transaction will also typically receive a commission equal to a percentage of the transaction. The portion of the tax credit that has been siphoned off due to the sales discount and transaction fee has no stimulative effect on R&D expenditures. Eight states allow RDTCs to be refunded (i.e., a cash grant is paid in lieu of the tax credit) but four of them restrict refundability to small firms.

Many states offer long carryforward periods to allow firms sufficient time to use their credit awards, with nine years the average carryforward period across states. Pennsylvania has a 15-year carryforward period. North Dakota is the only state to offer a carryback (three years), and the federal program permits a one-year carryback.

The fourth column of Table 3.1 displays the annual dollar cap (if applicable) and the fifth column lists total credit awards for the latest year that data are available. Currently, five states have credit caps in place: Florida, Maryland, New Hampshire, Pennsylvania and Virginia. Three states dominate tax credit awards: California (\$1.8 billion), Texas (\$660 million) and Massachusetts (\$242 million). Nine states awarded credits between \$40 to \$100 million, while the remainder awarded various amounts under \$40 million.

**Table 3.1  
State and Federal R&D Tax Credits**

	Calculation Method	Utilization <sup>1</sup>	Carryforward	Annual	
				Cap	Amount <sup>2</sup>
Arizona	incremental	RSB	15 years	-	\$42.0
Arkansas	incremental	-	9 years	-	4.6
California	incremental & fixed rate	-	unlimited	-	1,800.0
Connecticut	incremental & fixed rate	RSB	15 years	-	86.2
Delaware	incremental & fixed rate	refundable	none	-	2.3
Florida	incremental	-	5 years	\$9 million	9.0
Georgia	incremental	-	10 years	-	4.0
Hawaii	100% federal award	refundable	none	-	3.1
Idaho	incremental & fixed rate	-	14 years	-	8.2
Illinois	incremental	-	5 years	-	53.5
Indiana	incremental	-	10 years	-	25.8
Iowa	incremental	refundable	1 year	-	70.0
Kansas	incremental	-	unlimited	-	0.8
Louisiana	incremental	-	5 years	-	4.9
Maine	incremental	-	15 years	-	0.6
Maryland	incremental & fixed rate	RSB	7 years	\$12 million	12.0
Massachusetts	incremental	-	15 years	-	242.4
Minnesota	incremental	-	15 years	-	18.5
Nebraska	15%/35% federal award	-	20 years	-	8.0
New Hampshire	incremental	-	5 years	\$7 million	5.3
New Jersey	incremental	TSB	7 years	-	80.0
New Mexico	fixed rate	RSB	3 years	-	4.5
North Dakota	incremental	TSB	15 years <sup>3</sup>	-	n.a.
Ohio	incremental	-	7 years	-	35.7
<b>Pennsylvania</b>	<b>incremental</b>	<b>transferable</b>	<b>15 years</b>	<b>\$55 million</b>	<b>55.0</b>
Rhode Island	incremental	-	7 years	-	2.7
South Carolina	fixed rate	-	10 years	-	63.1
Texas	incremental	-	none	-	660.0
Utah	incremental & fixed rate	-	14 years	-	70.2
Vermont	27% federal award	-	10 years	-	3.0
Virginia	incremental	refundable	none	\$7 million	4.2
Wisconsin	incremental	-	15 years	-	52.3
Federal <sup>4</sup>	incremental	-	20 years	-	12,567.6

Note: Excluded states do not have a research and development tax credit effective for TY 2019. Some states also allow a flat rate credit for basic research payments to qualifying research facilities.

<sup>1</sup>RSB is refundable for qualifying small businesses and TSB is transferable for qualifying small businesses.

<sup>2</sup>Millions of dollars. Credit amount is latest amount reported by state agency that administers the credit. Most values pertain to fiscal year 2016-17, 2017-18 or 2018-19.

<sup>3</sup>Also permits a 3-year carryback.

<sup>4</sup>Also permits a 1-year carryback. Amount pertains to C corporations only for tax year 2014. Amounts reflect 35 percent reduction applied by most firms because the R&D expenses that qualify for the tax credit are also deducted from taxable net income. This prevents double-counting.

Source: Credit amounts from various state tax expenditure reports. See <https://itep.org/state-by-state-expenditure-reports/> for a full set of links to existing reports.

## Impact on Corporate Effective Tax Rate

**Table 3.2** displays the impact of the RDTC on CNIT rates for Pennsylvania, border states and select other states (Michigan, Connecticut, North Carolina and Virginia). Across comparison states, Pennsylvania has the second highest statutory CNIT rate at 9.99 percent. An RDTC is an incentive that can be used to reduce the effective tax rate for firms in R&D intensive sectors. It is a method that states use to compete for firm location and expansion. Due to a number of desirable attributes, policymakers pay close attention to R&D intensive firms. Those attributes include (1) wage rates that are far above the statewide average, (2) operations that can have high economic multiplier effects because the goods or services are sold outside the state economy, (3) social, synergistic and agglomeration benefits and (4) a potential reduction of “brain drain” or the departure of new college graduates to out-of-state employers. These characteristics are discussed further in the next section.

For the purpose of this comparison, the following simplifying assumptions were made:

- Total sales equal \$100 million and the firm has a 7 percent profit margin. The firm is not small.
- Current year QRE is \$4 million and QRE eligible for the credit is \$1 million.
- The corporation operates only within the state so that an apportionment factor does not impact the computation.
- The tax credit can be used immediately to offset taxes and is not sold. The computation disregards any interactions with the federal tax code.

**Table 3.2**  
**Impact of RDTC on Statutory Tax Rate**

State	CNIT Rate	R&D Tax Credit		Effective Rate with Credit	
		Base	Applicable Rate	No Pro-Ration	w/ Pro-Ration
<b>Pennsylvania</b>	<b>9.99%</b>	<b>incremental</b>	<b>10.0%</b>	<b>8.56%</b>	<b>9.44%</b>
New Jersey	11.50%	incremental	10.0%	10.07%	10.07%
New York	6.50%	n.a.	n.a.	6.50%	6.50%
Ohio	GRT	incremental	7.0%	n.a.	n.a.
Maryland	8.25%	incremental	10.0%	6.82%	8.09%
North Carolina	2.50%	n.a.	n.a.	2.50%	2.50%
Virginia	6.00%	incremental	15.0%	3.86%	3.86%
West Virginia	6.50%	n.a.	n.a.	6.50%	6.50%
Michigan	6.00%	n.a.	n.a.	6.00%	6.00%
Connecticut	7.50%	incremental	20.0%	4.64%	4.64%

Note: CNIT is corporate net income tax.

Source: Commerce Clearing House.

Based on these assumptions, Table 3.2 computes the effective tax rate with the tax credit. The first computation ignores any pro-ration of the credit that may occur due to oversubscription. The computation applies the applicable credit rate from the table for each state to the \$1 million of QRE eligible for the tax credit. For Pennsylvania, the credit reduces the effective tax rate to 8.56 percent, a reduction of more than 1.4 percentage points. However, due to oversubscription, credits awarded to large firms were pro-rated to 38.5 percent, so the effective tax rate increases to 9.44 percent.

Maryland is also affected by pro-ration as the tax credit is significantly oversubscribed.<sup>9</sup> All other states with an RDTC do not have a dollar cap or did not hit the cap in the latest year that data are available.

## Research and Development Spending Trends

**Table 3.3** displays R&D spending trends for the latest decade that data are available (2006-07 to 2016-17) for Pennsylvania, border states and select other states (Michigan, Connecticut, North Carolina and Virginia).<sup>10</sup> The data are from the National Science Foundation and represent business spending only. For 2006-07, the data show \$10.1 billion in private R&D spending for Pennsylvania. To provide context and scale, that amount was 2.09 percent of state private gross domestic product (GDP, excludes government sector), and the state ranked 13<sup>th</sup> in the nation based on that metric. For 2016-17, the metric declined to 1.76 and the state rank fell to 21<sup>st</sup>. During the decade, business R&D spending in the state increased at an average rate of 1.4 percent per annum.

By comparison, R&D spending for the U.S. increased at an average rate of 4.1 percent per annum. States with robust high-tech growth recorded significant gains (e.g., North Carolina). Maryland performs well using these metrics due to the presence of the federal government. However, Virginia underperformed due to reductions in federal defense spending. New York does not have an RDTC but moved up one spot in the state ranks.

**Table 3.3**  
**Business Spending on Research and Development**

	Average 2006-07			Average 2016-17			Growth or Change	
	Dollar Amount	Share GDP	State Rank	Dollar Amount	Share GDP	State Rank	Avg. Ann. Growth	Rank Change
<b>Pennsylvania</b>	<b>\$10,103</b>	<b>2.09</b>	<b>13</b>	<b>\$11,643</b>	<b>1.76</b>	<b>21</b>	<b>1.4%</b>	<b>-8</b>
New York	10,217	1.05	30	15,693	1.11	29	4.4	1
New Jersey	16,249	3.86	5	16,060	3.05	8	-0.1	-3
Ohio	7,059	1.64	20	9,331	1.65	22	2.8	-2
Maryland	3,543	1.55	22	5,636	1.82	19	4.8	3
Virginia	4,828	1.52	23	4,053	0.99	31	-1.7	-8
West Virginia	227	0.47	40	197	0.33	47	-1.4	-7
Michigan	16,107	4.56	2	19,945	4.48	4	2.2	-2
North Carolina	6,158	1.82	17	10,155	2.22	14	5.1	3
Connecticut	8,859	4.26	3	8,341	3.49	6	-0.6	-3
<b>United States</b>	<b>258,468</b>	<b>1.62</b>	<b>--</b>	<b>387,393</b>	<b>1.65</b>	<b>--</b>	<b>4.1</b>	<b>--</b>

Note: Millions of dollars. US share of private GDP (excludes government) is unweighted state average (i.e., each state has same weight).

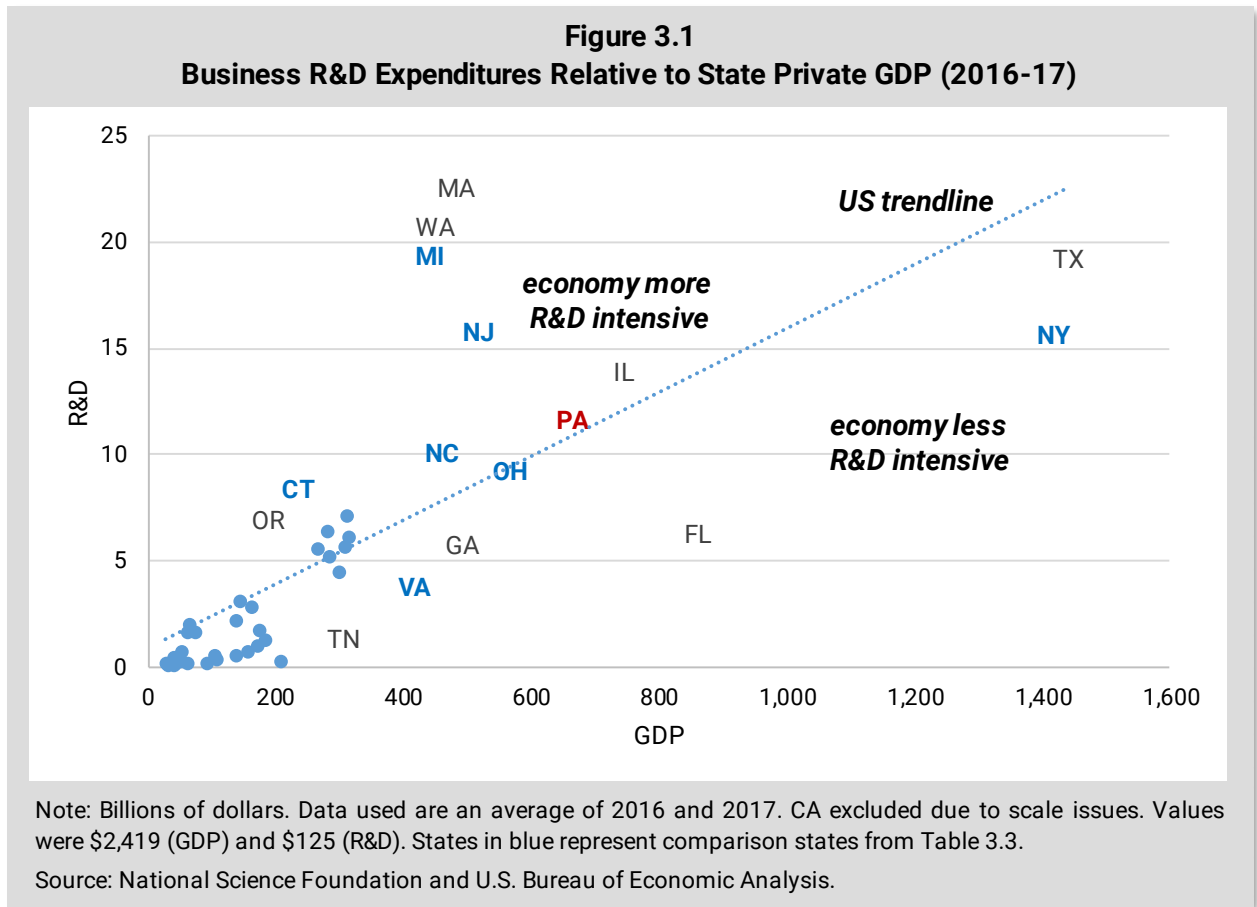
Sources: National Science Foundation and Bureau of Economic Analysis.

<sup>9</sup> The pro-ration factor for Maryland is based on: "Evaluation of the Research and Development Tax Credit," Department of Legislative Services, State of Maryland (October 2018).

<sup>10</sup> A two-year average is used for each end point due to the volatility of R&D spending.



**Figure 3.1** displays the relationship between state private GDP and business R&D spending for 2016-17. The dotted blue line is a national trendline across all states that depicts the “typical” relationship between state GDP and R&D spending. States above the line are relatively more R&D intensive. The figure illustrates that Massachusetts, Washington and Michigan are very R&D intensive for the latest year that data are available due to software (Massachusetts), automotive (Michigan) and airplane (Washington) manufacturers. By contrast, large states like New York, Texas and Florida are relatively much less R&D intensive due to the presence of other large industries such as the financial, energy and tourism industries.



## Research and Development Employment Trends

**Table 3.4** displays employment growth for the subsectors that were awarded 70 percent of Pennsylvania RDTC in 2018. Those subsectors include chemical manufacturing, machinery manufacturing, computer and semi-conductor manufacturing, motor vehicle manufacturing, internet and data processing, software publishers and engineering-computer design. Using data from the U.S. Bureau of Labor Statistics, the analysis compares total employment in those subsectors across comparison states for 2008, 2013 and 2018. It is noted that these years are different than Table 3.3 because more recent data are available.

For 2008, there were 387,500 payroll jobs in the identified R&D subsectors that received significant R&D tax credits in award year 2018.<sup>11</sup> Those subsectors comprised 7.8 percent of all payroll jobs in that year. That share was lower than all comparison states except New York (6.8 percent) and West Virginia (5.4 percent), and lower than the U.S. average (8.9 percent). Following the Great Recession, the share declined slightly to 7.7 percent and most border states declined as well, but the overall national average remained unchanged. From 2013 to 2018, Pennsylvania employment in these R&D intensive subsectors expanded at an average rate of 1.2 percent per annum (final column). Total payroll jobs in the state increased at the same rate and the R&D intensive subsector share did not change. The shares declined for New Jersey and Virginia, but increased for all other comparison states and the U.S.

**Table 3.4**  
**State Employment Comparison Based on R&D Subsectors**

	2008 (000s)		2013 (000s)		2018 (000s)		Number of Jobs	
	Number of Jobs	Share of All Jobs	Number of Jobs	Share of All Jobs	Number of Jobs	Share of All Jobs	AAGR 2008-13	AAGR 2013-18
<b>Pennsylvania</b>	<b>387.5</b>	<b>7.8%</b>	<b>375.7</b>	<b>7.7%</b>	<b>398.4</b>	<b>7.7%</b>	<b>-0.6%</b>	<b>1.2%</b>
New York	489.5	6.8	491.5	6.7	567.8	7.1	0.1	2.9
New Jersey	307.2	9.2	280.7	8.7	296.1	8.5	-1.8	1.1
Ohio	421.0	9.4	404.3	9.2	452.6	9.7	-0.8	2.3
Maryland	222.9	10.8	229.8	11.2	250.8	11.5	0.6	1.8
Virginia	393.9	13.2	402.6	13.6	429.4	13.5	0.4	1.3
West Virginia	30.8	5.4	31.4	5.5	32.9	5.9	0.3	1.0
Michigan	444.8	12.8	459.7	13.3	527.9	14.0	0.7	2.8
North Carolina	280.4	8.3	283.7	8.6	347.6	9.4	0.2	4.1
Connecticut	149.9	10.4	138.8	9.9	145.7	10.1	-1.5	1.0
<b>United States</b>	<b>9,989.7</b>	<b>8.9</b>	<b>10,025.6</b>	<b>8.9</b>	<b>11,436.2</b>	<b>9.2</b>	<b>0.1</b>	<b>2.7</b>

Note: Jobs include the following subsectors which claim more than 70 percent of state and federal R&D tax credits: chemical manufacturing, machinery manufacturing, computer and electronic manufacturing, transportation and equipment manufacturing, data processing and hosting, internet publishing and web portals, software publishers, architecture and engineering, computer system design and related, management and technical consulting and scientific research and development. Private and payroll jobs only. Excludes self-employed individuals, sole proprietors and independent contractors.

Sources: U.S. Bureau of Labor Statistics.

<sup>11</sup> Payroll jobs include full- and part-time jobs and do not include self-employed individuals, sole proprietors or independent contractors.

## State Comparison Summary

Compared to other states that offer an RDTC, the Pennsylvania tax credit is neither exceptionally high nor low. As measured by state GDP, larger population states could award much larger amounts (California and Texas), award very modest amounts (Florida) or have no tax credit (New York). Many smaller states award higher amounts such as Iowa, Connecticut, Massachusetts and Utah.

Other results from this section can be summarized as follows:

- The effective tax rate computation from Table 3.2 illustrates that the RDTC could materially reduce the effective tax rate paid by certain R&D intensive firms but due to oversubscription, the potential impact is greatly reduced. The impact on the effective tax rate will depend directly on the profit margin of the firm and the amount of QRE that is eligible for the RDTC in the specific year. The simple computation from Table 3.2 was a stylized example and the impact on the actual effective tax rate will vary considerably among eligible firms and across tax years.
- The spending and GDP data from Table 3.3 suggest that Pennsylvania remains relatively R&D intensive, but less dramatically relative to other states over the past decade.
- The employment data from Table 3.4, which focuses solely on R&D intensive subsectors that claim the tax credit, confirm the finding from the prior bullet. For Pennsylvania, employment in those subsectors in 2018 (398,400) was somewhat higher (2.8 percent) than a decade earlier (387,500). By comparison, national employment in those same subsectors increased by 14.5 percent during the decade.

It should be noted that these results do not demonstrate that the RDTC is ineffective in promoting economic activity and employment growth in R&D intensive subsectors. It is possible that employment would have contracted in the absence of the RDTC. Given the data that are available, it is not possible to identify the true counterfactual outcome if the RDTC was not available, or had not increased from \$40 million in 2008 to \$55 million in 2012.

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## Section 4: Economic Analysis

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This section presents the economic analysis for the RDTC. Prior to the analysis, a brief review of recent studies is presented to provide background, motivation and context for the economic impact analysis.

### Key Findings from RDTC Studies

Compared to other tax credits, the RDTC has been the subject of considerable research at the federal level, and to a lesser extent, the state level. For the federal tax credit, recent analyses from government and private entities include:

- A working paper by the **U.S. Treasury Department** (2016) surveyed credible research and noted that much research finds that “an elasticity of -1.0 best represents the literature.”<sup>12</sup> An elasticity is a parameter that summarizes the responsiveness of spending on a good or service (in this case spending on R&D) to its after-tax price. An elasticity of -1.0 indicates that a 1.0 percent reduction in the cost of R&D expenses (such as wages) would lead to a 1.0 percent increase in R&D expenditures. The -1.0 elasticity implies a dollar-for-dollar increase in R&D spending with respect to the tax credit: firms increased private spending by \$1 for each \$1 in tax credit. The paper cites other research that suggests the elasticity or response could be somewhat higher (ranging up to -1.5 percent) and generally higher for small firms that are financially constrained and lack cash flow.
- The **Congressional Research Service** (2015) cited a short-run price elasticity of -0.4 to -0.8 percent for the federal R&D tax credit.<sup>13</sup>
- A report by the **Congressional Budget Office** (2007) notes that R&D “studies have produced a variety of results, many of which have clustered around the finding that a dollar of an R&D tax credit leads firms to spend an additional dollar of their own on research and development.”<sup>14</sup>
- An older paper by the former **Office of Technological Assessment, U.S. Congress** (1995), found that for every dollar of lost tax revenue, the R&D tax credit produced a dollar increase in private R&D spending, on the margin.<sup>15</sup>
- A paper by **Ernst & Young** (2011) surveyed federal R&D tax credit studies and, for the purpose of the analysis, assumed that every one percent increase in the price of research would cause research spending to fall by one percent.<sup>16</sup>

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<sup>12</sup> “Research and Experimentation Credit (R&E),” U.S. Department of Treasury, Office of Tax Analysis (October 2016).

<sup>13</sup> “Research Tax Credit: Current Law and Policy Issues for the 114<sup>th</sup> Congress,” Congressional Research Service, RL31181 (March 2015).

<sup>14</sup> “Federal Support for Research and Development,” Congressional Budget Office (June 2007).

<sup>15</sup> “The Effectiveness of the Research and Experimental Tax Credits: Critical Literature Review and Research Design,” U.S. Congress, Office of Technological Assessment (1995).

<sup>16</sup> “The R&D Credit: An Effective Policy for Promoting Research Spending,” Carroll et al., Ernst & Young (September 2011).

For state RDTCs, recent studies include the following:

- A study on the **Minnesota Research Tax Credit** (2017) found that the state net return on investment (ROI) from the tax credit ranged from 5 to 22 cents per tax credit dollar (average of 10.3 cents) for tax years 2008 to 2014. During that span, claimed credits averaged \$50 million per annum, and the analysis estimated that the credit created or retained 1,150 jobs per annum, generated \$85 million in new earnings at an average salary of \$72,000 and a net fiscal cost of \$42,000 per job created.<sup>17</sup>
- A report on the **Maryland Research and Development Tax Credit** (2018) found that there was no evidence that the tax credit was effective and could find no correlation between the tax credit and increased innovation and long-term economic growth. The report notes that part of that result is attributable to the fact that a portion of the tax credit base is not computed using an incremental method (i.e., the credit applies to all QRE, not just a portion).<sup>18</sup>
- A working paper by staff at the **Federal Reserve Board** (2014) examined state RDTCs generally and found that a 1.0 percent increase in R&D tax incentives leads to a 2.8 to 3.8 percent increase in R&D spending. The paper attempts to correct certain technical issues that caused prior analyses to derive a lower elasticity or responsiveness to tax incentives.<sup>19</sup>
- A report on the **Rhode Island Research and Development Tax Credit** (2018) found that the state net ROI was 73 cents per tax credit dollar. The study assumed that the tax credit incentivized 17.5 percent of all R&D investment and industry sales at recipient firms.<sup>20</sup>
- A report on the **Iowa Research Activities Tax Credit** (2016) assumed that \$1.00 of tax credit increased private spending on R&D by \$1.68. The analysis assumed a price elasticity of R&D spending of -1.5. For tax years 2010 to 2014, the analysis estimated that \$230 million of tax credits increased private R&D spending by \$258 to \$516 million.<sup>21</sup>
- An analysis of the now expired **Washington High Technology Business and Occupation Tax Credit** (2012) found that the tax credit did increase employment, but the cost per job created ranged from \$40,000 to \$50,000 per job.<sup>22</sup>
- A report on **Virginia Economic Development Incentives** (2018) found that the net ROI to the state from economic development tax credits was 4 cents per tax credit dollar. The state's RDTDC was one of the tax credits included.<sup>23</sup>

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<sup>17</sup> "Minnesota Research Tax Credit," Office of the Legislative Auditor, State of Minnesota (February 2017).

<sup>18</sup> "Evaluation of the Research and Development Tax Credit," Department of Legislative Services, State of Maryland (October 2018).

<sup>19</sup> "Tax Policy Endogeneity: Evidence from R&D Tax Credits," Chang, Andrew, Working Paper 2014-101, Federal Reserve Board (November 2014).

<sup>20</sup> "Economic Development Tax Incentive Evaluation Act: Evaluation of Research and Development Tax Incentive Programs," Department of Revenue, State of Rhode Island (June 2018).

<sup>21</sup> "Research Activities Tax Credit: Tax Credits Program Evaluation Study," Tax Research and Program Analysis Section, Iowa Department of Revenue (December 2016).

<sup>22</sup> "An Analysis of the Employment Effects of the Washington High Technology Business and Occupation Tax Credit: Technical Report," Bartik, Timothy and Kevin Hollenbeck, Upjohn Institute Working Paper No. 12-187 (June 2012).

<sup>23</sup> "Economic Development Incentives 2018: Spending, Performance and Economic Benefits," Virginia Joint Legislative Audit and Review Commission (December 2018).

- A working paper from the **Federal Reserve Bank of San Francisco** (2007) found that a 1 percent reduction in the user cost (i.e., price) via R&D tax incentives increased R&D spending by 2.5 percent across states. The author also found that spending gains were shifted from other states, suggesting a zero-sum game among states.<sup>24</sup>
- A recent **NBER working paper** (2019) found that state RDTCs are associated with a significant long-term impact on the overall quantity and quality of entrepreneurial activity (i.e., startup firms), but most of the impact does not materialize until five years after a policy is enacted. The authors note that state RDTCs do not offer a quick fix for states seeking to spur regional economic growth, and it may take a decade or more for the RDTC to have an impact on the state economy through entrepreneurship.<sup>25</sup>

In summary, research does find that federal and state RDTCs appear to stimulate private spending, but some studies noted that firms might simply shift spending from other states and not increase overall spending on R&D activity. There appears to be some consensus that an RDTC could increase private spending by a similar magnitude as the tax credit, or perhaps up to twice as much. No study found that the tax credit was self-financed (i.e., paid for itself), and the net ROI was generally modest. However, it should also be noted that the models used by the studies reviewed could not accurately capture longer-term entrepreneurial and dynamic impacts, social impacts (i.e., positive externalities or spillovers) or the potential benefits from agglomeration effects. Agglomeration effects occur when firms in the same industry or related industries can reduce costs and create synergies by locating in close proximity. Academic studies have found that high-tech firms can benefit from agglomeration effects.<sup>26</sup>

## Economic Impact

The analysis of the economic impact of the RDTC can be conceptualized in four general steps. They are as follows:

- Determine the new private spending that is incentivized by the tax credit. This is known as the direct spending effect.
- Determine the relevant economic sectors that claim the tax credit. The tax credit should incentivize R&D spending and production. An appropriate multiplier is then applied to reflect the fact that the production and spending incentivized by the RDTC is respent and circulates through the state economy and generates indirect and induced effects (defined in footnote 31).
- Deduct the impact from the alternative use of the tax credit monies. The tax credit monies could have been used to increase spending or reduce taxes.
- Determine the tax revenues that result from the overall increase in economic activity.

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<sup>24</sup> "Beggars thy Neighbor? The In-State, Out-of-State, and Aggregate Effects of R&D Tax Credits," Wilson, Daniel, Federal Reserve Bank of San Francisco, Working Paper 2005-08 (August 2007).

<sup>25</sup> "The Impact of State-Level R&D Tax Credits on the Quantity and Quality of Entrepreneurship," Fazio et al., National Bureau of Economic Research, Working Paper 26099 (July 2019).

<sup>26</sup> For example, see "Local Job Multipliers in the United States: Variation with Local Characteristics and High-Tech Shocks," Bartik, Timothy and Nathan Sutherland, Upjohn Institute Working Paper 19-301 (March 2019).

**Table 4.1** contains the economic impact analysis. The text that follows provides a brief description based on line number in the table. The analysis assumes that credits are used in the same year they are awarded. Timing issues related to award and utilization have minor implications for the analysis because the majority of firms sell the tax credit to generate immediate cash flow or apply it relatively quickly against liability.

**Line 1** For recent years, a total of \$11 million of credits was awarded to small firms and \$44 million to large firms.

**Line 2** Data show that one-fifth to one-quarter of tax credits are sold for 93 to 94 cents per tax credit dollar. For credits sold, the analysis also assumes a five percent fee is paid. The amounts lost to brokers as commissions or other firms as discounts do not motivate R&D spending because the firm does not realize any benefit from those monies. Therefore, they are removed from the economic impact analysis.<sup>27</sup>

**Line 3** The net value to firms is \$53.4 million. That net amount incentivizes firm decisions and behavior.

**Line 4** Based on the literature review from the prior subsection, the analysis assumes that \$1.00 of tax credit increases private R&D spending by \$1.75 for small firms and \$1.25 for large firms. (The figure in the table is a weighted average.) A higher multiple is used for small firms because many small firms are financially constrained and are more responsive to subsidization from a tax credit that can be sold to generate cash flow.<sup>28</sup>

**Line 5** Based on these assumptions, private R&D spending increases by \$72 million. That amount can be conceptualized as \$53 million from the state and much of the residual \$19 million is assumed to be shifted into the state. Research suggests that state RDTCs may not increase total R&D spending, but may incentivize larger multistate firms to shift it between states. This analysis assumes that generally occurs for the additional spending leveraged by the tax credit.

**Line 6** The analysis assumes that the higher R&D spending is 85 percent employee compensation and 15 percent supplies. Those amounts are split equally across three representative subsectors that claim significant RDTCs.<sup>29</sup> Essentially, the analysis assumes that the tax credit incentivizes employment and production that would not otherwise occur, and that firms sell output and engage suppliers as they would do for regular production that is not incentivized by the tax credit. Based on established relationships for these subsectors as modeled by the IMPLAN input-output model, output or sales would increase by a multiple of the \$72 million because labor is only one input used in the production process. Based on the subsectors modeled, total sales of goods and services (also referred to as total output) increase by \$184 million.<sup>30</sup>

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<sup>27</sup> The 97 percent figure shown in the table is a weighted average of firms that use the tax credit and receive 100 percent of the value (80 percent of large firms, 50 percent of small firms) and those that sell the credit at a discount and pay a commission.

<sup>28</sup> Although the analysis uses a "dollar match" methodology, the same general result would be obtained if an elasticity of -1.75 (small firms) and -1.25 (large firms) were used and applied to the percentage increase in total QRE that is induced by the tax credit award. The dollar match method is used because it simplifies the presentation.

<sup>29</sup> The three representative sectors used for the model were: semiconductor and machinery manufacturing; data processing, hosting and related services and computer system design services. Adding additional sector detail would not alter the general results of the analysis.

<sup>30</sup> IMPLAN is an economic input-output model that captures the interrelationships between individual sectors of state and local economies. It incorporates the most recent data published by the U.S. Bureau of Economic Analysis on supply chains and economic multipliers. The model produces static impact estimates because various technical parameters (e.g., relative price levels and migration patterns) are assumed constant.



**Line 7** Additional spending incentivized by the tax credit creates multiplier effects known as induced and indirect effects.<sup>31</sup> For these subsectors, the IMPLAN input-output model derives a weighted average multiplier of 1.91.

**Line 8** That output or spending figure double counts sales in the supply chain and the net impact on state gross domestic product (GDP) is \$188 million. The GDP figure does not double count sales and represents only the value of sales to final consumers.<sup>32</sup> This figure is also referred to as value-added.

**Table 4.1**  
**RDTC Economic Impact**

	<b>Amount</b>
<b>1 Tax Credits Awarded</b>	<b>55.0</b>
2 Sales Discount and Fees	<u>97.0%</u>
<b>3 Net Value to Firm</b>	<b>53.4</b>
4 Private Spend Multiple	<u>1.35</u>
<b>5 New Private R&amp;D Spending</b>	<b>72.0</b>
6 Increase in Output or Sales	184.0
7 Include Multiplier Effects	351.5
<b>8 Convert to Gross Domestic Product (GDP)</b>	<b>188.0</b>
9 Less: Balanced Budget Adjustment	<u>-66.8</u>
<b>10 Net Impact on GDP</b>	<b>121.2</b>
a Full-Time Equivalent Jobs	915
b All Labor Earnings	80.5
c Annual Wage - Software Developer	93,670
d Annual Wage - Electronic Engineer	96,340
e Annual Wage - Mechanical Engineer	81,270
<b>11 Impact on State Tax Revenues</b>	<b>6.1</b>
12 Return on Investment	
a Net Return	0.12
b Gross Return	0.16

Note: Millions of dollars, except median annual wage and return on investment.

<sup>31</sup> The indirect effect is the impact on firms that supply inputs to the sectors directly affected by the tax credit. The induced effect is the impact from employees that work at the affected firms and business owners that receive additional income. Both will eventually respense most of the income received. Other BEA multipliers are used to determine the impact on state gross domestic product (GDP), full time equivalent jobs and earnings of workers and business owners

<sup>32</sup> The impact on state GDP will be smaller than the impact on spending/output because spending/output counts certain spending twice. For example, the sale of a product will be counted multiple times as it is purchased and resold as it moves through the supply chain and the sale of one firm becomes an input for another (e.g., raw materials). By contrast, the GDP effect only counts sales to final consumers, and eliminates double counting.

**Line 9** The balanced budget adjustment. The state must increase taxes or cut spending to provide funds for the tax credit. The analysis assumes that state spending is reduced to pay for the credit. If spent for other purposes, that spending would generate economic activity, which would also have multiplier effects. Line 9 displays the corresponding impact on GDP if the tax credit monies had been used generally for education and non-education purposes (equal split).<sup>33</sup> This impact was also determined by the IMPLAN model.

**Line 10** The net impact on state GDP from the tax credit (\$121 million). The tax credit has a net positive impact on GDP for several reasons. First, it may leverage or shift R&D spending into the state due to the wage subsidization and lower effective tax rate. Second, many of the incentivized industries are high value-added export-based industries that pull monies into the state. Third, the long-standing tax credit may allow the incubation of young firms that will mature and establish multistate supply and sales networks. As noted, it may also have cluster and agglomeration impacts (defined previously), which are not quantified for the purpose of this analysis.

Lines 10a to 10e list various economic metrics associated with net increase in state GDP. Full-time equivalent employees increase by 915. Labor earnings increase by \$80.5 million.<sup>34</sup> Median annual wage rates for typical occupations in subsectors that use the credit include software developer (\$93,670), electronics engineer (\$96,340) and mechanical engineer (\$81,270).<sup>35</sup>

**Line 11** The total impact on state tax revenues (sales, personal income and other miscellaneous taxes). Per statute, the estimate assumes that all R&D spending motivated by the tax credit is spent in the state and all employee wage compensation would be taxed. Moreover, all spending for contract labor is also assumed to occur in the state and personal income tax is remitted on any payments for labor services.

**Line 12** The **net return on investment (ROI)** for the Commonwealth is 12 cents per tax credit dollar and is equal to the tax revenues generated (\$6.1 million) divided by total tax credits awarded (\$55 million). That figure reflects the alternative use of the tax credit monies. The net ROI exceeds zero, therefore the tax credit generates more tax revenues compared to the assumed alternative use of the funds. The **gross ROI** is 16 cents per dollar. The gross ROI disregards the alternative use of funds and is best used to assess whether the tax credit is self-financed, or pays for itself. If the gross ROI exceeds 1.0, then the tax credit pays for itself. The analysis finds that the RDTC is nearly one-sixth self-financed.

If the analysis had used a parameter of 2.0 on Line 4 (i.e., \$1 of tax credit incentivizes \$2 of private R&D spending), that would increase the gross ROI to 23 cents and the net ROI to 19 cents per tax credit dollar. Those outcomes are also plausible.

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<sup>33</sup> For this purpose, the analysis used “institutional spending patterns” for state government spending for education and non-education purposes.

<sup>34</sup> Labor earnings includes all payments to employees such as wages and salaries, healthcare benefits, pensions and employer payroll taxes. Earnings of sole proprietors, independent contractors and partners in partnerships are also included.

<sup>35</sup> Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics, Pennsylvania Occupational Wages for 2018.

## Analysis Caveats

It is noted that the static analysis from Table 4.1 does not explicitly reflect or model certain impacts that may result from an RDTC. They are as follows:

- The analysis does not assume that any jobs incentivized by the tax credit are permanent, but some portion could be permanent from a tax credit award in a particular year. For example, it is possible that the infusion of tax credit monies kept a small firm solvent and allowed operations to continue until products were brought to market or cash flow constraints eased.
- The analysis does not include the impact of agglomeration effects. These effects reduce costs for firms that are physically located near one another and may also enhance synergies and innovation.
- The analysis does not include any impact from long-term entrepreneurial activity. A study from the prior subsection found a positive impact on that activity from state RDTCs. However, the impact may require five to ten years to manifest itself.
- The analysis did not attempt to address the “relabeling” issue that is well known in federal RDTC studies. Many of those studies note that firms may simply relabel expenses as R&D so that they qualify for the federal credit, with no actual increase in R&D spending. It is also well known that the IRS faces significant challenges administering and enforcing the federal RDTC due to the imprecise definition of expenses that qualify as R&D. Pennsylvania uses the federal tax code definitions and it is possible that a non-trivial portion of QRE is not actual R&D expenses.
- The analysis does not explicitly model the interaction with the federal tax code. If a firm sells the state RDTC, that income is taxable for federal purposes. For a profitable C corporation, the higher federal tax would effectively reduce the net value of the tax credit by 21 percent. In either case (sale or application of a tax credit to reduce state income tax liability), the net value to the firm is reduced. In the case of an applied tax credit, state income taxes are deductible on the federal tax return, so lower deductions due to a state credit implies that federal taxable income and federal taxes increase.

If it were possible to model these impacts, the first three would increase the economic impact, while the final two would reduce the economic impact. The analysis assumes that the impacts largely offset in the long run.

Finally, it is also noted that there may be non-economic or social benefits that are not included in the analysis. The analysis does not include any estimates for these positive externalities or spillover effects. For example, R&D spending by defense contractors often has unintended benefits for other industries, such as technology firms.

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## Section 5: Tax Credit Plan

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Act 48 of 2017 directs the IFO to review all tax credits and develop a tax credit plan for credits subject to review. The act states that tax credit plans should include performance metrics for each credit. The act does not specify any other elements of the tax credit plan. For this review, the IFO defined the tax credit plan more broadly to include the following elements: (1) the general findings of the review, (2) specific recommendations, including performance metrics and (3) key decision points for policymakers to consider.

### General Findings

For the purpose of this report, the IFO reviewed numerous RDTC studies and spoke with multiple stakeholders, as well as the agencies that administer the tax credit. The following bullet points summarize the main findings of this research:

- Thirty-two states offer an RDTC, but three states dominate awards: California (\$1.8 billion), Texas (\$660 million) and Massachusetts (\$242 million). Nine states (includes Pennsylvania) awarded credits between \$40 to \$100 million, while the remainder awarded various amounts under \$40 million.
- Pennsylvania is one of three states that allows tax credits to be sold but is the only state to allow large firms to sell tax credits.
- Research finds that the tax credit incentivizes R&D expenditures, but evidence of that effect cannot be identified in statewide jobs or R&D expenditure data.
- The tax credit does flow to the subsectors that heavily engage in R&D activity: certain manufacturers, internet and data processing and certain professional service firms (e.g., computer design).
- The RDTC can be an important incentive to offset a high statutory corporate income tax rate (9.99 percent) for firms that qualify. Many firms that claim the RDTC are large multistate firms that can shift R&D spending between states.
- The tax credit does not pay for itself, but it does generate more tax revenues than the assumed alternative use of those funds. It is noted that the fiscal return on investment from state spending is only one of many metrics that should be used to evaluate state spending, regardless of the form it takes.
- Historical data suggest that roughly one-fifth to one-quarter of tax credits are sold for 93 to 94 cents on the dollar. Brokers also secure a fee for their services. The discount and fee represent leakage that do not incentivize R&D spending.
- On August 26, 2019, the Dauphin County Court of Common Pleas accepted Investigating Grand Jury Report No. 2 on an elaborate scheme to fraudulently obtain state tax credits. The Grand Jury report provided detailed information on the scheme and made six recommendations to reduce future fraud in the KIZ and R&D Tax Credit. See the Appendix for additional information on the Grand Jury recommendations and the changes the agencies have initiated in response to the report.

## Specific Recommendations

Based on these general findings, the IFO submits the following recommendations to enhance the efficiency of the tax credit and improve its ability to achieve its goals and purpose.

### **The credit should be made refundable for 95 cents on the dollar as well as remain transferable.**

Data suggest that roughly one-fifth to one-quarter of RDTCs are transferred or sold to firms other than the original recipient. For recent years, sellers received roughly 93 to 94 cents on the dollar, and the entity that facilitated the transaction received a commission. These transactions represent leakage that does not incentivize R&D spending. Refundability will simplify administration and eliminate the role of tax credit brokers. It should also enhance the appeal of the tax credit to small firms.

### **The eligible QRE computation could be adjusted so that less QRE qualifies for the tax credit.**

This adjustment would have two beneficial impacts. First, it would alleviate the oversubscription of the tax credit and require less pro-ration to all firms. Second, the computation could be adjusted to better target truly incremental QRE that might be incentivized by the tax credit. For example, the 50 percent limit of current QRE could be raised to 60 percent, and a three-year average could be used instead of four. Alternatively, the computation might require that current year QRE exceed the amount in the prior year. For many award recipients, current year QRE is lower than the prior year.

### **The tax credit could have a per firm dollar limit to reduce the impact of large, one-time awards.**

For 2018 awards, a single firm received an award that exceeded \$10 million. That outcome is unusual. For 2017, the largest award was \$4.8 million. Very large awards exacerbate oversubscription, penalize other firms and reduce incentive effects. Alternatively, a tiered rate structure could be used and a lower rate offered for awards that exceed a certain threshold.

### **The QRE computation could exclude contract labor.**

Currently, contract labor can be included as QRE, but only 65 percent may be included. Contract labor comprises roughly 15 percent of QRE. The firm that receives the payment must be physically located in the state, but it is not clear that the income or proceeds remain in the state. An unknown amount of those payments also reflect profits, which may not directly correspond to R&D spending.

### **The statutory program deadlines should be revisited to facilitate the taxpayer's ability to include supporting documents with the tax credit application and to allow for a more thorough evaluation of applications after they are submitted.**

Federal extension returns are due October 15 and the corresponding state return is due November 15. Currently, the credit application is due September 15 and DOR has 90 days (September 15 to December 15) to perform a review of the application and supporting documentation, determine applicant eligibility and verify compliance with state tax obligations. An application due date after November 15 would allow the applicant to include final copies of their federal and state tax returns. A review period greater than 90 days would provide the administering agencies more time to review the applications and supporting documentation.

### **Policymakers should enact statutory reforms to facilitate enforcement of the tax credit.**

In response to an inquiry by the IFO, DOR recommends that the General Assembly consider the following changes:

- Move the due date for the RDTC application to December 1 to allow the taxpayer to have completed both state and federal returns. Move the period in which sales and assignments may be processed by DOR to June 1 following the immediate tax year in which the credit was awarded.
- Authorize DOR to require a taxpayer to hire an independent auditor to prepare audited financial statements.
- Provide DOR with the authority to audit a taxpayer, business firm or other recipient of a tax credit, including the purchaser of a tax credit.
- Allow DOR to recapture credits in applicable cases.
- Standardize due process rights to taxpayers denied tax credits for noncompliance or were subject to recapture within six months of the award date.
- Require the brokers to be registered with DOR.
- Require taxpayers to file federal Form 6765 with the PA RDTC application to allow DOR to perform reconciliations on eligible expenditures and disallow submission of a pro forma statement only.
- Require taxpayers to claim a federal income tax credit to qualify for the state credit.

### **Policymakers should enact statutory reforms to deter fraudulent activity.**

For this purpose, the analysis does not offer any specific recommendations but refers to the Grand Jury summary and agency responses included in the Appendix to this review.

## **Key Decision Points**

In addition to the specific recommendations above, policymakers should also consider other issues that merit discussion if the RDTC is amended. These issues are strategic and will be related to the overall goals and purpose of the tax credit as envisioned by policymakers:

- How does the tax credit interact (or not) with other economic development incentives offered by the Commonwealth? Firms could receive multiple incentives that are redundant (e.g., Keystone Innovation Zone credits, RDTCs and Ben Franklin Technology Development Partners challenge grants).
- Is the amount reserved for small business sufficient? That is, to what extent is the credit targeted to new firms that are financially constrained?
- Is it consistent with the purpose of the tax credit that a large group of firms receive awards nearly every year? For recent years, these firms received nearly 40 percent of all tax credit awards. It is not clear if R&D expenses are truly incentivized by a tax credit that is claimed each and every year by the same firms.
- Because the federal RDTC is now permanent, policymakers should anticipate that the state tax credit will continue to be significantly oversubscribed. As noted, the incentive effects decline considerably due to pro-ration of the tax credit.

## Conclusion

Act 48 of 2017 requires that the IFO make a determination regarding whether the RDTC has achieved its goals and purpose. The tax credit did not have a specific legislative intent and for this report, the IFO established the goals and purpose as follows:

### Goals

- Provide incentives to increase R&D spending in Pennsylvania.
- Attract new research and development firms to the Commonwealth.
- Support the growth and expansion of technology intensive industries.
- Support technology clusters and economic agglomeration effects.

### Purpose

- Expand economic activity (e.g., spending and sales) of R&D intensive sectors.
- Expand employment in R&D intensive sectors that pay above-average wages.
- Increase entrepreneurial activity as evidenced by the number of small, start-up firms that bring new products or services to market.

Based on the data and studies included in this review, the RDTC has partially achieved these goals, but it is unclear whether that has translated to the purpose and intent of the tax credit. The employment and spending data suggest that Pennsylvania has lost ground compared to national trends. However, the micro tax credit data show that firms that claim the tax credit on a very regular basis use it to offset most of their CNIT liability. Large, multistate firms that claim the tax credit nearly every year may be more sensitive to effective CNIT rates, and the RDTC can be an effective mechanism to reduce tax liability for firms in targeted economic subsectors.



# Appendix

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## Tax Credit Review Mandate

Act 48 of 2017 is the Performance-Based Budgeting and Tax Credit Efficiency Act. The act requires the Independent Fiscal Office (IFO) to review tax credits based on a five-year schedule determined jointly by the Secretary of the Budget and the Director of the IFO. The act specifies that the schedule must ensure that tax credits are subject to a review by the IFO at least once every five years. The IFO will submit reviews to the Performance-Based Budgeting (PBB) Board and the Chairs of the House and Senate Finance Committees and make the report available to the public through its website.

The act specifies that reviews shall contain the following content:

- The purpose for which the tax credit was created.
- Whether that tax credit is accomplishing the tax credit's legislative intent.
- Whether the tax credit could be more efficiently implemented through alternative methods.
- Any alternative methods which will make the tax credit more efficient if necessary.
- The costs of providing the tax credit, including the administrative costs to the Commonwealth and local government entities within this Commonwealth.

The act also specifies that the IFO shall develop a tax credit plan for all tax credits subject to a review. The plans should include performance measures, and where applicable, the measures should reflect outcome-based measures (including efficiency measures), measures of status improvements of recipient populations, and economic outcomes or performance benchmarks against similar State programs or similar programs of other states or jurisdictions.

## Overview of the Recent Grand Jury Report

On August 26, 2019, the Dauphin County Court of Common Pleas accepted Investigating Grand Jury Report No. 2 on a fraudulent scheme to obtain state tax credits. The scheme involved \$10.6 million in Pennsylvania Keystone Innovation Zone (KIZ) and Research and Development Tax Credit (RDTC) awards over a six-year period. Before the scheme was discovered, \$6.4 million of the fraudulent tax credits were sold for cash. The Grand Jury report provided detailed information on the scheme and made six recommendations to reduce future fraud in the KIZ and RDTC programs. The recommendations can be summarized as follows:

- Require an audit of applications by an independent certified public accountant.
- Allow more time for a thorough application review process.
- Tax brokers that facilitate the sale of tax credits should receive training, be licensed and be required to report suspicious activity.
- Local KIZ coordinators should be properly trained and required to make unscheduled site visits.
- Verify applications through in-person interviews, photographic submissions, receipts and other financial records.
- Awardees should be required to provide an annual breakdown of how the tax credits were used, or if sold, how the proceeds from the sale were utilized.

The first three Grand Jury recommendations would require statutory changes to implement. Small businesses (particularly young KIZ firms) may find the audit requirement costly and burdensome if they are not otherwise required to produce audited financial statements.

The last two Grand Jury recommendations may prove difficult to implement in practice. First, it is unlikely that DOR or DCED possess the resources necessary to conduct in-person interviews for every applicant for the KIZ and RDTC or to review all of the suggested supporting documentation, particularly under the current timeline. Second, it is unclear how an awardee would document the use of proceeds from the sale of a credit. Savings from the tax credit or proceeds from a sale cannot be distinguished from other monies available for spending within the business.

In response to the fraud and the subsequent Grand Jury report, DCED implemented, or is in the process of implementing, the following protocols:

- Mandated annual site visits by the local KIZ coordinators.
- Mandated state tax compliance checks for KIZ firms to verify complete and timely state tax filings and no outstanding state tax liabilities.
- Development of a standardized Statement of Work for KIZ coordinators which establishes best practices and procedures for the responsible administration of the KIZ Tax Credit.
- Creation of a database to monitor KIZ applicants suspected of fraud or other questionable activity concerning tax credits.
- Cross-training of DCED personnel to increase efficiency in the review of KIZ applications and to increase the breadth and depth of KIZ knowledge among DCED personnel.

DOR has implemented, or is in the process of implementing, the following changes:

- Mandated electronic filing of RDTC applications to facilitate DOR's review and analysis.
- Implementation of a risk-based review process that identifies RDTC applications that require additional examination and documentation.
- Creation of a database to monitor firms suspected of fraudulent or questionable RDTC sales.
- Additional training for staff and updated protocols to improve interactions with tax credit applicants.
- Reorganization of DOR staff, which will help create a standardized training plan that provides employees with education on fraud prevention.
- Implementation of a new electronic filing system for all taxes that will integrate many of DOR's old systems into a single system. The new system will provide DOR with a consolidated view of each taxpayer's account, which lead to an improved starting point to detect fraud.
- DOR will utilize the Fraud Detection and Analysis Unit's resources to examine potential cases of fraud in future tax credit applications that are received by the department.

## Performance-Based Budgeting and Tax Credit Review Schedule

Performance-Based Budgets						
Year						
1	Corrections	Board of Probation and Parole	PA Commission on Crime & Delinquency	Juvenile Court Judges' Commission	Banking and Securities	General Services
2	Economic & Community Development	Human Services – Part 1	Health	Environmental Protection	PA Emergency Management Agency	State
3	PennDOT	Human Services – Part 2	State Police	Military & Veterans Affairs		
4	Education	Human Services – Part 3	Aging	PA Historical & Museum Commission	Agriculture	Labor and Industry
5	Drug and Alcohol Programs	Insurance	Revenue	Executive Offices	Environmental Hearing Board	Conservation and Natural Resources
Tax Credits						
Year						
1	Film Production	New Jobs	Historic Preservation Incentive			
2	Research and Development	Keystone Innovation Zones	Mobile Telecom and Broadband	Organ and Bone Marrow		
3	Neighborhood Assistance	Resource Enhancement and Protections (REAP)	Entertainment & Economic Enhancement	Video Game Production	Keystone Special Development Zones	
4	Educational Tax Credits	Coal Refuse and Reclamation	Mixed Use	Community-Based Services		
5	Resource Manufacturing	Brewers'	Computer Data Center	Manufacturing and Investment	Waterfront Development	Rural Jobs and Investment

 Independent Fiscal Office

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## Stakeholder Feedback



3815 West Chester Pike  
Newtown Square, PA 19073  
610.455.4255

September 30, 2019

Stacey Knavel  
Independent Fiscal Office  
State of Pennsylvania  
2<sup>nd</sup> Floor Rachel Carson State Office Bldg  
400 Market Street  
Harrisburg, PA 17105

Dear Stacey,

Archimedic has leveraged the Pennsylvania R&D tax credit over the last several years. This tax credit has enabled Archimedic to reinvest profits in additional Pennsylvania based R&D jobs.

Archimedic is a medical device developer with offices in Newtown Square, PA and Waltham, MA. We work with innovators from academic, startups, and established companies to advance innovations from the lab to the market. Our firm specializes in the design of surgical instrumentation, drug delivery devices, and diagnostic systems. We are a service-based firm that is engaged by clients to accelerate time to market, address critical technical and business risks, and ensure a quality-based approach that meets regulatory requirements.

We intend to continue growing our base of engineering personnel, and the Pennsylvania R&D tax credit is helpful in this goal. We fully support the expansion of the Pennsylvania R&D tax credit. Thank you for your time and the opportunity to share our experiences regarding the credit.

Sincerely,

A handwritten signature in blue ink that reads "Eric Sugalski".

Eric Sugalski  
President & CEO

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Boston  
Philadelphia



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October 30, 2019

Matthew Knittel  
Director  
Independent Fiscal Office  
2nd Floor Rachel Carson State Office Building  
400 Market Street  
Harrisburg, PA 17105

Dear Mr. Knittel;

On behalf of the members of Life Sciences Pennsylvania, I am writing to express support of the Pennsylvania Research and Development Tax Credit Program and outline some of the benefits it has provided the life sciences industry.

Pennsylvania is home to more than 2,840 life sciences establishments that generate \$88.8 billion in annual economic impact and directly employ 112,000 individuals. Since 2008, 727 new research and development-based companies have formed; however, a significant portion of those life sciences companies employ fewer than 10 people. This start-up community is exciting, as these entities work to develop novel therapies and technologies for patients, but it is also very fragile.

The average length of time from discovery of a new medicine to Food and Drug Administration (FDA)-approval is 10-12 years – six to seven of which are spent in clinical trial phases – and will cost on average more than \$2 billion. Furthermore, 90% of new drug applications filed with the FDA fail in the development process. Clearly, it is a long, resource-intensive path for patients to gain access to new, innovative treatments. The Research and Development Tax Credit Program provides critical, much-needed support for companies to reach important milestones in that process and rewards their efforts for doing the life-changing, innovative work they are conducting in the Commonwealth of Pennsylvania.

The Research and Development Tax Credit Program has only been able to provide tax credits to 41 percent of the applicants since its beginning in 1997, we advocate the cap be raised to \$125 million to accommodate many of the companies that apply.

Life Sciences Pennsylvania strongly endorses the Research and Development Tax Credit Program. In 2018, 83 member companies utilized \$16.8 million to sustain their important work. We know the value this program brings to our member companies and wholeheartedly support its continued utilization to help patients, incentivize innovation and bolster the Commonwealth's economy.

Sincerely,

Christopher P. Molineaux  
President & Chief Executive Officer

WWW.LIFESCIENCESPA.ORG



Nabriva Therapeutics US, Inc.  
1000 Cornerstone Drive, Suite 400  
King of Prussia, PA 19406  
United States

October 4, 2019

Stacey J. Knavel  
Principal Revenue Analyst  
Independent Fiscal Office  
2nd Floor Rachel Carson Building  
400 Market Street  
Harrisburg, PA 17121

Re: Research and Development Tax Credit

Dear Ms. Knavel:

In 2014, Nabriva – then an Austrian domiciled company - made an important decision to locate its U.S. operations in suburban Philadelphia. The Company was poised to begin late state clinical trials on its lead antibiotic lefamulin, for the treatment of Community Acquired Bacterial Pneumonia, or CABP in adults. The Board of Directors chose King of Prussia given the expert clinical development, regulatory, manufacturing and commercial talent in the general vicinity. A favorable business and tax environment also contributed to this decision.

Since then, Nabriva has invested tens of millions of dollars to complete two successful phase three clinical trials and to file two New Drug Applications with the FDA. In August 2019, the FDA approved lefamulin (brand name XENLETA) in both IV and oral formulations – the first new IV and oral antibiotic with a novel mechanism of action approved in nearly two decades. The Research and Development Tax Credits played a meaningful role in helping to bring these important new treatment options to patients and physicians as Nabriva is contributing to the fight against the growing threat of antimicrobial resistance.

Sincerely,

Gary Sender  
Chief Financial Officer



