



Iowa Department of
REVENUE

**Research Activities Tax Credit
Tax Credits Program Evaluation Study
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**By
Anthony G. Girardi, PhD**

**Tax Research and Program Analysis Section
Iowa Department of Revenue**

Preface

Iowa Code Section 2.48 directs the Legislative Tax Expenditure Committee to review all tax expenditures with assistance from the Department of Revenue. This law also provides a schedule for such reviews and requires a review in 2016 of the Research Activities Tax Credit. In addition, the Department was directed to assist the legislature by performing periodic economic studies of tax credit programs. This is the third evaluation study of the Research Activities Tax Credit expenditure, with prior evaluation studies completed in 2008 and 2011.

As part of the evaluation, Angela Gullickson and Amy Rehder Harris reviewed this report. In addition, an advisory panel was convened to provide input and advice on the study's scope and analysis.

Liesl Eathington	Iowa State University
Mike Ralston	Iowa Association of Business and Industry
John Solow	The University of Iowa
Paul Stueckrad	Iowa Economic Development Authority

The author wishes to thank the members of the panel and other reviewers. The assistance of an advisory panel implies no responsibility on their part for the content and conclusions of the evaluation study.

This study and other evaluations of Iowa tax credits can be found on the [evaluation study web page](#) on the Iowa Department of Revenue website.

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Executive Summary

The Iowa Research Activities Tax Credit (RAC) is available for incremental increases in qualified expenditures associated with research conducted in Iowa. The RAC can be calculated in one of two ways, termed the Regular Method and the Alternative Simplified method. These methods are based on rules governing the federal research and experimentation tax credit. The RAC can be applied against corporation income tax, individual income tax, and fiduciary tax.

In addition to the automatic RAC, which can be claimed by any qualified taxpayer, the Supplemental Research Activities Tax Credit (SRAC) is available for businesses who receive an economic development award under the High Quality Jobs Program administered by the Iowa Economic Development Authority.

The purpose of this evaluation study is to analyze tax data and other pertinent information in order to assess the RAC in terms of its utilization and economic impact.

The major findings of the study are these:

Tax Credits for Research Activities across the United States

- Since 1981, the federal government has offered a credit for research and development (R&D) equal to 20 percent of incremental expenditures. Iowa was among the first states to adopt an R&D tax credit.
- As of 2016, 36 states, including Iowa, offer a tax credit for research. Among them are three of the six states that border Iowa; these are Minnesota, Nebraska, and Wisconsin.
- Under the most typical format for state R&D credits, tax credit amounts are based on incremental growth in research expenditures conducted within that state. Tax credits in at least seven states are either limited to or offer preferences for research in certain industries and tax credits in seven states offer preferences for small businesses.
- Among the 33 states in which the research tax credit is calculated as a percentage of the incremental increase in research expenditures, including five states whose statutory rate relates to the federal tax credit, the state tax credit rate for qualified research expenditures varies from a low of 3 percent in Colorado to a high of 20 percent in Hawaii. Arkansas offers a 33 percent rate for a limited amount of qualifying expenditures. The Iowa tax credit rate under the regular calculation is 6.5 percent.
- Aside from differences in rates, states provide various limits on their tax credits. These include percentage caps on tax liability and other limits imposed at the taxpayer level. Statewide program caps vary from \$2 million in New Hampshire to,

by far the largest, \$250 million in New York. Altogether, sixteen states impose some kind of limit on their R&D tax credits beyond the application of statutory rates.

- Iowa is one of eight states whose R&D tax credit is broadly refundable. Another four states offer more limited refundability. Among states without refundability or with only limited refundability, unused R&D tax credits may be carried forward from a minimum of three years to up 99 years in two states. In one state, there is no limit on the carryforward period.

Literature Review

- There is an extensive body of literature on the impact of research tax credits. This includes a number of studies seeking to assess the impacts of state incentives for research and development. These studies typically concern the impact of state-level incentives on various economic metrics such as migration patterns by research scientists or the degree to which variation in R&D tax credit rates contribute to variation in levels of private R&D among states. Although, taken together, the findings of such studies are mixed, they suggest that the impact of R&D tax credits can be very specific to certain sectors.
- A number of studies have assessed the impact of the federal R&D tax credit. One early study identifies the two key questions around federal support for R&D as, one, estimating the impact of incentives on costs and, two, estimating the price elasticity of R&D.
- The research on federal and state tax incentives for R&D is principally concerned with the extent to which such incentives stimulate research spending and more general economic growth. Work on the federal R&D tax credit, in particular, has sought to calculate its impact on research costs in relation to the price elasticity of R&D. Studies generally find that the federal tax credit increases R&D expenditures.

Research Activities Tax Credit Awards and Claims

- The 510 businesses conducting qualified research in Iowa during tax year 2013 reported \$1.8 billion of research in the state. So far in tax year 2014, data for which is incomplete, 494 businesses reported \$1.8 billion of research.
- RAC recipients report expenditures divided into four categories: wages, supplies, rental or lease of personal property such as computers, and contract expenditures. In general, two-thirds of research expenditures are associated with wages. Supplies account for approximately 23 percent of expenditures. Contract expenditures account for most of the remainder; expenditures for the lease of personal property are negligible.

- Based on their qualified research expenditures in tax year 2013, businesses using the regular method of calculating the RAC earned \$26.5 million in both automatic and Supplemental credits. This equates to 3.4 cents per dollar of total Iowa research. For businesses using the Alternative Simplified method earned \$31.5 million. This equates to 3.1 cents per total Iowa research dollar in 2013.
- Roughly half of businesses earning RAC are pass-through entities with claim made by shareholders on individual income tax returns. However, claims against corporation income tax account for the 87.5 percent of claimed RAC amounts.
- In tax year 2013, 82.9 percent of RAC credits claimed by corporation taxpayers were paid as refunds; 43.1 percent of RAC credits claimed by individual taxpayers were paid as refunds.

Evaluation of the Research Activities Credit

- Based on analysis of a subset of ASC credits between tax years 2010 and 2014, it is estimated that the tax credit received by all firms using the ASC during these years was 24 percent higher than what these firms would have received under the regular method, which equates to \$24.5 million in additional RAC claims.
- For many credits earned during the period, the reverse is true. The estimated value of the RAC using the regular method was higher for 36 percent of firms that used the ASC; for half of such firms, the difference between the RAC actually received under the ASC and the calculated value of the RAC using the regular method ranges was below \$3,200.
- Given the differing tax credit rates applicable to the two methods of calculating the RAC, the question arises whether one or the other method is associated with greater rates of growth in qualified research expenditures. An examination of the rates of compound annual growth suggests there is very little difference among firms regardless of the method used to calculate the RAC.
- Since fiscal year 2011, the tax credit rate for the Supplemental RAC varies based on whether the recipient's gross revenues are more than or less than \$20 million. Whereas for contracts signed prior to July 1, 2010 the Supplemental RAC equaled up to the RAC for all Supplemental RAC recipients, for contracts signed since that date, supplemental credits for recipients with gross revenues of less than \$20 million exceed the automatic credit; supplemental credits for recipients with gross revenues of more than \$20 million are less than one-half of the automatic credit. An analysis of Supplemental RAC awardees suggests that changes made in 2011 to programs associated with Supplemental RAC tax credits increased participation by smaller companies. However, on balance, the available data is too preliminary to fully

assess the impact of these program changes. Analysis in future years will shed further light on this matter.

- Relying on estimates of the price elasticity of research spending available from the academic literature, an estimate of the marginal impact of the RAC on research expenditures in Iowa is completed. This is not a measurement of what research would be in Iowa if the RAC did not exist, rather it is an estimate that takes as a given that all businesses doing research in Iowa have already decided to do research in the state and the choice that is measured is how much research expenditures to conduct in Iowa under the marginal change in the “price of research” resulting from the RAC. This analysis estimates that tax credit recipients expended approximately \$1.68 on qualified research per tax credit dollar for the years 2010 through 2014. That is, each dollar foregone as tax revenue by the State during that period has resulted in \$1.68 being spent on qualified research conducted in Iowa. This estimate assumes that R&D spending is sensitive to costs such that a 1 percent reduction in the cost of research leads to a 1.5 percent increase in R&D spending.
- Under alternative assumptions regarding this elasticity, estimates of the impact of the RAC on marginal R&D spending will vary. In total, taxpayers earned RAC amounting to \$230.1 million during tax years 2010 through 2014. On the basis of these alternative assumptions regarding the price elasticity of R&D, it is estimated that the RAC has induced marginal R&D spending of between \$258.0 million and \$516.0 million during this period. This impact equates to between 3 percent and 6 percent of total R&D spending qualified research expenditures during tax years 2010 through 2014 as the marginal impact of the lower price of research as a result of the RAC.

I. Introduction

The Iowa Research Activities Tax Credit (RAC) is available for incremental increases in qualified expenditures associated with research conducted in Iowa. Similar to tax credits available in a number of other states, the RAC is based on the rules governing the federal research and experimentation tax credit. It became available in 1985, four years after the introduction of that federal tax credit. Since its initial enactment, the RAC, like the federal tax credit, has been modified and expanded on several occasions. Most notably, the Supplemental RAC became available in 1997 as an additional incentive to Iowa businesses participating in economic development programs awarded by the Iowa Economic Development Authority (EDA).

The purpose of this evaluation study is to analyze tax data and other pertinent information in order to assess the RAC in terms of its utilization and economic impact. This evaluation study concerns both the regular RAC and the Supplemental RAC. This evaluation study is the Iowa Department of Revenue's (IDR) third concerning the RAC. The first evaluation study of the RAC, published in 2008, focused on corporate credits from its inception in 1985 through the 2005 tax year. IDR's second evaluation study of the RAC was published in 2011. That study provided data on corporate and individual credits through the 2009 tax year with the help of the tax credit data collected from the IA 148 Tax Credits Schedule. The study also presented findings from a survey of businesses in Iowa about their utilization of the RAC. The present evaluation study builds on the work of the prior studies, with particular attention to the RAC since 2010.

Section II of this report provides background on the tax credit and its administration. Section III provides information about similar tax credits in other states. Section IV provides a review of existing literature concerning the impacts of the federal research tax credit and similar state incentives on research and development. Section V presents data regarding RAC claims. Section VI provides an analysis of the economic effects of the credits. The final section of this report provides a brief conclusion.

II. Background of the Research Activities Tax Credit

A. Tax Credit Description

The Iowa Research Activities Tax Credit (RAC) is a tax credit based on qualified expenditures for increasing research activities. Qualified research expenditures include costs of conducting basic research, research-related wages and supply costs for in-house research, and payments for contract research conducted in Iowa. Taxpayers can elect each year the method by which to compute the tax credit. The RAC can be calculated one of two ways based on the rules governing the federal research and experimentation tax credit. The RAC is refundable and may not be sold or traded. Tax credits earned by a pass-through entity are claimed by its shareholders based on their respective share of the entity's income. The tax credit thus applies to corporation income tax, individual income tax, and fiduciary tax. Iowa code does not specify a sunset date for the RAC.

B. Methods for Calculating the Research Activities Tax Credit

The RAC does not require any award in order for a taxpayer to claim and is thus said to be “automatic;” however, the tax credit does require that taxpayers demonstrate eligibility by providing information on the applicable tax form. For Iowa tax purposes since tax year 2010, taxpayers may elect each year whether to calculate the RAC using one of two methods. These are referred to as the regular method and the alternative simplified method (ASC). A separate tax form is applicable to each method. Between tax years 2000 and 2009, the alternative incremental method was available. Currently, the value of the RAC is calculated for each method, and form, as follows:

Regular Method (Form IA 128)

- 6.5 percent of incremental basic research in Iowa, and
- 6.5 percent of incremental qualified research expenditures apportioned to Iowa over the larger of the base period amount or 50 percent of current year research expenditures.

Alternative Simplified Method (Form IA 128S)

- 6.5 percent of incremental basic research in Iowa, and
- 4.55 percent of qualified research expenditures above 50 percent of average qualified research expenditures in Iowa over the prior three years; or,
- 1.95 percent of total qualified research expenditures in Iowa in the current year when no prior research has been conducted.

These calculation methods follow the two calculations available for the federal research and experimentation tax credit. Businesses can choose either method each tax year for Iowa, regardless of what method is used for the federal credit calculation.

C. Supplemental Research Activities Tax Credit

For businesses eligible for the RAC, a Supplemental RAC may be awarded to companies participating in the High Quality Jobs Program (HQJ) as authorized by the Iowa Economic Development Authority (EDA). Supplemental RAC amounts are awarded by application to the EDA. Whereas taxpayers earn the automatic RAC, if eligible, by providing requisite information on the applicable form along with the income tax return, the Supplemental RAC may only be reported on the return if first awarded by EDA.

Since fiscal year 2011, the tax credit rate for the Supplemental RAC varies based on whether the recipient's gross revenues are more than or less than \$20 million. Whereas for contracts signed prior to July 1, 2010 the Supplemental RAC could as much as double the RAC for all Supplemental RAC recipients, for contracts signed since that date, supplemental credits for recipients with gross revenues of \$20 million or less exceed the automatic credit; supplemental credits for recipients with gross revenues of more than \$20 million are less than one-half of the automatic credit.

As with the RAC, the Supplemental RAC may be calculated using the regular method or using the alternative simplified method, but must be calculated under the same method used for the RAC in a given tax year.

For businesses using the regular method and with annual gross revenues of \$20 million or less the amount of supplemental credit is the sum of:

- 10.0 percent of incremental basic research in Iowa, and
- 10.0 percent of incremental qualified research expenditures apportioned to Iowa over the larger of the base period amount or 50 percent of current year research expenditures.

For businesses with gross revenues exceeding \$20 million the amount of the supplemental credits is the sum of:

- 3.0 percent of incremental basic research in Iowa, and
- 3.0 percent of incremental qualified research expenditures apportioned to Iowa over the larger of the base period amount or 50 percent of current year research expenditures.

For businesses choosing to compute the credit using the alternative simplified methodology the supplemental credit percentages are 7 percent or 3 percent of qualified research expenditures incurred in Iowa for businesses with annual gross revenues of \$20 million or less; for businesses with annual gross revenues exceeding \$20 million the percentages are 2.1 percent or 0.9 percent.

D. Renewable Energy Components Research Activities Tax Credit

Since 2005, an additional RAC has been available for expenditures related to the development and deployment of innovative renewable energy generation components manufactured or assembled in Iowa. This additional tax credit is known as the Renewable Energy Components Research Activities Tax Credit. Initially capped at \$1 million, this tax credit has been capped at \$2 million since 2009. Expenditures associated with this tax credit are not eligible for the federal research tax credit. A business eligible for this credit must first receive an award under the High Quality Jobs Program by the EDA. However, since 2005, no awards have been made for this component of the tax credit.

E. Limits and Other Provisions of the RAC

The RAC can be claimed against corporation income, individual income, and fiduciary taxes. There is no limit on the RAC amount a business may claim except that the Renewable Energy Components RAC, which is granted on a first-come, first-served basis, is limited to \$2 million in aggregate.

Since fiscal year 2009, awards of the Supplemental RAC are subject to the cumulative EDA tax credit award cap. Initially set at \$185 million per fiscal year; this cap was reduced to \$120 million in 2010, then increased to \$170 million effective 2012. The cap is temporarily reduced to \$145 million for fiscal years 2017 through 2021 with \$105 million designated for HQJ.

Taxpayers making RAC or Supplemental RAC claims that total \$500,000 or more on a tax return filed after July 1, 2009, must be reported annually to the Legislature in a report completed by the IDR.¹ The report must also include total claims made during the previous calendar year and the portion of claims issued as refunds.

Businesses who have conducted eligible research expenditures must complete either the Form IA 128 or Form IA 128S to substantiate their eligibility and calculate the RAC earned. A business can change the method of Research Activities Tax Credit calculation between tax years; however, the calculation method used for a tax year cannot be changed from Form IA 128S to Form IA 128 or vice versa once the tax year has ended. If the business is a C corporation, the taxpayer must also complete the IA 148 Tax Credit Schedule and Schedule C1 to make a claim to the RAC against tax liability. If the business is a pass-through entity, the business passes through the RAC to shareholders providing information on the K-1s. Then shareholders must complete the pass-through lines on either the Form IA 128 or Form IA 128S with their claim for the Research Activities Tax Credit in addition to the IA 148 Tax Credit Schedule.

Iowa Code §15.101 makes clear that the programs it authorizes, which includes the Supplemental RAC, are intended to implement economic development policy in the state by means of a collaboration between government and the private sector. In addition, it states that economic development is an important public purpose and that both the public and private sectors have a shared interest in fostering the economic vitality of the state.

F. Federal Research and Experimentation Tax Credit

The Iowa RAC is modeled on the Research and Experimentation Tax Credit, a federal tax credit provided by section 41 of the Internal Revenue Code (IRC). Often referred to as the R&E tax credit, the credit is perhaps more widely known as the R&D tax credit in reference to the more conventional jargon of research and development, or simply the federal research tax credit. It is an income tax credit equal to 20 percent of qualified research expenditures (QREs) incurred in the United States above a base amount.² Unlike the Iowa RAC, the federal research credit is not refundable. Unused credits can be carried back one year or forward up to 20 years. But, similar to the Iowa RAC, the federal research credit is automatic, with no application or prior approval required to make a claim.

Initially enacted in 1981, the federal research tax credit was a temporary credit that had been extended 16 times until 2015, when it was made permanent by the Protecting

¹ The reporting requirement is found in Iowa Code §15.335 (9). The reports are available here: <https://tax.iowa.gov/report/Reports?combine=Research%20Activities>

² Federal tax law also allows for a full expensing of qualified research spending under Section 174 of the IRC. However, if a firm takes a deduction for research expenditures and claims the research tax credit for those same expenditures, the firm must reduce the deduction by the amount of the credit claimed.

Americans from Tax Hikes (PATH) Act. Since 1981, the credit had been available for every period but one, lapsing between July 1, 1995 and June 30, 1996.

The federal research tax credit actually incorporates three tax credits. These include a credit for basic research payments, a credit for energy research, and the main research credit. Basic research payments are amounts paid by a corporation to qualified organizations, such as universities and other research entities, for investigations into the advancement of scientific knowledge not having a specific commercial objective. Energy research is the support of otherwise qualified research by organizations that are organized and operated primarily to conduct energy-related research in the public interest.

The main research credit is provided for incremental research expenditures; that is, for increases in research expenditures above a base amount. The main research credit can be calculated using either the regular method or the alternative simplified credit (ASC), a calculation method introduced for federal tax purposes in 2007. For tax years 1996 through 2008, the alternative incremental research credit (AIRC) method was also available. Unlike the Iowa RAC, under which taxpayers may select either the regular or alternative simplified method at their own discretion, for the federal research credit, taxpayers who choose to compute their main credit using the alternative method are required to continue to use that method in future tax years unless given IRS authorization to change credit calculation methods.³

As defined by the Internal Revenue Code (IRC), and applicable to both the federal research credit and the RAC, eligible research must meet four criteria:

1. Research must qualify under IRC section 174 research expensing rules;
2. Research must be undertaken to discover information that is technological in nature;
3. The goal of research must be the development of a new or improved product, process, formula, or invention;
4. Research must constitute elements of a process of experimentation.

For in-house research, qualified research expenditures include wages and salaries for qualified research services, the cost of supplies used in conducting qualified research,

³ The federal research credit also offers the option to claim a reduced federal credit. Internal Revenue Code Section 280C(c)(1) requires taxpayers who claim the credit to reduce their deduction for research expenses by an amount equal to the credit. Under IRC Section 280C(c), taxpayers may either (1) claim a full R&E credit under Section 41 and reduce their current business expense deduction for research expenses by the credit amount, or (2) elect to reduce their R&E credit by 35 percent and claim a full deduction for research expenses. Under the second option, the 20 percent statutory credit rate effectively becomes 13 percent. In general, a corporation subject to the top corporate tax rate pays the same federal corporate tax under either option. However, taxpayers may choose to claim the reduced credit to minimize state taxes. In Iowa, federal taxable income is the starting point for calculating Iowa taxable income (Iowa Code Section 422.35). By making the federal reduced credit election, a taxpayer would reduce Iowa taxable income by the full amount of the research expenses with no impact on the Iowa Research Activities Tax Credit the taxpayer can claim. Claims to the Iowa credit do not impact the extent to which a company can deduct research expenses from Iowa taxable income.

and the rental or lease cost of personal property, such as computers, used to conduct qualified research. For contract research, research funded by the taxpayer but not conducted at the taxpayer's business, only 65 percent of amounts paid are eligible. This percentage increases to 75 percent for research performed by non-profit organizations and to 100 percent for research performed by small firms, universities, or federal laboratories. Costs associated with purchased equipment or buildings, overhead costs, and fringe benefits for employees are examples of non-eligible expenditures.

The main research credit is an incremental credit, which means that qualified research expenditures that exceed the larger of a base amount or 50 percent of current year expenditures are eligible for the credit.⁴ Under the ASC method, firms may take a credit equal to 14 percent of QREs that exceed 50 percent of average QREs of the three preceding tax years. For firms that have no QREs in any of the three previous years, the ASC is six percent of current year QREs.

III. Tax Credits for Research Activities across the United States

This section provides a review of R&D tax credits among the states with particular attention to recent changes. It must be noted at the outset there are numerous research-related tax incentives in the states and some states offer more than one kind of incentive. For example, Kentucky and New York both offer a tax credit for construction costs of research facilities and Mississippi offers a tax credit for new jobs that require research and development skills. However, of these states, only New York also offers a tax credit for more direct costs of research and development along the lines of the federal R&D credit. The analysis here is focused on such tax credits that relate to the proximate costs of conducting research.

As of 2016, 36 states, including Iowa, offer a tax credit for research (see Table 1). Among them are three of the six states that border Iowa, including Minnesota, Nebraska, and Wisconsin. Illinois, Missouri, and South Dakota do not offer R&D tax credits although both Illinois and Missouri did so formerly. Missouri's credit was allowed to expire in 2005. Illinois's was available until much more recently. Lapsing in 2011, it was subsequently extended through 2015. Outside of the region, states whose R&D tax credits have expired since the most recent Iowa RAC evaluation study was published in 2011 are Montana, Maine, North Carolina and Washington. Hawaii's expired in 2010 but was reinstated three years later.

⁴ The base amount for established firms, those firms with both business revenue and research expenditures for three or more years during the 1984 to 1988 period, is computed by multiplying average gross receipts for the four years prior to the credit claim by the fixed-base percentage. The fixed-base percentage equals total QREs for the 1984 to 1988 period divided by total gross receipts for that same period. The fixed-base percentage is capped at 16 percent. Non-established, or new, firms are assigned an initial fixed-base percentage of three percent during the first five years that the firm reports both receipts and qualified research expenditures. After five years, the percentage is gradually adjusted based on actual experience; by the eleventh year the fixed-base percentage is based on total QREs relative to total receipts in the sixth through tenth tax years. In all cases, the base amount is equal to the larger of the amount computed using one of the above methods or 50 percent of current year QREs.

A. Time Frame and New Programs

In 1981, Minnesota became the first state to enact an R&D tax credit along the lines of the federal credit. Iowa followed suit four years later, just the third state to adopt an R&D tax credit and one of eight states to adopt the tax credit in the 1980s. Since the inception of the federal credit, states' adoption of R&D tax credits has been gradual, with at least one state initiating a new R&D tax credit in 26 of the 36 years between 1981 and 2016. Since 2011, at least six states have adopted new, reinstated, or significantly expanded R&D tax credits. These include Delaware, Florida, Hawaii, Texas, Vermont, and Virginia. In addition, Oregon's tax credit, which had been scheduled to sunset, was extended through 2018.

B. Basis for State Tax Credits

Under the most typical format for state R&D credits, tax credit amounts are based on incremental growth in research expenditures conducted within that state. In 28 of the 36 states with R&D tax credits, the credit represents a percentage of incremental increases in in-state research expenditures; however, such increases are defined by each state. In another five states, the statutory rate either must be or may be applied to the amount of the federal R&D credit attributable to research conducted in the state. For most states, qualified expenditures are defined in the same way as for the federal R&D credit. However, in three states, credits can be claimed on all research expenditures rather than only incremental. Alternatively, in New Hampshire eligible expenditures include only wages paid in New Hampshire for research activities.

As noted above, there are five states whose statutory tax credit rate can represent a percentage of the federal credit. In Alaska, Nebraska, New York, and Vermont, this method of calculation is mandatory. In Delaware, it is an option; the taxpayer may compute the credit as either ten percent of incremental research expenditures or fifty percent of the apportioned federal research tax credit computed under the alternative simplified method. Among these five states, statutory rates vary from 15 percent to 50 percent of the federal rate under either the regular or the alternative simplified method, as specified. In this connection, it should be noted that for federal tax purposes taxpayers have the option to either calculate the full R&D credit to which they are entitled and reduce their research expense deduction by the credit amount or elect to reduce their federal R&D credit by 35 percent and claim a full deduction for research expenditures. Meanwhile, federal taxable income is the starting point for calculating state taxable income for many states, including Iowa. Thus, for those states in which the R&D tax credit is a percentage of the federal credit, the requirement ensures that taxpayers receive a reduced state R&D tax credit when they claim the research expense deduction for federal tax purposes.

In Michigan, Utah, and West Virginia, credit amounts either must be or may be computed as a percentage of all qualified research expenditures, rather than only expenditures that represent an incremental increase; incremental increases also factor into the credit calculation for two of these states. The North Carolina tax credit, which has expired, was also based on all qualified research expenditures. Washington

formerly presented a special case, with its tax credit amount based on the level of qualified research expenditures conducted in the state in excess of 0.92 percent of taxable income. However, Washington's tax credit expired in 2015.

Tax credits in at least seven states are either limited to or offer preferences for research in certain industries. The tax credits in Florida, Hawaii, and New York are available to research in specified strategic industries. The tax credits in Arkansas, North Dakota, and Wisconsin offer rate premiums for research in targeted subjects. Colorado requires that eligible research is conducted in an Enterprise Zone.

Tax credits in seven states offer preferences for small businesses. New Mexico's R&D tax credit is in fact limited to firms with no more than 50 employees. Other states that give preferences to small businesses are Arizona, Connecticut, Delaware, Louisiana, North Dakota, and Pennsylvania. Tax credits in Florida, Kansas, and Wisconsin are limited to C corporations.

C. Tax Rates

Statutory rates for the federal credit are 20 percent for the regular credit and 14 percent for the ASC. Among those 33 states in which the R&D tax credit can be calculated, whether wholly or in part, as a percentage of the incremental increase in research expenditures, including those five states whose statutory rate relates to the federal tax credit, the state tax credit rate for qualified research expenditures varies from a low of 3 percent to a high of 33 percent. However, a number of states offer more than one rate, with rates tiered by research expenditure levels or some other mechanism; this is the case with most states that offer the highest rates. Indeed, the highest rate, 33 percent, belongs to the tiered Arkansas R&D tax credit program; its base rate is 10 percent and the higher rate is offered only for research in specified strategic areas. More typically for states with tiered rates, rates are tiered with respect to level of research expenditures. For example, the second highest tax credit rate offered for incremental expenditures is offered by North Dakota. That state's highest rate is 25 percent but applies only to the taxpayer's first \$100,000 of qualified research expenditures. For expenditures over this threshold, since 2016, the rate is 8 percent. Maryland is a special case in that it grants a credit for 10 percent of qualified research expenditures conducted in the state that exceed the Maryland base amount and 3 percent of expenditures that fall below.

Among the state tax credit programs based on incremental research expenditures, again including those for which these rates are calculated from the federal credit, the highest rate that is applicable to all expenditures—i.e., the highest rate for a state whose program rates are not tiered—is 20 percent. This is the applicable rate for both Connecticut and Hawaii. However, Connecticut limits the tax credit amount available to a taxpayer to no more than 70 percent of tax liability. Hawaii makes no such limitation. Considering the highest rate offered for incremental expenditures in each state, the most common rate is ten percent, with eleven states offering this rate. Seven other states offer a five percent rate. Along with Iowa, only Kansas offers a regular rate of 6.5 percent. Among the states with credits based, in whole or in part, on incremental

increase in research expenditures, the average rate is 10.9 percent and the median tax credit rate is ten percent.

As noted above, the tax credit rate is applied by Michigan, Utah, and West Virginia against all qualified expenditures, not only incremental increases. The Utah R&D tax credit is earned against both incremental expenditures and all expenditures, with separate rates applying to these two categories. In West Virginia, taxpayers earn the greater of three percent of qualified research expenditures conducted in the state or ten percent of incremental expenditures over a three-year base period.

D. Caps and Other Limitations

Aside from differences in rates, states provide various limits on their tax credits. For states that do impose such limits, they might apply to the state program as a whole, to the amount of tax credits which a taxpayer may claim, or both. Connecticut's limitation of the tax credit to no more than 70 percent of tax liability is an example of a way in which states limit credit amounts. Including Connecticut, there are currently nine states that limit the tax credit in this way. Michigan and Pennsylvania limit tax credits to 75 percent of tax liability, as does Virginia for its Major R&D Expense Credit. Massachusetts imposes the same percentage limitation on credits in excess of \$25,000, as did Maine. The four other states, Florida, Georgia, Rhode Island, and South Carolina, impose a limit of 50 percent of taxpayer liability. North Carolina also had this limitation. Virginia's standard R&D tax credit is earned at a rate of 15-20 percent of the first \$300,000 of incremental qualified research expenditures and is thus limited to \$60,000. Oregon specifies a dollar limit of \$1 million in tax credits per taxpayer. Washington's now-expired tax credit had a cap of \$2 million per taxpayer.

Colorado and Kansas employ a somewhat different approach. In these two states, no more than one quarter of an allowable credit may be taken in any one tax year, with the remaining amount credited to the succeeding three years. In Florida, which also limits tax credits to 50 percent of taxpayer liability, an additional limit applies to businesses that are less than four years old; for these new businesses, the Florida tax credit is reduced by one quarter for each taxable year the business did not exist.

The foregoing limitations apply at the taxpayer level. Seven states also cap their R&D tax credits on a statewide basis. These statewide program caps vary from \$2 million in New Hampshire to, by far the largest, \$250 million in New York. The state with the next highest cap is Pennsylvania, whose cap is \$55 million, of which \$11 million is reserved for small businesses. For its bifurcated program, Virginia provides two caps, \$7 million for its standard credit and \$20 million for its Major R&D Expense Credit. The statewide cap for the Florida tax credit was set to \$23 million for 2016 only, up from \$9 million in 2015 and returning to this level in 2017. The caps in Florida and New York are applied on a first-come, first-served basis. Arizona's cap of \$5 million applies to the refundable portion of its program. The caps in the other four states are prorated across tax credit recipients.

Altogether, sixteen states impose some kind of limit on their R&D tax credits beyond the application of statutory rates, whether at the statewide or taxpayer level or both. Iowa is among the other 20 states that do not.

E. Refundability

In the event that tax credits earned exceed tax liability, states make various provisions for their refundability or carryforward. Iowa is one of twelve states whose R&D tax credit is at least partially refundable. However, this number includes four states whose tax credits are refundable to qualified small businesses only. These four are Arizona, Connecticut, Maryland, and West Virginia.

Along with Iowa, the other states whose tax credits are more broadly refundable are Delaware, Hawaii, Louisiana, Massachusetts, Nebraska, New York, and Virginia. Beginning in tax year 2016, Virginia's standard 15 percent R&D tax credit on the first \$300,000 of research, which has a statewide cap of \$7 million, is refundable; tax credits awarded under Virginia's Major R&D Expense Credit program, which is capped at \$20 million, are not refundable. Delaware's 10 percent R&D tax credit is refundable effective in tax year 2017. Refundability of the Massachusetts credit is somewhat restricted. The 10 percent Massachusetts tax credit may be used towards the first \$25,000 of tax liability and 75 percent of any liability over that amount; after applying these rules, Massachusetts taxpayers may elect a refund of 90 percent of any balance of the tax credit. Of the three states that border Iowa and have an R&D tax credit, only Nebraska offers refundability. This signifies a fairly recent change, as Minnesota's R&D tax had been refundable for tax years 2010 through 2012.

Among states without refundability or with only limited refundability, unused R&D tax credits may be carried forward. The carryforward period is unlimited in Colorado, and virtually so in Kansas and New Mexico where unused tax credits may be carried forward 99 years. The most common carryforward period is 15 years, the length allowed by seven states. Six states have ten-year carryforward periods. The median length of carryforward is ten years. The shortest length of carryforward is that of Arkansas, which allows unused credits to be carried forward only three years.

F. Recent Changes

The R&D tax credit programs in several states have undergone recent changes including Delaware, Hawaii, Minnesota, New Hampshire, Virginia, and Washington. Among the broadest expansions to a state's R&D tax credit were those to Delaware's program. Effective with the 2017 tax year, Delaware removed both a statewide \$5 million program cap as well as provisions limiting credits to no more than 50 percent of tax liability. In addition, Delaware made its R&D tax credit refundable. Virginia also expanded its R&D tax credit and extended its sunset date through 2021. Among the changes to the tax credit, Virginia increased its program cap from \$6 million to \$7 million and increased the limit on the amount of tax credits a taxpayer may earn from \$46,800 to \$60,000. In addition, for companies with R&D expenditures greater than \$5 million, Virginia created the Major R&D Expense Credit, described above. Effective in 2017, New Hampshire increased the cap on its credit from \$2 million to \$7 million. Moving in

the opposite direction, Minnesota made its tax credit nonrefundable effective in 2013 after three years as a refundable tax credit. R&D tax credits in several other states have recently expired including Illinois and North Carolina.

G. Summary of Competitiveness of the Iowa RAC

Since the inception of the federal R&D tax credit in 1981, the landscape of tax credits for research in the states has undergone continuous evolution. Over the last 35 years, such tax credits have been available in at least 40 of the states. These state tax credits have undergone countless modifications over the years; while some have been allowed to sunset or have otherwise been repealed, many have been expanded. Although this report does not offer a meta-analysis of tax credit parameters nationwide, the trend towards program expansion among many states seems to have been largely offset by retrenchment elsewhere. In 2016, the number of states offering R&D tax credits remains equal to what it was five years earlier; as several states' tax credits have been added, others have expired.

As noted above, Iowa was among the first states to adopt an R&D tax credit. From the outset, Iowa's RAC was among the most remunerative available across the country due to its being fully refundable. In 2011, Iowa was one of only six states to offer a refundable research tax credit; in 2015, while twelve states offer some refundability, refundability is broadly available in only eight states and two of these eight cap their programs at some level. Of the other seven states, Delaware, Hawaii, Nebraska, Louisiana, Massachusetts, New York and Virginia, only Nebraska is a regional competitor. Most of the others are located on the eastern seaboard and all are coastal states.

Vis à vis its contiguous neighbors, in particular, Iowa's R&D tax credit stands out. Among the three bordering states that currently offer an R&D tax credit, only Nebraska's is refundable. Although Iowa's 6.5 percent tax credit rate falls below the most common rate of 10 percent and below the overall median rate, among its neighbors, Iowa offers the highest general tax credit rate. Nebraska offers 15 percent of the federal credit, which equates to three percent of incremental research expenditures. Nebraska's credit, however, is in general allowed for only twenty consecutive years; for tax credits based on the higher rate it offers for research conducted at state colleges and universities, this limit is reduced to five years. Minnesota offers a rate of 10 percent, but caps this rate for expenditures up to \$2 million; its rate of 2.5 percent applies to expenditures above this level. Wisconsin's standard tax credit rate is 5.75 percent although a higher rate is available for expenditures associated with research on internal combustion engines and certain energy efficient products.

IV. Literature Review

A. Discussion of the Literature Review in the 2011 RAC Evaluation Study

In their 2011 evaluation study of the Iowa Research Activities Tax Credit, Gullickson, Harris, and Jin provided a review of the related research literature published up to that

time. In describing the state of the knowledge base, their analysis identified two central concerns; namely, the impact of tax credits on research spending by firms and the relationship between research and economic growth. While the former matter relates to the effectiveness of tax-based incentives for research, the second concerns the rationale for why states invest in research at all.

Work by Florida (2002 and 2014) provides a useful jumping off point for discussion of economic growth and the public sector's ability to effect it in positive ways. While Florida's work focuses primarily on the role of cities, it has been influential in setting the terms for contemporary discussion on the topic. At its most fundamental, Florida argues, lasting economic growth arises from improvements in productivity. In this view, the essential purpose of public efforts to promote economic development is, or ought to be, to effectively increase productivity. As a consequence, because they seek to increase productivity, incentives aimed at promoting research and development have, whether implicitly or explicitly, the outcome of promoting economic growth. Among the implications of this insight are that the meaningful effects of public incentives for research and development, are comparatively small, indirect, and difficult to measure.

There is an extensive body of literature on the impact of research tax credits, much of it previously reviewed in connection with the Iowa Research Activities Tax Credit by Gullickson *et al.* in 2011. The examination of literature that follows seeks to build on that earlier review, with particular attention to research that has been published in the interim.

B. Impacts of State Incentives for Research and Development

In a 2013 study, Morreti and Wilson addressed the impact of state-level tax incentives on the relocation behavior of biotechnology scientists. Using firm-level data, their research assessed the degree to which state tax rates and state tax incentives motivated highly productive researchers, whom the authors termed "star scientists," to relocate to a state. Morreti and Wilson found that state R&D tax incentives, by lowering the cost of capital, raised the number of star scientists in a state by 22 percent. In addition, the authors identified large effects on local employment owing to a large multiplier effect of biotech employment.

Quite in contrast to the findings described by Moretti and Wilson, Mazerov (2014) found that "Differences in tax levels among states have little to no effect on whether and where people move" (p. 1). Mazerov was not focused on the relocation patterns of so-called star scientists in biotechnology, but rather migration patterns more generally. Nevertheless, Mazerov offers evidence on the limitations of state tax policy in attracting residents and economic activity.

Morreti and Wilson (2013) also found "mixed evidence of a displacement effect on states that are geographically close, or states that are economically close as measured by migration flows" (p. 20). This is relevant since any analysis of state-level incentives is ultimately concerned with the extent to which they act as inducements vis à vis other states' tax regimes. However, little explicit attention has been given to the extent to

which incentives draw investment from other states. Chirinko and Wilson (2008) did take up the question in an analysis of cross-jurisdictional differences in state tax credits. Though not exclusively concerned with R&D tax credits, these authors found that capital formation in a given state is substantially increased by reductions in the price of capital engendered by tax incentives. However, they likewise found that such capital formation was substantially decreased by similar price reductions in competitor states.

In an analysis of state R&D tax credits, Wilson (2009) also addressed the zero-sum nature of state incentives. That research was particularly concerned with the extent to which state tax credits are capable of functioning as incentives given their proliferation. Wilson found that tax incentives were effective in increasing in-state R&D, but that nearly all of this increase was due to R&D being attracted from other states and not because of a net increase in research nationally.

Wheeler and Wallace (2007) estimated the comparative impact of state R&D tax credit rates on R&D. Their analysis employed an approach that, while fairly common in the literature, seems not to have been used previously to analyze R&D tax credits. These authors used regression analysis to identify the degree to which variation in R&D tax credit rates contribute to variation in levels of private R&D among states, controlling for such factors as federally funded R&D, gross state product, and measures of educational attainment. They posit that the federal R&D tax credit would have no effect on variation in R&D among states because it is applied uniformly to all U.S. firms. Wheeler and Wallace found that state R&D tax credits seem not to play an important role in promoting R&D in the states.

Wu (2008) likewise examined the effects of state R&D tax credits using regression analysis. The analysis considered tax credits' impact on the size of the high technology business sectors between states. Somewhat in contrast to Wheeler and Wallace, Wu found that state R&D tax credits did have an impact on research activity, albeit with respect to different measures. In particular, Wu found state tax credits to significantly affect both the absolute number of high-technology establishments in a state as well as this number relative to state population.

The respective analyses by Wheeler and Wallace (2007) and by Wu (2009) not only employ different metrics for R&D activity but also control for slightly different sets of associated factors. While both studies attempted to control for human capital and government-funded R&D, Wu also includes measures of corporate income tax rates. There is, then, no reason to believe that the findings of both these studies cannot be correct. Together, their findings suggest that the impact of R&D tax credits are, or at least can be, specific to certain sectors. This is consistent with assertions by Hemphill (2009) who noted that most of the tax credits are indeed claimed in a small number of industries.

C. Impacts of the Federal Research Tax Credit

Whereas a number of studies have addressed questions around state tax-based and other financial incentives for R&D, others have assessed the impact of the federal R&D

tax credit. A 2007 Congressional Budget Office (CBO) report identifies the two key questions around federal support for R&D as, one, estimating the impact of incentives on costs and, two, estimating the price elasticity of R&D. As the CBO report notes, together, these two estimates can be used to understand the extent to which a given incentive, whose cost is known, stimulates R&D. Citing, in particular, research by Hall and Van Reenen (2000) and Bloom, Griffith, and Van Reenen (2002), the CBO noted that many studies have found that each dollar of federal revenue foregone as a result of tax credits results in an additional dollar of private expenditure on R&D. Summarizing, the report noted that studies generally find that the federal tax credit increases R&D expenditures.

Nonetheless, the same CBO report acknowledged that its conclusions are by no means a consensus view. Hemphill (2009) concurred that the foregoing constitute the basic questions of research on the topic. However, in a review of the literature, Hemphill found that analysis on the federal R&D tax credit found an overall negligible effect on industry R&D investment. Hemphill cites eleven studies published between 1983 and 1997. The studies that were concerned with the effect of the federal R&D tax credit in its earliest years indicated an approximately one-to-one impact of each tax credit dollar on research spending, while those studies concerned with a longer time period found a somewhat greater impact, with a two-to-one dollar effect on R&D spending. It is worth reiterating that while the CBO and Hemphill cite a number of the same studies, they disagree with respect to their implications, the CBO suggesting that the two-to-one return estimated on tax credit investment is something more than negligible.

In still another analysis, Carroll, Prante, and Quek (2011), acknowledge that estimates of the effects of the federal R&D tax credit vary, but ultimately concluded that it has contributed to the economy in terms of additional private research spending. Additionally, Carroll *et al.*, found that the federal R&D tax credit positively affects employment and wages, both nationally and at the state level. In so doing, Carroll *et al.*, assert that, because some of the benefits of the federal R&D tax credit accrue to the broader economy, they are not necessarily fully recognized by individual firms, thus justifying some public subsidy.

As described in Section III, many states' R&D tax credits, including Iowa's, are a percentage applied to the same measure of R&D as the federal tax credit. It must be noted that, since many of the earlier studies discussed here were published, both the federal R&D tax credit program itself and those in many states have been modified. Thus, while they are pertinent to the present evaluation study, the analyses discussed above must be seen as relating to a set of programs that have continued to evolve since the analyses were initially conducted. Indeed, the federal R&D tax credit has undergone modifications at various points since its inception. Three notable, somewhat recent studies have sought to exploit certain of these changes for research purposes, utilizing program changes as treatment effects in quasi-experimental research designs. These include work by Gupta, Hwang, and Schmidt (2011), Rao (2016), and Finley, Lusch, and Cook (2015).

Gupta *et al.* (2011) focused on 1989 as a transition point in order to examine the tax credit's incentive effects. A law change in that year was among the most significant in the history of the program, redefining the base amount from which incremental expenditures are calculated. These authors estimated the change's impact on firm eligibility and R&D intensity, a credit parameter equal to the ratio of R&D expenditures to sales. They found that eligibility declined overall but increased for firms in high-technology industries. Among firms in these sectors, the authors found that median R&D spending intensity increased by 15.9 percent in the five years after the law change. Even more pertinent to the present study, Gupta *et al.* calculated the quantity of research induced by the tax credit. As noted by Gullickson *et al.* and discussed above in connection with reports by the CBO, Hemphill, and others, this question is of central concern both to policymakers as well as to researchers of the subject. Gupta and colleagues estimated that given the existence of the tax credit, the reduction in the marginal cost of research as a result of the tax credit induced \$2.08 of research spending per each \$1 in tax credits claimed during the period immediately following the program change.

Rao (2016) employed IRS data concerning each of the five tax years between 1981 and 1991 that immediately followed a tax credit program change. Like Gupta *et al.*, Rao made use of these program changes for analytical purposes; actual tax factors for a given year were compared to synthetic factors derived from the policy obtaining in the prior year. Rao estimated that a ten percent reduction in the user cost of R&D led firms to increase research intensity by 19.8 percent, on average, in the short-run and, after accounting for adjustment costs, by a somewhat greater percentage over time. These findings equate to an elasticity of -1.98. That is, a 1 percent decrease in the unit price of research results in a 1.98 percent increase in the amount of research purchased by companies.

The 2015 study by Finley *et al.* evaluated the impact of the enactment of the Alternative Simplified Credit, which, for the federal R&D tax credit, occurred in 2007. Finley *et al.* focused on R&D spending rather than on R&D intensity. R&D intensity was appropriate to the research by Gupta *et al.* because, under the regular method of calculation, the base used to determine the tax credit reflects the ratio of research to sales. However, for Finley *et al.*, R&D spending was the more suitable variable of interest because, under the ASC, the base amount is derived directly from R&D spending; or more exactly, current-year R&D spending compared to 50 percent of spending during the prior three years. Finley *et al.* found the addition of the ASC to have resulted in a large increase in tax credit eligibility. In addition, they calculated the impact of the ASC on R&D, estimating that the ASC induced \$2.26 of research spending per \$1 in tax credit claimed. This estimate is very consistent with findings by Gupta *et al.* and Rao.

Noting that the ASC did not supplant but rather augmented the existing tax credit program as an option to the regular RAC, Finley *et al.* compared the effects of the respective calculation methods. Specifically, they examined whether firms utilizing the ASC increased R&D spending relative to firms using the regular method. They found that firms using the regular method decreased spending after the implementation of the

ASC; meanwhile firms electing the ASC increased R&D spending. Finley *et al.* conclude that the ASC was effective as an incentive for additional R&D investment.

D. Summary and Applications

The research on federal and state tax incentives for R&D is principally concerned with the extent to which such incentives stimulate research spending and more general economic growth. Work on the federal R&D tax credit, in particular, has sought to calculate its impact on research costs in relation to the price elasticity of R&D. Published estimates of this metric can vary on the basis of industry and other factors, but extend roughly from -1.0 to -2.0 for the federal R&D tax credit. Among the more recent studies cited above, estimates generally cluster in the top half of this range of magnitude, or from -1.5 to -2.0. These findings are essential to the methodology employed in the present evaluation study to address certain questions. In particular, this study uses published estimates of price elasticity to calculate the amount of additional research spending stimulated by the Iowa RAC on the margin.

In a 2009 report, the GAO used a similar approach to evaluate the incentive effects and revenue costs associated with various iterations of the federal R&D tax credit. Because the GAO audits the effectiveness of federal government spending, this approach was highly suited to its purposes. To compare various historical modifications to the tax credit, the GAO compared the marginal effective rate (MER) associated with each design, noting that this metric quantifies its incentive effect on marginal spending. The GAO methodology to calculate what it explicitly terms the “bang-per-buck” of the credit is adapted for the Iowa RAC in Section VI of the present evaluation study. The adapted methodology is described in more detail in that section.

V. Research Activities Tax Credit Awards and Claims

Businesses in Iowa that are eligible to earn the RAC report qualified research expenditures divided into four categories: wages, supplies, rental or lease of personal property such as computers, and contract expenditures (see Table 2). Firms using the regular method, or Form IA 128, to calculate the RAC over tax years 2006 through 2014 reported 67.6 percent of qualified research expenditures in Iowa were wages. Supply costs accounted for the second-greatest share of expenditures, at 22.9 percent and contract expenditures comprised 9.4 percent of expenditures during the period. Expenditures reported for the lease of personal property were negligible, at 0.1 percent. For firms using the IA 128S, or the Alternative Simplified method, available data concern a more limited time period since the ASC has been in place only since tax year 2010. For these firms, reported expenditures across the four categories are distributed very similarly to firms using the regular method with wages at 65.4 percent and supplies at 22.7 percent.

In tax year 2013, businesses using the regular method to calculate the RAC reported \$8.2 billion in U.S. qualified research expenditures and \$773.5 million in Iowa qualified research expenditures. Iowa research expenditures thus accounted for 9.4 percent of

their total U.S. research expenditures. Not all businesses using the IA 128S report total U.S. research expenditures because the number is not necessary for the tax credit calculation. For firms using this calculation method, IA QREs amounted to \$1.0 billion in tax year 2013, or 9.3 percent of the total reported U.S. QREs. Thus, 56.1 percent of Iowa QREs reported for the RAC in tax year 2013, the most current complete tax year, are associated with ASC claims.

Based on their qualified research expenditures in tax year 2013, businesses claiming the regular RAC earned \$26.5 million in both automatic and Supplemental tax credits. This equates to 3.4 cents per dollar of total Iowa research. Recall that the RAC is provided for incremental research expenditures above a base amount rather than for total expenditures. For this reason, the calculated credit amount per dollar of total of research is somewhat lower than the rate allowed for incremental expenditures. For the regular credit, this rate is 6.5 cents per incremental research dollar. For the Alternative Simplified Credit, it is 4.55 cents. For businesses using this method, credits earned amounted to 3.1 cents per total Iowa research dollar in 2013.

Bearing in mind that data for tax year 2014 is incomplete, there were 494 RAC tax credits earned in that year (see Table 3). Of these, 281, or 57 percent, were calculated using the IA 128S, the requisite form for the Alternative Simplified method and 43 percent were calculated by means of the regular method, which employs the IA 128. In 2010 when the ASC became available, tax credits based on this method represented 36 percent of total RAC tax credits. Since then, ASC credits as a percentage of total credits has grown each year.

Both the IA 128 and the IA 128S forms collect data from taxpayers concerning their four-year moving average of annual gross receipts. Taxpayers using the IA 128S, however, are not required to supply this data to calculate the tax credit. On average, between tax years 2010 and 2014, 68 percent of taxpayers supplied this information each year, with 81 percent of taxpayers reporting for 2014.

The sum of the four-year moving average of gross receipts reported by RAC claimants was \$301.7 billion in tax year 2014. This represented a 12.5 percent increase over the prior year but the second-lowest total for the five-year period since 2010. The four-year moving average of gross receipts by RAC claimants peaked in 2011.

Except for 2012, when the sum of gross receipts was split evenly between the respective calculation methods, businesses using the regular method have accounted for well over half of the total in each year since 2010. In that year, businesses using the regular method accounted for 82 percent of the total moving average gross receipts reported by RAC claimants. In 2014, such businesses accounted for 67 percent of this total and ASC claimants accounted for 33 percent. If total receipts for ASC claimants are imputed from non-missing data using the calculated average, which is based on non-missing data only, and the number of claims, ASC claimants would account for 41 percent of gross receipts by RAC claimants in 2014. Imputing total receipts in this way assumes that ASC claimants' willingness to provide data for gross receipts is not related

to gross receipts levels. For example, it assumes that claimants who do not provide gross receipts data do not have higher gross receipts, on average, than those who do.

While the share of businesses claiming the RAC by means of the ASC has steadily increased, their share of moving average gross receipts has been comparatively low in some years. Although in 2011 and 2012, average gross receipts were much higher among businesses claiming the ASC, in more recent years the reverse is true: in 2013 and 2014, average gross receipts of businesses claiming the RAC using the regular method were more than twice as high as the reported average for firms claiming the ASC. Thus, over the last two years at least, businesses with lower average gross receipts have tended to select the ASC, whereas the regular method of claiming the RAC is favored by firms that have, on average, higher gross receipts.

In contrast, firms using the ASC account for more than half of qualified research expenditures in all years between 2010 and 2014 and have higher average levels of expenditures in each year except 2014. Thus, firms employing the ASC are, on average, more research-intensive than firms that employ the regular credit calculation method. Note that calculations of research intensity are based on non-missing data only. On average, QREs represent 0.4 percent of the four-year average of gross receipts among firms using the regular method in 2014. This represents the end point of a steady increase in average research intensity among such firms since 2010, when their research intensity was 0.2 percent. Meanwhile, average research intensity among firms claiming the ASC has generally been somewhat higher. Excepting those two years when average annual gross receipts among ASC claimants were higher, research intensity among those businesses using the ASC has been at least twice as high as among those using the regular method. In 2014, for example, QREs represent 0.8 percent of gross receipts, on average, among entities earning the RAC using the ASC and 0.4 percent of gross receipts among those using the regular method. It is noteworthy that research intensity overall has trended generally upwards in the years since 2010. Along with a similar trend in average QREs, it suggests that companies have increased research spending after what was likely a period of slow-down during and immediately following the recession of late 2008 through early 2010.

In each year since 2010, at least 50 percent of RAC credit amounts have been calculated using the ASC. This percentage has remained steady between 50 and 55 percent throughout the period (see Table 4). Bearing in mind that the tax credit rate for the regular method of claiming the RAC is somewhat higher than that for the ASC although the QREs under the different calculations might be higher for the latter, average and median RAC credit amounts are approximately equal among businesses using the respective calculation methods. Between 2010 and 2014, earned RAC rose from \$38.9 million to \$56.5 million. Supplemental RAC dropped over this time, from \$15.8 million to \$8.2 million. Total RAC earned by firms conducting qualified research in Iowa also increased over this time from \$54.8 million to \$64.8 million, but the growth was muted by the drop in the Supplemental RAC.

As noted above, the businesses that earn the RAC are often not the taxpayers that claim the tax credits against tax liability. Claims against corporation income tax account for the great majority of claimed RAC amounts. In tax year 2013, corporate claims accounted for 88 percent of total RAC dollars claimed (see Table 5). This percentage has remained quite constant over the last decade. Corporate claims account for a smaller percentage of the number of claims (20.4% in 2013), however. This is because RAC tax credits earned by pass-through entities are claimed by their shareholders on individual income tax returns; thus a single RAC tax credit earned by a pass-through entity might be claimed on any number of individual tax returns.

As noted in Section III, Iowa is one of only eight states whose RAC is broadly refundable. In tax year 2006, \$36.7 million of \$39.0 million, or 94.1 percent, of RAC claims were refunded to corporation taxpayers (see Table 6). The percentage of RAC tax credits paid as refunds declined somewhat beginning around 2010 but subsequently increased. In 2013, 82.9 percent of RAC claims by corporate taxpayers were paid as refunds. Corporations receive a larger share of claim dollars as refunds than do individual income taxpayers, averaging 82.6 percent of total claim dollars refunded in recent tax years compared to 53.0 percent of claim dollars refunded to individuals. The difference likely reflects that individuals, as shareholders, have wages or other taxable income unrelated to the business carrying out the research that offset the credit claim. Also the size of the average claim made by a corporation taxpayer is nearly \$223,000 while individual taxpayers have an average claim of \$7,000. In 2013, 72.2 percent of corporations with a RAC claim received at least one dollar in refund compared to 27.3 percent of individuals.

VI. Evaluation of the Research Activities Credit

In its economic analysis of the RAC tax credit program, this evaluation study addresses four general questions.

1. What are the net tax revenue effects of the Alternative Simplified Credit for the RAC?
2. What has been the impact of the availability of the Alternative Simplified Credit on firms' research spending?
3. What is the impact of changes to the calculation of the Supplemental RAC?
4. How much R&D spending does the RAC generate in Iowa?

Each of these general questions comprises more specific questions.

Research Question 1. What are the net tax expenditures of the Alternative Simplified Credit for the RAC?

By way of assessing the overall net tax revenue effects of the RAC, this analysis considers the revenue impact of the Alternative Simplified method of calculating the tax credit. This impact is evaluated in two related ways. First, this study estimates the total value of RAC claims for all firms if only the regular method of calculation had been allowed since 2010, when the Alternative Simplified method became available. This analysis concerns tax years 2010 through 2014, bearing in mind that data for tax year 2014 is incomplete. Secondly, the study estimates the expenditure effects of the RAC using the firm as the unit of analysis. Specifically, it addresses how RAC earned on the basis of either the regular method or the Alternative Simplified method would compare under the other method for a given firm, given its qualified research expenditures for the year. This aspect of the study particularly concerns whether, and to what extent, claims made using the IA 128S, or Alternative Simplified method, are higher than what a firm might have received using the regular method, or IA 128.⁵

A. Overview of data used for analysis

Over tax years 2010 through 2014 combined, some 455 firms earned the RAC on the basis of the Alternative Simplified method of calculating the credit, having filed the IA 128S. These include 185 firms that received their first RAC prior to 2010 and switched to the IA 128S in 2010 or after; 247 firms that received the RAC for the first time in 2010 or after and who initially used the Alternative Simplified method to claim the RAC; and another 23 firms whose first RAC was in 2010 or after and who initially used the IA 128, but for at least one tax year thereafter used the IA 128S. For the discussion in this section, all firms that claimed the RAC using the IA 128S in any tax year are termed IA 128S firms.

Though 455 firms filed an IA 128S to claim the Alternative Simplified RAC between tax years 2010 and 2014, because most of these firms filed IA 128S claims for more than one tax year, there have been 1,142 such claims filed during this period. Of these, data

⁵ Forms IA 128 and IA 128S for tax year 2016 are provided in Appendix 2 and Appendix 3.

necessary to estimate the RAC using the regular method of calculation for each firm given its qualified research expenditures was available for 590 claims filed by 281 firms (see Table 7). This data, which is comparable to that collected on the IA 128 for the regular method, is thus available for approximately half of all IA 128S cases, including about half of all those filed for each tax year.

The number of firms using the IA 128S varies each tax year. The number of such firms has varied from 143 in 2010 to, as of the time this analysis was conducted, 281 in 2014 (see Table 8). Annually, Iowa qualified research expenditures made by IA 128S firms varied from \$735 million in 2010 to \$1.02 billion in tax year 2013, with expenditures reported to this point for 2014 at \$1.02 billion. On the basis of these expenditures, which totaled \$4.6 billion, IA 128S firms have earned RAC tax credits totaling \$127.0 million over the period.

In general, given their qualified research expenditures, it is possible to estimate what the total value of the RAC tax credit would have been for IA 128S firms if the ASC did not exist and these firms instead availed themselves of the regular method of calculating the RAC. Data for most, though not all, of the parameters necessary to make such an estimate is typically provided by firms on the IA 128S itself. However, firms are not required to provide some of the data points in order to claim the credit. In addition, the Form IA 128S does not collect a firm's fixed-base percentage, which is necessary to compute the firm's base amount under the regular method of calculating the RAC and is collected on line 10 of the IA 128. For many firms, this information was available from separate documentation; specifically, either the firm's claim for a regular federal research tax credit on Form 6765 or an IA 128 the firm might have filed for a different tax year.

In order to calculate the regular RAC amount for firms claiming the Alternative Simplified RAC, this evaluation study utilizes information, when available, from the IA 128S, Form 6765, and the IA 128. For those instances in which a firm's fixed-base percentage was not available from another source, it was assumed to be three percent for purposes of the analysis described in this section. This assumption is reasonable because the fixed-base percentage is set at three percent for the first five taxable years in which a new firm, any firm without research expenditures during the 1984 through 1989 period, has qualified research expenditures. Except in the case of new firms in their sixth through tenth taxable years with qualified research expenditures, a firm's fixed-base percentage does not change.

B. Did the introduction of the ASC increase the fiscal impact of the RAC?

During tax years 2010 through 2014, the 590 IA 128S cases with usable comparative data reported total qualified research expenditures of \$2.6 billion. On the basis of these expenditures, these firms received ASC tax credits totaling \$67.0 million, or 2.5 percent of their qualified research expenditures. Based on analysis of comparable data available for these firms, given their qualified expenditures, these firms would have received \$54.0 million had they used the regular method of calculating the RAC.

The regular method and the ASC offer differing levels of tax benefit to qualifying firms. While these depend on individual circumstances, it is to be supposed that, in general, firms will select the procedure that allows them to maximize their tax benefit. This supposition is borne out by the findings described above. Overall, firms that selected the ASC received a greater tax benefit by doing so than they would have by utilizing the regular RAC.

However, the degree of comparative tax benefit associated with the ASC for these firms varies substantially by year. Generally speaking, the comparative tax benefit has decreased each year since 2011. For tax year 2010, the ASC offered firms for which comparative data is available a premium of 51 percent over the regular RAC. That is, in aggregate, the value of the ASC was 51 percent higher than the estimated value of the regular RAC, given their qualified research expenditures. The relative benefit associated with the ASC for these firms was even greater in 2011, when it was 63 percent higher than the estimated value of the regular RAC. This premium decreased to just 5 percent in 2013. In 2014, the comparative benefit associated with the ASC for these firms was negative in aggregate. In that year, for which data is incomplete, the RAC earned by these firms using the ASC was just 85 percent of what they would have under the regular method of calculation.

The foregoing analysis quantifies the degree to which the tax benefit differed, in aggregate, between the ASC and the regular RAC for those firms for which comparative data is available. Using the percentage difference between, on one hand, the RAC these firms in fact received by using the ASC and, on the other, the estimated RAC they would have received by using the regular method, these findings can be extrapolated to all firms that selected the ASC between 2010 and 2014. On this basis, it would be estimated that the tax credit received by all ASC-claiming firms during these years was 24 percent higher than what they would have received under the regular method. Because over this time period IA 128S firms received RAC tax credits totaling \$126.9 million, this extrapolation suggests that, given their qualified research expenditures, all such firms would have received \$102.4 million had they been limited to the regular method of calculation.

C. Are claims to the ASC always higher than the regular RAC, or do some firms choose the ASC even if the credit is lower?

Iowa law allows firms claiming the RAC to select either the regular method or the ASC each tax year. As described in the previous section, overall, the ASC has provided a higher tax benefit to those firms that have selected it, to say nothing of the ASC being simpler to calculate for the tax preparer. However, the analysis above concerns aggregate outcomes. It provides an approximation of the cost to the State associated with the ASC, but it does not address the comparative benefit associated with the ASC at the individual firm level. The benefit can vary from year to year as well as from firm to firm, given each claimant's individual circumstances. In this light, it is worth examining the extent to which the tax benefit of the ASC exceeds that of the regular RAC for those firms that select it. A related question is whether and to what extent firms select the ASC even though it might offer them a lower tax credit.

As indicated in the previous section, there were a total of 455 firms that filed the IA 128S in tax years 2010 through 2014; and, as noted above, data necessary to estimate the value of the regular RAC for these firms, given their qualified research expenditures, is available for many of them. This data is principally derived from information supplied by firms themselves on the IA 128S, with two limitations that are especially pertinent to the following analysis.

The first such limitation is that the IA 128S does not collect information concerning the firm's fixed-base percentage, necessary to compute the RAC using the regular method but not the ASC. This information is sometimes available from the IA 128 in a different tax year or federal Form 6765. For purposes of this analysis, information about each firm's fixed-base percentage was obtained from these other sources when available; otherwise, the firm's fixed-base percentage was assumed to be 3 percent. Again, except for new firms in their sixth through tenth taxable years with qualified research expenditures, a firm's fixed-base percentage does not change.

A second pertinent limitation relevant to this analysis similarly to the prior analysis is that certain data elements collected on the IA 128S that are necessary to compute the value of the RAC using the regular method are not, however, required to claim the ASC. For example, the IA 128S calls for the claimant firm to provide its average U.S. annual gross receipts for the prior four years. Because this information is not used to calculate the ASC, some firms do not provide it. For the analysis in this section, ASC forms which did not contain such other information necessary to compute the value of the regular RAC were excluded.

As noted above, there were 1,142 ASC forms filed between 2010 and 2014. Of these, 552 did not include information, such as average U.S. annual gross receipts, sufficient to calculate the value of the regular RAC. The remaining 590 are included in the analysis described in this section (see Table 9). For 172 of these, the firm's fixed-base percentage was available from other tax documentation. For the remaining 418 ASC forms, the firm's fixed-base percentage was assumed to be 3 percent. Thus, for this analysis, there are two sets of claims: those for which the fixed-base percentage is based on tax documentation supplied by the claimant and those for which the fixed-base percentage is assumed to be 3 percent. As necessary in the discussion that follows, information for these two sets of claims is provided separately.

Over tax years 2010 through 2014, the 590 ASC claims included in this analysis were the basis for credits amounting to \$67.0 million. Consistent with the analysis of the previous section, the aggregate estimated value of the RAC for these claims using the regular method, based on reported qualified research expenditures, was considerably lower, at \$54.0 million, 24 percent lower than the ASC.

However, for many single credits earned during the period, the reverse is true. The calculated value of the RAC using the regular method was in fact higher for 210, or 36 percent, of the 590 credits included in this analysis (see Table 10). In other words, for

these 210 ASC credits, the firm would have received a greater tax benefit by utilizing the regular calculation method. In addition, this apparent contradiction is even more pronounced for those credits for which the most complete data has been incorporated into the analysis; i.e., for 44 percent of those 172 credits for which the firm's fixed-base percentage could be obtained from firm-specific tax documentation, the estimated credit amount under the regular method was higher than the actual amount under the ASC (see Table 11).

As noted above, the calculated value of the RAC was higher for 36 percent of ASC credits over the entire period analyzed. The pattern is generally consistent when claims are disaggregated by tax year. The percentage of ASC credits for which the estimated value of the RAC is higher under the regular method deviates no more than five percentage points in any one year except 2014, for which data are incomplete. For a number of these claims, the difference between the RAC actually received under the ASC and the calculated value of the RAC using the regular method is quite small; for one firm, in 2014, for example, it was \$23, a difference of three tenths of a percentage point of the RAC that taxpayer received. Over all years, the median difference was \$3,184, 25.6 percent of the median credit and 2.8 percent of the average credit. Although the differences are large, taxpayers could be making a rational decision if the simplicity of the calculation method under the ASC has a value to these firms.

On the other hand, among those credits for which the estimated value of the RAC under the regular method is higher than the amount earned under the ASC, there are a number for which the difference is quite high. Based on an analysis that includes those credits for which firms' fixed-base percentages are imputed, the maximum difference for a single claim is \$1.1 million. However, because this estimate is based in part on an imputed parameter, it must be considered with caution. Limiting consideration to only those firms whose fixed-base percentage could be obtained from tax documentation, the maximum difference between the RAC as calculated using the regular method and the ASC actually received is much lower, if nevertheless surprisingly high. The amount of the difference was as high as \$127,233 for one firm in tax year 2010; in dollar terms this case represents the maximum disparity identified in this analysis. In percentage terms, the maximum difference between a firm's actual claim using the ASC and the estimated credit value using the regular method was 273 percent. In that instance, however, the difference in dollar terms, which is not shown in the table, amounted to approximately \$18,000.

Research Question 2. What has been the impact of the availability of the Alternative Simplified Credit on firms' research spending?

In addition to assessing the net tax revenue effects of the RAC, this evaluation study addresses the impact of the introduction of the Alternative Simplified calculation method on firms' research spending. It must be acknowledged at the outset that firms' research spending is only partly, if at all, motivated by tax policy. Other considerations are fundamental. These include both the microeconomic context that shapes business decision-making at the firm level as well as broader economic factors. The following analysis seeks to shed light on the relationship between the RAC and research spending by assessing the following question: What has been the impact of the

availability of the Alternative Simplified Credit on firms' research spending? Firms are assessed in terms of growth in Iowa qualified research expenditures given their form usage. In this section, the term qualified research expenditures and its abbreviation, QRE, refer to such expenditures occurring in Iowa.

A. Firm category by form usage

As noted in Section II, which provides background on the RAC, the Alternative Simplified method of calculating the RAC became available in tax year 2010. The ASC provides a credit equal to 4.55 percent of qualified research expenditures that exceed 50 percent of average qualified research expenditures in Iowa over the prior three years. In contrast, the regular method is equal to 6.5 percent of the incremental qualified research expenditures over the base period amount. For this analysis, then, firms are classified in terms of the method used to calculate the RAC. Because each method of calculating the RAC employs a different tax form, another way of saying this is that firms are categorized in terms of their form usage. Firms are thus classified as follows:

IA 128S Switch Firms These firms first earned the RAC prior to tax year 2010 and switched to the IA 128S in tax year 2010 or after

IA 128 Continuing Firms These firms first earned the RAC prior to tax year 2010 and did not switch to the IA 128S in tax year 2010 or after.

IA 128S New Firms These firms first earned the RAC in tax year 2010 or after and first used the IA 128S to calculate the tax credit. This category includes firms that switched to the IA 128 in subsequent tax years. It includes firms that filed an Iowa tax return prior to tax year 2010 and those that did not.

IA 128 New Firms These firms first earned the RAC in tax year 2010 or after and first used the IA 128 to calculate the credit. This category includes firms that switched to the IA 128S in subsequent tax years. It includes firms that filed an Iowa tax return prior to 2010 and those that did not.

The data set includes 1,084 firms who earned the RAC in one or more tax years between tax years 2006 and 2014. A number of firms in the data set only earned the RAC prior to 2010. In addition, although the data set available for this evaluation study includes credits filed for tax year 2014, data for this tax year is incomplete.

In terms of the number of firms in each, categories are fairly evenly balanced. This is particularly the case when firms that earned the RAC in tax year 2010 or after are considered separately from firms that began to earn the RAC prior to that year. Among the 1,087 firms, there are 185 IA 128S Switch Firms and 171 IA 128 Continuing Firms; again, these are firms that began to earn the RAC prior to 2010 and either switched to the IA 128S or continued using the IA 128. Among firms that began to earn the RAC

after the IA 128S became available in 2010, there are 243 IA 128S New Firms and 189 IA 128 New Firms (see Table 12).

On average, firms that began to earn the RAC only since tax year 2010 have much lower qualified research expenditures (QRE) than firms that have earned the tax credit since prior to that year (see Figure 1). For firms newly earning the RAC, average qualified research expenditures were under \$1 million for nearly the entire period 2010 through 2013. For both IA 128S New Firms and IA 128 New Firms, average QRE were, in fact, below this level until 2013 when average QRE for IA 128 New Firms reached \$1.3 million. Meanwhile, among those firms that have earned the RAC prior to 2010, including both IA 128S Switch Firms and IA 128 Continuing Firms, average annual qualified research expenditures were above \$3.5 million throughout the period from 2006 through 2013. On average, since 2007, IA 128S Switch Firms have spent considerably more on research each year than have IA 128 Continuing Firms. This difference reached its highest level in 2012, when average qualified research expenditures by IA 128S Switch Firms were \$6 million, thirty percent higher than average expenditures by IA 128 Continuing Firms for that year.

B. Compound Annual Growth Rate

Given the differing tax credit rates applicable to the respective methods of calculating the RAC, the question arises whether one or the other method is associated with greater rates of growth in qualified research expenditures. An initial examination of growth in qualified research expenditures in terms of firm use category would seem to suggest there might be some such relationship.

The compound annual growth rate can be used as the basis for comparing expenditure growth among firms using different RAC calculation methodologies. The compound annual growth rate provides a direct measure of growth over multiple time periods and is used in this study to measure aggregate growth over tax years 2010 through 2013. This period is used as a frame of reference because its starting year marks the first year in which the RAC could be earned using the Alternative Simplified method and its ending year is the most recent for which complete credit information is available. For this analysis, the compound annual growth rate is the rate of growth in a firm's qualified expenditures between the beginning of the period, tax year 2010, and the end of the period, tax year 2013.

Despite its advantages, the compound annual growth rate is limited insofar as it measures growth from a given starting point to a given end point for all firms. This is a limitation because these breakpoints are somewhat arbitrary. While in this instance 2010 coincides with the first tax year in which the IA 128S became available for earning the RAC, this year may not, and likely does not, have any particular significance relative to each individual firm's research spending trajectory. Certain analyses described below concern only firms that reported research spending in all four tax years during the period under analysis.

On average, the rate of compound annual growth in QRE during the period 2010 through 2013 was 7.8 percent for IA 128S Switch Firms (see Table 13). Similarly, for the 247 IA 128S New Firms in the data set, the average rate was 7.3 percent over the same time period. It must be noted, however, that this average is derived from a very small number of IA 128S New Firms; specifically, those 32 of such firms that filed RAC credits for all tax years 2010 through 2013. Comparatively few firms in this group filed credits for both 2010 and any of the three tax years thereafter; no more than 36 firms in this category reported expenditures in any pair of tax years during the period. For new firms that filed the IA 128, the average rate of compound annual growth in QRE during the years 2010 through 2013 reflects just 31 firms, or 15 percent of the 204 firms in the IA 128 New category. For these firms, the average compound annual growth rate for the period 2010 through 2013 was 12.4 percent. By comparison, among firms that continued to use the IA 128 throughout the period, the average compound annual growth rate was 2.4 percent. The compound annual growth rate is calculated controlling for inflation using the Consumer Price Index – All Urban Consumers.

Despite the difference in average rate of compound annual growth among firms in terms of their method of calculating the RAC, an examination of the frequency distribution of rates suggests there is very little difference among firm use categories. The compound annual rate of growth in QRE during the period 2010 through 2013 ranged from a decrease of more than 100 percent for some firms to an increase of more than 95 percent (see Figure 2). However, more than half of firms in both the IA 128 Switch and the IA 128 Continuing category experienced no more than a 10 percent change in QRE. At least 70 percent of firms in all four categories in this analysis experienced a change in expenditures of no more than 20 percent. Thus, although there are a number of firms that experienced considerable changes in qualified research spending between 2010 and 2013, the average rate applicable to each firm use category are not meaningfully different from one another. Statistical tests of whether the groups are significantly different from one another on this measure confirm this.

Many firms have earned the RAC only once, or earn it only intermittently. Consideration of the compound annual growth in qualified research expenditures among only those firms that earn the RAC on a more consistent basis is also worthwhile. Those 116 of the 185 IA 128S Switch Firms that earned the RAC in all four years between 2010 and 2013 experienced an average rate of growth of 7.5 percent over the entire period (see Table 14). Meanwhile, those 100 of the 171 IA 128 Continuing Firms that earned the RAC in every year during the period increased expenditures by an average of 6.4 percent. Considering only the period 2010 through 2012, IA 128S Switch Firms increased research spending by an average 8.5 percent compared to 4.4 percent during the same period for IA 128 Continuing Firms.

It should be noted that very few IA 128S New Firms and IA 128 New Firms have earned the RAC in all four years since 2010. This is not surprising given that these firms are partly defined by their not having earned the RAC prior to that year. Those few IA 128S New Firms and IA 128 New Firms that did earn the RAC in each year of the period demonstrated compound annual growth rates over the whole term of 11.0 percent and

10.9 percent, respectively. These rates are somewhat greater than the average rates of the other categories of firms. This finding, too, is to be expected because these rates are measured against the first year in which these firms are in the data set, which covers tax years 2006 through 2014, as having earned the RAC.

As is the case when considering all firms for which a compound annual growth rate can be calculated, an examination of the frequency distribution of rates of only those IA 128S Switch Firms and IA 128 Continuing Firms that earned the RAC in all four years during the period suggests there is very little difference in growth rates between these two categories of firms. The distribution of rates for IA 128S Switch Firms and IA 128 Continuing Firms closely align with one another (see Figure 3).

Research Question 3. What is the impact of changes to the calculation of the Supplemental RAC?

As noted in Section II, in addition to the RAC, a Supplemental RAC may be awarded to companies participating in the High Quality Jobs Program as authorized by the Iowa Economic Development Authority (EDA). Until fiscal year 2014, when the program was discontinued, Supplemental RAC tax credits were also available to companies participating in the Enterprise Zone Program. Supplemental RAC amounts are awarded by the EDA as part of incentive packages to new or expanding businesses for making capital investments and creating or retaining jobs in Iowa. The packages can also include Investment Tax Credits and sales and use refunds for taxes paid during construction. Applicant businesses that indicate they will conduct qualified research during their contract with EDA can also be awarded Supplemental RAC.

Prior to fiscal year 2009, Supplemental RAC awards were an estimate of the likely RAC amounts to be earned by firms, but did not limit the amount of claims made during the contract period. Once a tax credit cap was implemented for EDA in fiscal year 2009, awarded amounts came to constitute limits on total Supplemental RAC credits by firms. Another change specific to the calculation of the Supplemental RAC was implemented effective for contracts signed on or after July 1, 2010. For awards made prior to 2011 the Supplemental RAC could as much as double the RAC for all Supplemental RAC recipients. For awards made in fiscal year 2011 and later, the tax credit rate for calculating the Supplemental RAC varies based on whether the recipient's gross revenues are more than or less than \$20 million. Supplemental RAC credits for recipients with gross revenues of \$20 million or less can more than exceed the automatic credit (with a rate of 10 percent compared to 6.5 percent). In contrast, Supplemental RAC credits for recipients with gross revenues of more than \$20 million are less than one-half of the automatic credit (with a rate of 3 percent compared to 6.5 percent).⁶ The change was intended to target credits to research conducted by smaller firms.

Between fiscal years 2005 and 2014, the EDA awarded 96 contracts with Supplemental RAC to businesses (see Table 15). Awards that have subsequently been claimed can

⁶ The applicable rates for the ASC method result in similar ratios between the supplemental and the automatic credit, see Section II.

be analyzed in terms of average annual gross revenues reported on the IA 128 or IA 128S. For awards unmatched to claims, this information is not available. For this analysis, firms were categorized on the basis of their four-year moving average annual gross receipts with respect to whether these were greater or less than \$20 million.

Because there are only a handful of Supplemental RAC awardees in most years, it is necessary to combine tax return data from several tax years in this analysis to ensure taxpayer confidentiality. Because this analysis of the Supplemental RAC program is concerned with the impact of a change that occurred effective with award year 2011, it compares data for the six-year period between 2005 through 2010 to data for years 2011 through 2014. During the period before the program change that occurred in 2011, an average of eight Supplemental RAC contracts were awarded per year. Of these, on average per year, 1.7 were awarded to firms with average annual gross revenues of \$20 million or less and 3.7 were awarded to firms with average annual gross revenues of greater than this amount. The remaining 2.7 awards per year during this period were to firms whose annual average gross revenues information was not identified in this analysis. Among firms with average annual gross revenues information, the average number of Supplemental RAC awards made each year after 2011 to firms with average annual gross revenues of \$20 million or less doubled to 3.5. This suggests that the 2011 program change increased participation in programs associated with Supplemental RAC tax credits by smaller companies. It is important to recognize, however, that a number of firms receiving awards both prior to and after the 2011 program change could not be matched to revenues data.

Average Supplemental RAC award amounts decreased for all firms after 2011. Awards averaged \$1.1 million prior to 2011 and \$380,000 in the period between 2011 and 2014. The reduction in average awards is true of both small and large firms; i.e., firms with average annual gross revenues both above and below the Supplemental RAC program's \$20 million breakpoint.

Overall, between 2005 and 2014, 96 awards have been made for \$71.9 million.⁷ Of these awards, \$52.0 million has been claimed to date. However, for awards made prior to 2009, claimed amounts could exceed award amounts, which was the case for certificates issued in 2005, 2006, and 2008. Awards made in a given fiscal year cover credits earned for several subsequent tax years, depending on the terms of the contract with EDA. In general, awards made to companies participating in the High Quality Jobs program cover up to five years and awards made through the Enterprise Zone program may cover up to ten years.

Considering credits earned in terms of the year the award was granted, rather than in terms of the tax year of the claim, the majority are based on awards made in the period 2005 through 2010 (see Table 16). During the period prior to 2011, firms that were smaller in terms of average annual gross revenues accounted for 40 percent of Supplemental RAC. Since 2011, this percentage increased to 62 percent. However,

⁷ These awards reflect only those contracts in good standing. Awards made to businesses that subsequently terminated the contract with EDA are excluded.

where 92 percent of awards made prior to 2011 have been claimed, only 15 percent of awards made in 2011 and after have been claimed to date. Thus, the percentage of credits associated with larger and smaller firms is likely to change substantially moving forward. This is because taxpayers are only beginning to report Supplemental RAC based on awards made since fiscal year 2011.

One other data point sheds additional light on the impact of the 2011 Supplemental RAC program changes that were intended to encourage participation by smaller firms. Supplemental RAC considered in terms of tax year, rather than in terms of award year as under the discussion above, suggests changes to the Supplemental RAC program beginning in 2011 were reflected in measures of qualified research expenditures. Prior to 2011, firms reporting Supplemental RAC had average QRE that were many times greater than those of non-recipients (see Figure 4). In tax year 2012, the first tax year where awards made in fiscal year 2011 are likely to be reflected, average qualified research expenditure of Supplemental RAC recipients moved markedly closer towards the average of non-recipients.

As discussed above, the number of smaller firms receiving Supplemental RAC tax credits increased for awards made in fiscal year 2011 and after, the first year with the incentives higher for these smaller firms. This is evident in the overall average number of awards per year during the period after 2011 as compared to the prior six year period as well as in measures of reported research expenditures. However, on balance, the available data is too preliminary to more fully assess the impact of the 2011 program change on participation by smaller firms. This is because the analysis is driven primarily by data obtained from tax credits earned, which total only 15 percent of Supplemental RAC awards made since 2011. Analysis conducted in future years would likely shed further light on this matter.

Research Question 4. How much R&D spending does the RAC generate in Iowa?

The analysis in this section concerns the amount of research spending generated by the RAC. It is not a measurement of what research would be in Iowa if the RAC did not exist, rather it is an estimate that takes as a given that all businesses doing research in Iowa have already decided to do research in the state and the choice that is measured is how much research expenditures to conduct in Iowa under the marginal change in the “price of research” resulting from the RAC. Using published estimates of the price elasticity of research, it computes the approximate value of research spending in Iowa stimulated by the tax credit.

As noted in the literature review provided in Section IV, in a 2009 study, the U.S. GAO evaluated various historical iterations of the federal R&D tax credit on this basis. For its report, the GAO used estimates of, first, the impact of tax credits on R&D costs and, second, of the price elasticity of R&D to measure the amount of research spending stimulated by each tax revenue dollar foregone. The GAO termed this measure the credit’s “bang-per-buck.” For the discussion that follows in this section, the GAO’s

method for calculating the amount of research spending stimulated per tax credit dollar is adapted to an analysis of the Iowa RAC.⁸

Using this formula, the amount of research spending stimulated by each tax credit dollar can be estimated as follows:

Formula

$$(marginal\ QRE \times MER \times PED) / RAC = \text{Amount of research spending stimulated}$$

where

- QRE = qualified research expenditures
- MER = marginal effective rate of the credit
- PED = estimated price elasticity of research spending
- RAC = tax credit amount

An explanation of each of these parameters follows.

QRE and Marginal QRE

QRE are qualified research expenditures as reported by firms on their RAC forms. QRE are used to represent the quantity of research because, for this analysis, the quantity of R&D is expressed in terms of one dollar units; i.e., the price of a unit of R&D is taken to be one dollar. Marginal QRE are the quantity of research expenditures that exceed the threshold amount of QRE necessary for a firm to earn the RAC on the next dollar. In other words, given the RAC formula, marginal QRE are the expenditures subsidized by the tax credit.

MER

The MER relates tax credit benefit to the price per unit of R&D. It is the tax credit benefit per \$1 of R&D cost. Factoring the corporation income tax rate into the cost of R&D, the MER equates to the tax credit benefit per \$1 of R&D minus the marginal corporation tax rate, minus the tax credit rate under the RAC. (Stated mathematically, the $MER = (\tau / (1 - t - \tau))$ where t is the marginal corporation income tax rate and τ is the RAC rate.) Based on Iowa corporation income tax data, the average marginal corporation income tax rate was 11.7 percent in tax year 2013, the most recent year for which data are available. For this analysis, the average marginal Iowa corporation income tax rate is assumed to be 11.7 percent for those firms that take a deduction of their research expenditures for

⁸ One important difference between the formulas used by the GAO for the regular and alternative methods of calculating the federal tax credit and the formulas used in the following analysis is that the GAO had to account for the nonrefundability of the R&D federal tax credit. Because the Iowa RAC is refundable, the analysis is much simplified. Iowa taxpayers are allowed to use the RAC in the same year as they earn it, regardless of their tax liability. For the present analysis, then, it is not necessary to factor in a discount rate and the number of years before a taxpayer is able to use the credit.

federal tax purposes and 0 percent for those firms that do not.⁹ Because the Iowa RAC database provides no information on whether a firm has elected to deduct research expenditures for federal tax purposes, it is assumed for purposes of this analysis that half of tax credit amounts are associated with the firms that take the deduction and half are associated with firms that do not. Mathematically, this is equivalent to all Iowa qualified research expenditures (QRE) being subject to a marginal Iowa corporate tax rate that is one half of the average marginal tax rate assumed to be applicable to those firms that deduct research expenditures for federal tax purposes. Therefore, it is assumed for this analysis that QRE are subject to an average marginal corporation income tax rate equal to one half of 11.7 percent, or 5.85 percent.

The tax credit rate under the RAC varies according to method of calculating the credit. For the regular method it is 6.5 percent. For the Alternative Simplified Credit (ASC) it is 4.55 percent. Thus, for purposes of this analysis, the MER is taken to be as follows for the regular method of calculating the RAC:

$$(0.065/(1 - .0585 - .065)) = .074 = 7.4\%$$

For the ASC, the MER is assumed to be:

$$(0.0455/(1 - .0585 - .0455)) = .051 = 5.1\%$$

It should be noted that an MER calculated for Supplemental RAC tax credits would be somewhat higher because the Supplemental RAC program provides additional tax credits for the same research expenditures used to qualify for the regular RAC. The MER and the impact of the Supplemental RAC on research spending are not estimated here.

PED

The PED is the estimated price elasticity of demand for research spending. The PED quantifies the relationship between price and demand, expressing the sensitivity of R&D spending to R&D costs. The price elasticity of research spending is defined as the percentage change in total research spending divided by the percentage change in the price of a unit of research. A PED of -1.5, for example, indicates that a 1 percent

⁹ This approach accounts for the option under the Internal Revenue Code (IRC) for firms to either claim a full federal R&D credit and reduce their research expense deduction by the credit amount or elect to reduce their federal R&D credit by 35 percent and claim a full deduction for research expenditures. That is, under Section 174 of the IRC, a firm that takes a deduction against federal taxes for research expenditures and claims the federal R&D tax credit for those same expenditures must reduce the deduction by the amount of the federal R&D tax credit claimed; but a firm can claim a full deduction for research expenditures if they elect to reduce their federal R&D credit by 35 percent. This consideration bears upon the Iowa RAC because for Iowa tax purposes, federal taxable income is the starting point for calculating Iowa taxable income. By electing a full deduction and reduced tax credit for federal tax purposes, a taxpayer would reduce Iowa taxable income by the amount of the federal R&D credit with no impact on their Iowa RAC.

reduction in the firm's cost of research leads to a 1.5 percent increase in demand for R&D.

The effectiveness of the RAC in stimulating marginal research spending is linked to this elasticity; the larger the elasticity of demand for research spending, the more effective the tax credit will be in stimulating marginal research. Estimates of the long-run price elasticity of R&D used for this analysis are taken from published research concerning the federal R&D tax credit. This research is reviewed in Section IV. Generally speaking, studies concerned with the effect of the federal R&D tax credit in its earliest years indicate roughly a one-to-one impact, with each tax credit dollar reckoned to induce one dollar of research spending; studies focused on more recent time periods have found more sizable impacts. Such were the findings of a review by Hemphill (2009). A report by the Congressional Budget Office (2007) suggested that studies of both the federal R&D tax credit and similar tax incentives in other countries generally concur that, "each additional dollar of forgone revenue attributable to the R&D promoting tax credit causes companies to spend another dollar on R&D projects" (p. 24). Given parameters applicable to the RAC, such a finding would equate to an elasticity of approximately -1.8. A study based on the federal R&D tax credit by Gupta, Hwang, and Schmidt (2011) calculated additional R&D spending of approximately \$2.08 per dollar of forgone tax revenue. More recently, Rao (2016) found a price elasticity for research spending of -1.98 for at least well-established companies. As noted in Section IV, there is an extensive literature dealing with the price elasticity of R&D, with the references noted constituting a fairly representative sample. Inasmuch as these estimates are applicable to the Iowa RAC, they are a tool for estimating the tax credit's impact on research spending in the state.

RAC

RAC is the dollar amount of the tax credit earned by the business and excludes any Supplemental RAC awarded to the business.

A. Marginal RAC Impact Analysis

The analysis here proceeds in two steps. For the first step, the RAC's impact on research spending is calculated assuming a PED of -1.5. This level represents the mid-point between the likely lower bound of the PED in practice, or approximately -1.0, and the highest estimates available from recent academic literature, roughly -2.0. This analysis is done separately for both the regular RAC and the Alternative Simplified Credit for each tax year from 2010 through 2014. Estimates for the RAC overall are weighted on the basis of credits earned under the respective methods.

The second step is a sensitivity analysis that computes the impact of the RAC on R&D spending under alternative assumptions regarding the PED. These are derived from estimates of the PED for R&D reported in published research as described above. This analysis computes the impact for eleven values for the PED. These include the presumed lower bound for the PED in practice, -1.0, and values through -2.0. The analysis is performed separately for both the regular and the Alternative Simplified

Credit at the various estimated PEDs, combining credit amounts for tax years between 2010 and 2014.¹⁰

For this analysis, it is assumed that the RAC's impact on the price of R&D is either a marginal change or that the elasticity of demand for R&D is constant. In addition, the analysis has important limitations. Estimates of the PED are based on research concerning the federal R&D tax credit, and may be less appropriate to an analysis of R&D spending in Iowa. It is possible, for example, that Iowa R&D expenditures are more sensitive to the Iowa RAC than national R&D spending is to the federal R&D tax credit since firms in Iowa can shift their research spending to other states more easily than firms nationally can shift spending to other countries. If this is so, it is possible that this analysis understates the extent to which the tax credit reduces R&D costs for Iowa companies. Furthermore, in practice, the PED may vary for certain industries as well as on the basis of broader economic factors. In short, the PED is a generalization. It is a tool for demarcating the likely impact of the RAC on R&D spending. Significantly, this analysis does not test the accuracy of the PED estimates it employs. The estimate of the amount of R&D spending per tax credit dollar is equal to incremental R&D spending per tax credit dollar, factoring the MER and the PED. It is expressed by the formula above.

The first step of this analysis assumes a PED of -1.5. Given this value and an MER of 7.4 percent, as detailed above, the amount of R&D spending stimulated by the RAC under the regular method is estimated at \$1.71 for the period including tax years 2010 through 2014 (see Table 17). For the ASC, for which the MER is estimated at 5.1 percent, the amount of R&D spending stimulated is estimated at \$1.66. Combining data for both calculation methods, weighted on the basis of credits earned under each, results in an estimate of \$1.68 per tax credit dollar.

Under the assumptions used for the analysis, the PED does not vary from year to year. For this reason, and because the tax credit rate is constant, estimated R&D spending per tax credit dollar does not vary from year to year for the regular method. For the ASC, estimated R&D spending per tax credit dollar varies slightly because the method offers a somewhat lower tax credit rate when no prior research has been conducted. The analysis excludes any RAC earned on the basis of basic research and payments to energy consortia which are minimal.

The second step of the analysis is a sensitivity analysis. For this step, the impact of the RAC on R&D spending is computed for eleven alternative assumptions regarding the PED, ranging from -1.0 through -2.0. It combines credit amounts for tax years between 2010 and 2014.

During tax years 2010 through 2014, taxpayers using the regular method earned \$110.8 million in RAC, excluding tax credits earned on the basis of basic research and payments to energy consortia and any Supplemental RAC awards. Given an MER of 7.4 percent, it is estimated that with a PED of -1.0, the amount of R&D spending

¹⁰ Data for tax year 2014 are incomplete.

estimated per tax credit dollar is \$1.14 (see Table 18). Note that, given a PED of -1.0, the estimated amount of R&D spending per tax credit dollar is somewhat greater than \$1.00; this reflects the difference between the statutory tax credit rate and the MER which, as noted above, factors the corporation income tax into estimates of the cost of R&D. Assuming a PED of -2.0, the estimated amount of R&D spending per tax credit dollar increases to \$2.28. Thus, given a range of between -1.0 and -2.0 for the PED, it is estimated that the amount of R&D induced between 2010 and 2014 as a result of the regular method is between \$126.4 million and \$252.8 million.

During the same period, taxpayers using the ASC earned \$119.3 million in RAC. Given an MER of 5.1 percent, it is estimated that with a PED of -1.0, the amount of R&D spending per tax credit dollar is \$1.10. The estimate increases to \$2.21 given a PED of -2.0. Given this range, it is estimated that the amount of R&D induced between 2010 and 2014 as a result of the ASC is between \$131.6 million and \$263.2 million.

In total, taxpayers earned RAC totaling \$230.1 million during tax years 2010 through 2014. On the basis of the sensitivity analysis described here, and given its underlying assumptions, it is estimated that the RAC has induced R&D spending of between \$258.0 million and \$516.0 million. Meanwhile, total QRE reported for the period by taxpayers earning the RAC amounted to \$8.2 billion. The amount of R&D stimulated by the RAC is thus estimated at between 3.2 percent and 6.3 percent of total QRE.

B. Brief Conclusion

The analysis in this section attempts to estimate the degree to which the subsidy for research expenditures offered by the RAC has changed behavior by inducing marginal increases in R&D spending. Relying on estimates of the price elasticity of R&D available from peer-reviewed sources, it suggests that tax credit recipients have likely expended roughly \$1.68 on qualified research per tax credit dollar over tax years 2010 through 2014. According to this analysis each dollar foregone as tax revenue by the State has resulted in an estimated \$1.68 being spent on qualified research conducted in Iowa. Given that Iowa taxpayers earned RAC totaling \$230.1 million during this period, it is estimated that the RAC induced marginal R&D spending of roughly \$387.1 million. This estimate assumes a price elasticity of research spending of -1.5, which means that R&D spending is sensitive to costs such that a 1 percent reduction in the cost of research leads to a 1.5 percent increase in R&D spending. Estimates for the amount of marginal R&D spending induced by the RAC and will thus vary given different assumptions for this price elasticity. The analysis computed the impact of the RAC on R&D spending under such alternative assumptions. Under these alternative assumptions, the impact of the RAC on marginal research spending is estimated at between \$258.0 million and \$516.0 million, or between about 3 and 6 percent of total R&D spending qualified for the RAC during the period between tax years 2010 and 2014.

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Tables and Figures

Table 1. Research and Development Tax Credit Programs by State

State	Credit Description	General Tax Credit Basis and Rate	Initial Tax Year	Sunset Date	Limit on Taxpayer Credit Amount	Statewide Program Cap	Refundable	Credit Carry Forward
Alabama	None	NA	NA	NA	NA	NA	NA	NA
Alaska	18% of the amount of research credit determined for federal income tax purposes which is attributable to Alaska.	18% of allocated federal credit	1998	No	No	No	No	15 Years
Arizona	24% of the first \$2.5 million of incremental research expenditures conducted in the state and 15% of incremental research expenditures over \$2.5 million. For tax year 2010 or later, if a taxpayer employs fewer than 150 people in the taxpayer's trade or business, the taxpayer may elect to receive a refund of the credit in the amount of 75% of the excess of the credit over tax liability up to \$5 million. However, the remaining 25% is forfeited by the taxpayer.	15%-24% of incremental research expenditures in-state	1993	2022	No	\$5 million for refundable portion	Yes, for qualified small businesses only	15 Years
Arkansas	10% of incremental qualified research expenditures (not to exceed \$10,000 per year) for up to five years for in-house research conducted in the state. Businesses can be granted a 33% credit per year for five years (not to exceed \$50,000 per year) for research in a strategic research area or research through the Arkansas Science and Technology Authority. This credit may be carried forward for nine years. Targeted businesses, which are qualified emerging technology companies, may also be eligible for a 33% credit with a nine-year carry forward or credits can be transferred. Eligible businesses can apply for an additional five years of credits at the higher rate.	10%-33% of incremental research expenditures	2003	No	No	No	No	3 Years
California	24% of basic research costs above a base amount, and 15% of incremental qualified research expenditures conducted in the state.	15% of incremental research expenditures	1988	No	No	No	No	20 Years
Colorado	3% of incremental research expenditures over the average of expenditures for the two prior taxable years conducted in an Enterprise Zone. No more than one-fourth of the allowable credit may be taken in any one tax year and the remaining amount is credited in the succeeding three taxable years.	3% of incremental research expenditures	1989	No	25% of credit amount	No	No	Until Utilized
Connecticut	20% of the amount spent directly on research expenditures in the state that exceeds the amount spent in the preceding income year. The credit cannot reduce tax liability by more than 70%. A small business with prior year gross receipts less than \$70 million with no tax liability may claim a refund equal to 65% of the value of the credit.	20% of incremental research expenditures	1993	No	70% of liability	No	Yes, partially, for qualified small businesses only	15 Years
Delaware	10% of incremental qualified research expenditures conducted in the state over the average of qualified research expenditures over the immediately preceding four taxable years or 50% of Delaware's apportioned share of the taxpayer's federal research tax credit computed under the alternative incremental credit method. For qualifying small businesses, amounts are doubled.	10% of incremental research expenditures or 50% of allocated federal research tax credit computed under alternative simplified method	2000	No	No	No	Yes (Effective January 1, 2017)	No

Table 1 (continued). Research and Development Tax Credit Programs by State

State	Credit Description	General Tax Credit Basis and Rate	Initial Tax Year	Sunset Date	Limit on Taxpayer Credit Amount	Statewide Program Cap	Refundable	Credit Carry Forward
Florida	10% of qualified research expenditures above the average of the four previous years of qualified research conducted in the state. For businesses less than four years old, the credit is reduced by 25% for each taxable year the business did not exist. Limited to 50% of tax liability after all other credits. Limited to C corporations in target industries only.	10% of incremental research expenditures	2012	No	50% of liability. For businesses less than four years old, limits apply.	\$9 million in 2015. \$23 million in 2016. \$9 million in 2017 and after. (First come, first served.)	No	5 Years
Georgia	10% of qualified research expenditures above the computed base conducted in the state. The computed base amount is determined using Georgia gross receipts. The credit taken in any taxable year cannot exceed 50% of the company's remaining tax liability after all other credits have been applied.	10% of incremental research expenditures	1998	No	50% of liability	No	No	10 Years
Hawaii	20% of incremental qualified research expenditures conducted in the state. The credit may only be claimed by a qualified high technology business as defined by Hawaii statute.	20% of incremental research expenditures	2013	2019	No	No	Yes	No
Idaho	5% of the incremental qualified research expenditures conducted in the state.	5% of incremental research expenditures	2001	No	No	No	No	14 Years
Illinois	6.5% of the incremental qualified research expenditures conducted in the state. The tax credit lapsed in 2011 but was subsequently extended through 2015.	6.5% of incremental research expenditures	1990	2015	No	No	No	5 Years
Indiana	15% of the first \$1 million of incremental qualified research expenditures in the state. After the first \$1 million, the credit is 10% of incremental qualified research expenditures.	10%-15% of incremental research expenditures	1984	No	No	No	No	10 Years
Iowa	6.5% of the incremental qualified research expenditures conducted in the state or 4.55% under the alternative simplified method	4.55% - 6.5% of incremental research expenditures	1985	No	No	No	Yes	No
Kansas	6.5% of the excess of research expenditures in the state over the average of the current and past two years. In a tax year, the credit claimed may not exceed 25% of the credit generated in a given year, forcing the credit claim to be spread over at least four years. Beginning in tax year 2013, this credit is only available to C corporations.	6.5% of incremental research expenditures	2001	No	25% of credit	No	No	99 Years
Kentucky	None	NA	NA	NA	NA	NA	NA	NA
Louisiana	8% of incremental qualified research expenditures conducted in the state if the taxpayer employs 100 or more Louisiana residents, 20% if the taxpayer employs 50 to 99 residents, or 40% for businesses with less than 50 residents. Taxpayers must pay a \$250 fee as part of the pre-application to claim the credit.	8% of incremental research expenditures	2003	2019	No	No	Yes	10 Years

Table 1 (continued). Research and Development Tax Credit Programs by State

State	Credit Description	General Tax Credit Basis and Rate	Initial Tax Year	Sunset Date	Limit on Taxpayer Credit Amount	Statewide Program Cap	Refundable	Credit Carry Forward
Maine	5% of the qualified research expenditures conducted in the state over the average qualified research expenditures for the three prior taxable years, along with 7.5% of basic research payments. The credit may be used against 100% of the first \$25,000 in tax liability, plus 75% of any tax in excess of \$25,000. All companies receiving \$10,000 or more in credits must file an annual report on employment levels and changes.	5% of incremental research expenditures	1996	2014	75% of liability beyond \$25,000	No	No	15 Years
Maryland	10% of qualified research expenditures conducted in the state that exceed the Maryland base amount and 3% of expenditures that fall below, where the base amount equals average annual gross receipts of the business for the four preceding tax years multiplied by the Maryland base percentage (usually the ratio of Maryland research expenditures for the preceding four tax years to total gross receipts for those years). Together, the two components of the credit cannot exceed \$6 million per year.	10% of incremental research expenditures	2000	2020	No	\$6 million statewide cap (Prorated)	Yes, for qualified small businesses only	7 Years
Massachusetts	10% of incremental qualified research expenditures conducted in the state, plus 15% of incremental qualified basic research payments. The credit may be used against the first \$25,000 in tax liability and 75% of any liability over \$25,000. Credits that exceed this limitation, but do not exceed 100% of the tax, are converted to unlimited carry forward status. For tax years 2009 and later, a taxpayer may choose to receive a refund of 90% of the balance of the credit after applying the rules above.	10% of incremental research expenditures	1991	No	75% of liability beyond \$25,000	No	Yes at discounted rate	15 Years
Michigan	1.9% of total research expenditures conducted in the state, but limited to 75% of total tax liability.	1.9% of in-state research expenditures	2006	No	75% of liability	No	No	No
Minnesota	10% of qualifying expenses for research conducted in the state up to \$2 million, and 2.5% for expenses above that level. The credit applies against regular corporate franchise tax and the individual income tax, but not the alternative minimum tax.	2.5% - 10% of incremental research expenditures	1981	No	No	No	No	15 Years
Mississippi	None	NA	NA	NA	NA	NA	NA	NA
Missouri	None	NA	NA	NA	NA	NA	NA	NA
Montana	None	NA	NA	NA	NA	NA	NA	NA
Nebraska	15% of the allocated federal credit for research done within the state. The credit can also be used to obtain a refund of state sales and use taxes paid.	15% of allocated federal credit	2006	2022	No	No	Yes	No
Nevada	None	NA	NA	NA	NA	NA	NA	NA
New Hampshire	10% of manufacturing research expenditures in the state over a base amount, up to a maximum credit of \$50,000. Eligible expenditures include only wages paid in New Hampshire for research activities.	10% of incremental research expenditures	2007	No	No	\$2 million statewide cap (Prorated)	No	5 Years

Table 1 (continued). Research and Development Tax Credit Programs by State

State	Credit Description	General Tax Credit Basis and Rate	Initial Tax Year	Sunset Date	Limit on Taxpayer Credit Amount	Statewide Program Cap	Refundable	Credit Carry Forward
New Jersey	10% on incremental qualified research expenditures conducted in the state. The amount of the credits applied cannot reduce tax liability to an amount less than the statutory minimum tax.	10% of incremental research expenditures	1994	No	No	No	No	7 Years. Certain types of research qualify for a 15 year carryforward.
New Mexico	5% of expenditures for qualified research of up to \$5 million conducted at a facility in New Mexico. The taxpayer must employ no more than 50 employees. The tax credit is doubled to 10% for expenditures in facilities located in rural New Mexico. An additional 5% credit is allowed for increasing in-state payroll by \$75,000 for every \$1 million in qualified expenditures.	5% of incremental research expenditures	2000	No	No	No	No	99 Years
New York	50% of the federal research credit attributed to research expenditures conducted in the state for companies that participate in the Excelsior Jobs Program and operate in New York. The tax credit is available to businesses in specified strategic industries. The program's credits are subject to a state-wide cap.	50% of allocated federal credit	2005	No	No	\$250 million statewide (First come, first served.)	Yes	No
North Carolina	1.25% of qualified research expenditures conducted in the state for companies with receipts under \$50 million, 2.25% for companies with receipts between \$50 million and \$200 million, and 3.25% for companies with receipts more than \$200 million. If a taxpayer is a business with receipts of \$1 million or less, or the research is performed in an economically distressed area of the state, then the applicable credit is 3.25%. The credit is 20% for any North Carolina University research expenditures. The credit claim is limited to 50% of tax liability.	1.25%-3.25% of qualified research expenses	2007	2015	50% of liability	No	No	15 Years
North Dakota	25% for the first \$100,000 of incremental qualified research expenditures conducted in the state. For expenditures over \$100,000, the applicable percentage for tax years 2007 through 2016 differs based on the start date for research. For tax years after 2016, the credit is 8% for all taxpayers on incremental research expenditures over \$100,000. Small businesses with gross receipts less than \$750,000 may transfer up to \$100,000 in credits if they fall in a "primary sector" industry classification and had claimed the credit prior to 2007.	25% of incremental research up to \$100,000. 8% of incremental research beyond \$100,000.	1988	No	No	No	No	15 Years or 3 Year Carry Back
Ohio	7% of research expenditures conducted in the state over the average of qualified research expenditures for the three prior tax years.	7% of incremental research expenditures	2001	No	No	No	No	7 Years

Table 1 (continued). Research and Development Tax Credit Programs by State

State	Credit Description	General Tax Credit Basis and Rate	Initial Tax Year	Sunset Date	Limit on Taxpayer Credit Amount	Statewide Program Cap	Refundable	Credit Carry Forward
Oklahoma	None	NA	NA	NA	NA	NA	NA	NA
Oregon	5% of incremental qualified research expenditures conducted in the state. Claims are limited to \$1 million per taxpayer per year.	5% of incremental research expenditures	1989	2018	\$1 million	No	No	5 Years
Pennsylvania	10% of the excess of qualified research expenditures conducted in the state over the ratio of the four prior year's research expenditures to gross receipts; 20% for small businesses. The credit is transferable, but purchasers can offset only 75% of liability and cannot carry forward unused credits.	10% of incremental research expenditures	1997	No	75% of liability	Statewide \$55 million cap, \$11 million reserved for small businesses (Prorated)	No	15 Years
Rhode Island	22.5% of the first \$111,111 in incremental qualified research expenditures conducted in the state and 16.9% for any remainder. The credit is applied to 50% of the tax due after all other credits available have been used.	16.9% - 22.5% of incremental research expenditures	1994	No	50% of liability	No	No	7 Years
South Carolina	5% of qualified research expenditures conducted in the state. The annual credit is capped at 50% of a taxpayer's state tax liability net of all other applied credits.	5% of incremental research expenditures	2001	No	50% of liability	No	No	10 Years
South Dakota	None	NA	NA	NA	NA	NA	NA	NA
Tennessee	None	NA	NA	NA	NA	NA	NA	NA
Texas	Either a franchise tax credit based on qualified research expenses or a sales and use tax exemption on the purchase, lease, rental, storage or use of depreciable tangible personal property directly used in qualified research. 5% of incremental research expenses; 6.25% if the taxpayer contracts with an institution of higher education in the state for the performance of qualified research.	5% of incremental research expenditures	2014	2026	No	No	No	20 Years
Utah	5% of incremental expenditures for research and 7.5% total research expenditures conducted in the state during the tax year.	5% of incremental qualified research expenditures and 7.5% of total qualified research expenditures	2008	No	No	No	No	14 Years for tax credits for incremental expenditures
Vermont	27% of the federal credit for qualified research expenditures conducted in the state.	27% of allocated federal credit	2011	No	No	No	No	10 Years
Virginia	<i>Standard R&D Expense Credit.</i> 15% of the first \$300,000 in incremental qualified research expenditures conducted in the state or 20% of the first \$300,000 in incremental qualified research expenditures if the research was conducted with a Virginia public or private college or university.	15%-20% of first \$300,000 of incremental research expenses	2011	2021	No	\$7 million statewide cap (Prorated)	Yes	No
	<i>Major R&D Expense Credit.</i> For companies with R&D expenses greater than \$5 million. In general, equal to 10% of incremental R&D expenses, or 5% of qualifying expenses for taxpayers that did not incur Virginia R&D expenses in any of the three prior years.	10% of incremental research expenses	2016	2021	75% of liability	\$20 million statewide cap (Prorated)	No	10 Years

Table 1 (continued). Research and Development Tax Credit Programs by State

State	Credit Description	General Tax Credit Basis and Rate	Initial Tax Year	Sunset Date	Limit on Taxpayer Credit Amount	Statewide Program Cap	Refundable	Credit Carry Forward
Washington	The greater of the taxpayer's average tax rate or 1.5% multiplied by qualified research expenditures conducted in the state in excess of 0.92% of taxable income. Credits are capped at \$2 million per company. The research must be carried out in one of the five high technology fields: advanced computing, advanced materials, biotechnology, electronic device technology, and environmental technology.	Average tax rate percentage of qualified research expenditures in excess of 0.92% of taxable income	1995	2015	\$2 million	No	No	No
West Virginia	The greater of 3% of qualified research expenditures conducted in the state or 10% of incremental qualified research expenditures over a three-year base period. The credit may be refundable for companies with annual gross receipts of less than \$20 million and annual payroll of less than \$2.5 million.	The greater of 3% of qualified research expenditures conducted in the state or 10% of incremental qualified research expenditures over a three-year base period.	2003	No	No	No	Yes, for qualified small businesses only	10 Years
Wisconsin	5.75% of incremental qualified research expenditures conducted in the state. 11.5% for research expenditures incurred in qualified research related to internal combustion engines and certain energy efficient products. Credits are only available to corporations. (If the claimant had no qualified research expenses in any of the 3 taxable years immediately preceding the taxable year for which the claimant claims the credit, the claimant may claim an amount equal to 2.875% of the qualified research expenses for the taxable year for which the credit is claimed or 5.75 % for research related to internal combustion engines or certain energy efficient products.)	5.75% - 11.5% of incremental research expenditures	1986	No	No	No	No	15 Years
Wyoming	None	NA	NA	NA	NA	NA	NA	NA

Sources: TaxCreditResearch.com, www.taxcreditresearch.com; C2ER State Business Incentives Database, www.stateincentives.org; updated June, 2016.

NA=Not applicable

Note: Table 1 shows state tax credits for research expenditures. Many states offer additional tax incentives for expenditures related to research, such as for construction of research facilities, which are not included in the table.

Table 2. Research Expenditures and Iowa Research Activities Tax Credit Amounts by Calculation Method

Research Expenditures and Research Activities Tax Credits Reported on Form IA 128												
				Tax Year	Count	Total U.S. Expenditures (Millions)	IA Share of U.S. Expenditures	Total IA Expenditures (Millions)	Research Activities Tax Credits (Millions)	Supplemental RAC (Millions)	Total RAC (Millions)	Total RAC per Research Dollar
Distribution of U.S. Research Expenditures Reported on Form IA 128				2006	336	\$13,255.06	5.1%	\$681.06	\$20.55	\$4.35	\$24.90	\$0.037
				2007	377	\$12,869.39	6.5%	\$833.61	\$24.82	\$10.24	\$35.06	\$0.042
Wages	Supplies	Computers	Contract	2008	305	\$12,634.88	5.0%	\$630.52	\$19.83	\$6.39	\$26.22	\$0.042
54.5%	22.6%	1.4%	21.6%	2009	265	\$10,129.08	6.1%	\$622.54	\$19.18	\$5.95	\$25.13	\$0.040
				2010	257	\$9,700.54	6.5%	\$626.43	\$19.58	\$4.18	\$23.76	\$0.038
Distribution of Iowa Research Expenditures Reported on Form IA 128				2011	242	\$9,083.12	6.9%	\$628.27	\$19.90	\$3.62	\$23.52	\$0.037
				2012	244	\$10,609.49	6.6%	\$698.99	\$22.08	\$2.21	\$24.29	\$0.035
Wages	Supplies	Computers	Contract	2013	243	\$8,222.15	9.4%	\$773.52	\$24.86	\$1.65	\$26.51	\$0.034
67.6%	22.9%	0.1%	9.4%	2014	213	\$8,293.61	9.6%	\$794.76	\$25.44	\$1.65	\$27.10	\$0.034

Research Expenditures and Research Activities Tax Credits Reported on Form IA 128A										
				Tax Year	Count	Total IA Expenditures (Millions)	Research Activities Tax Credits (Millions)	Supplemental RAC (Millions)	Total RAC (Millions)	Total RAC per Research Dollar
Distribution of Iowa Research Expenditures Reported on Form IA 128A				2006	37	\$420.38	\$19.57	\$4.19	\$23.76	\$0.057
				2007	63	\$504.87	\$23.72	\$10.50	\$34.22	\$0.068
Wages	Supplies	Computers	Contract	2008	79	\$594.39	\$19.40	\$6.34	\$25.74	\$0.043
65.9%	25.1%	0.4%	8.6%	2009	87	\$575.31	\$18.28	\$5.73	\$24.02	\$0.042

Research Expenditures and Research Activities Tax Credits Reported on Form IA 128S												
Distribution of U.S. Research Expenditures Reported on Form IA 128S				Tax Year	Count	Total U.S. Expenditures Reported* (Millions)	IA Share of Reported U.S. Expenditures	Total IA Expenditures (Millions)	Research Activities Tax Credits (Millions)	Supplemental RAC (Millions)	Total RAC (Millions)	Total RAC per Research Dollar
Wages	Supplies	Computers	Contract	2010	143	\$2,636.33	27.9%	\$736.24	\$19.34	\$11.66	\$30.99	\$0.042
63.3%	19.0%	0.0%	17.7%	2011	210	\$9,075.29	9.7%	\$879.33	\$23.67	\$12.71	\$36.38	\$0.041
Distribution of Iowa Research Expenditures Reported on Form IA 128S				2012	241	\$11,693.57	8.4%	\$979.57	\$26.93	\$6.67	\$33.60	\$0.034
Wages	Supplies	Computers	Contract	2013	267	\$10,978.13	9.3%	\$1,018.58	\$25.95	\$5.54	\$31.49	\$0.031
65.4%	22.7%	0.0%	11.8%	2014	281	\$8,659.95	11.7%	\$1,015.63	\$31.09	\$6.57	\$37.66	\$0.037

Table 2 (continued). Research Expenditures and Iowa Research Activities Tax Credit Amounts by Calculation Method

Total Research Expenditures and Research Activities Tax Credits												
				Tax Year	Count	Total U.S. Expenditures (Millions)	IA Share of U.S. Expenditures	Total IA Expenditures (Millions)	Research Activities Tax Credits (Millions)	Supplemental RAC (Millions)	Total RAC (Millions)	Total RAC per Research Dollar
				2006	373	\$13,255.06	8.3%	\$1,101.44	\$40.12	\$8.54	\$48.66	\$0.044
<u>Distribution of U.S. Research Expenditures</u>				2007	440	\$12,869.39	10.4%	\$1,338.48	\$48.54	\$20.74	\$69.28	\$0.052
Wages	Supplies	Computers	Contract	2008	384	\$12,634.88	9.7%	\$1,224.91	\$39.23	\$12.73	\$51.95	\$0.042
57.2%	21.5%	1.0%	20.3%	2009	352	\$10,129.08	11.8%	\$1,197.84	\$37.46	\$11.68	\$49.15	\$0.041
				2010	400	\$12,336.87	11.0%	\$1,362.67	\$38.92	\$15.83	\$54.75	\$0.040
				2011	452	\$18,158.41	8.3%	\$1,507.60	\$43.57	\$16.33	\$59.90	\$0.040
<u>Distribution of Iowa Research Expenditures</u>				2012	485	\$22,303.07	7.5%	\$1,678.56	\$49.00	\$8.88	\$57.89	\$0.034
Wages	Supplies	Computers	Contract	2013	510	\$19,200.28	9.3%	\$1,792.10	\$50.81	\$7.19	\$58.00	\$0.032
66.3%	23.4%	0.2%	10.1%	2014	494	\$16,953.55	10.7%	\$1,810.39	\$56.53	\$8.22	\$64.75	\$0.036

Source: Iowa Department of Revenue Tax Credit Tracking and Analysis System (TCTAS)* Taxpayers are not required to report total U.S. research expenditures on the IA 128S.
Tax year 2014 is incomplete

Table 3. Gross Receipts, Qualified Research Expenditures, and Aggregate Research Intensity by RAC Calculation Method

Tax Year	Credits		Reported Annual Gross Receipts* (Millions)				Qualified Research Expenditures (Millions)				Average Research Intensity**
	Number	Percent of Total	Amount	Percent of Total	Average	Median	Total	Percent of Total	Average	Median	Average
IA 128 - Regular Method											
2010	257	64%	\$319,603.48	82%	\$1,248.45	\$12.30	\$626.43	46%	\$2.44	\$0.45	0.20%
2011	242	54%	\$242,634.94	57%	\$1,023.78	\$9.92	\$628.27	42%	\$2.60	\$0.45	0.25%
2012	244	50%	\$198,199.46	50%	\$819.01	\$10.82	\$698.99	42%	\$2.86	\$0.46	0.35%
2013	243	48%	\$209,827.87	78%	\$870.66	\$7.73	\$773.52	43%	\$3.18	\$0.42	0.37%
2014	213	43%	\$200,786.94	67%	\$947.11	\$7.02	\$794.76	44%	\$3.73	\$0.40	0.39%
IA 128S - Alternative Simplified Method											
2010	143	36%	\$71,269.33	18%	\$848.44	\$17.12	\$736.24	54%	\$5.15	\$0.42	0.61%
2011	210	46%	\$184,213.20	43%	\$1,561.13	\$14.74	\$879.33	58%	\$4.19	\$0.58	0.27%
2012	241	50%	\$196,515.33	50%	\$1,162.81	\$5.47	\$979.57	58%	\$4.06	\$0.46	0.35%
2013	267	52%	\$58,530.22	22%	\$295.61	\$5.82	\$1,018.58	57%	\$3.81	\$0.55	1.29%
2014	281	57%	\$100,984.25	33%	\$440.98	\$4.94	\$1,015.63	56%	\$3.61	\$0.48	0.82%
Total											
2010	400	100%	\$390,872.81	100%	\$1,149.63	\$13.39	\$1,362.67	100%	\$3.41	\$0.43	0.30%
2011	452	100%	\$426,848.14	100%	\$1,202.39	\$11.02	\$1,507.60	100%	\$3.34	\$0.48	0.28%
2012	485	100%	\$394,714.79	100%	\$960.38	\$8.34	\$1,678.56	100%	\$3.46	\$0.46	0.36%
2013	510	100%	\$268,358.09	100%	\$611.29	\$6.81	\$1,792.10	100%	\$3.51	\$0.48	0.57%
2014	494	100%	\$301,771.19	100%	\$684.29	\$5.99	\$1,810.39	100%	\$3.66	\$0.46	0.54%

Source: Iowa Department of Revenue

Tax year 2014 is incomplete.

*Taxpayers report the four-year moving average of annual gross receipts. Taxpayers using the IA 128S are not required to supply data for annual gross receipts. The amount of annual gross receipts reflects the totals among taxpayers that supplied this information. Average and median annual gross receipts are calculated based on non-missing data.

**Research Intensity is the percentage of average of annual gross receipts represented by average qualified research expenditures, calculated based on non-missing data.

Table 4. Research Activities Tax Credits Earned by Calculation Method

Tax Year	Number	Tax Credit Amount		
		Total	Average	Median
RAC - Regular Method Only				
2010	257	\$19,583,161	\$76,199	\$12,735
2011	242	\$19,902,746	\$82,243	\$13,289
2012	244	\$22,075,706	\$90,474	\$14,233
2013	243	\$24,857,091	\$102,293	\$13,385
2014	213	\$25,443,700	\$119,454	\$12,979
RAC - Alternative Simplified Method Only				
2010	143	\$19,336,965	\$135,224	\$11,664
2011	210	\$23,667,565	\$112,703	\$15,561
2012	241	\$26,928,428	\$111,736	\$11,132
2013	267	\$25,950,748	\$97,194	\$12,995
2014	281	\$31,090,887	\$110,644	\$12,296
RAC - Total				
2010	400	\$38,920,126	\$97,300	\$12,320
2011	452	\$43,570,311	\$96,395	\$14,142
2012	485	\$49,004,134	\$101,040	\$12,987
2013	510	\$50,807,839	\$99,623	\$13,197
2014	494	\$56,534,587	\$114,443	\$12,457
Supplemental RAC				
2010	40	\$15,832,462	\$395,812	\$31,562
2011	41	\$16,326,452	\$398,206	\$51,494
2012	39	\$8,882,749	\$227,763	\$36,753
2013	31	\$7,187,340	\$231,850	\$51,186
2014	24	\$8,218,974	\$342,457	\$52,960
Total RAC and Supplemental RAC				
2010	400	\$54,752,588	\$136,881	\$12,923
2011	452	\$59,896,763	\$132,515	\$14,500
2012	485	\$57,886,883	\$119,354	\$13,210
2013	510	\$57,995,179	\$113,716	\$13,197
2014	494	\$64,753,561	\$131,080	\$12,457

Source: Iowa Department of Revenue
Tax year 2014 is incomplete.

Table 5. Research Activities Tax Credit Claims by Tax Type

Tax Year	Corporation Income Tax			Individual Income Tax			Total		Corporation Claims Share	
	Number of Claims	Amount of RAC Claims	Average RAC Claim	Number of Claims	Amount of RAC Claims	Average RAC Claim	Number of Claims	Amount of RAC Claims	Percent of Claims	Percent of Claimed Amount
2006	175	\$39,026,024	\$223,006	938	\$6,671,744	\$7,113	1,113	\$45,697,768	15.7%	85.4%
2007	184	\$49,581,042	\$269,462	951	\$6,758,984	\$7,107	1,135	\$56,340,026	16.2%	88.0%
2008	196	\$46,429,344	\$236,884	960	\$6,735,174	\$7,016	1,156	\$53,164,518	17.0%	87.3%
2009	183	\$45,421,669	\$248,206	976	\$6,894,051	\$7,064	1,159	\$52,315,720	15.8%	86.8%
2010	212	\$49,527,230	\$233,619	986	\$6,913,083	\$7,011	1,198	\$56,440,313	17.7%	87.8%
2011	242	\$52,389,340	\$216,485	984	\$6,797,439	\$6,908	1,226	\$59,186,779	19.7%	88.5%
2012	246	\$50,474,203	\$205,180	1,003	\$7,026,463	\$7,005	1,249	\$57,500,666	19.7%	87.8%
2013	261	\$50,766,772	\$194,509	1,018	\$7,060,321	\$6,935	1,279	\$57,827,093	20.4%	87.8%
2014	248	\$50,465,162	\$203,489	1,036	\$7,141,770	\$6,894	1,284	\$57,606,932	19.3%	87.6%
Total	1,947	\$434,080,786	\$222,949	8,852	\$61,999,029	\$7,004	10,799	\$496,079,815	18.0%	87.5%

Source: Iowa Department of Revenue Tax Credit Tracking and Analysis System (TCTAS)

Tax year 2014 is incomplete.

Note: RAC claim amounts include Supplemental RAC.

Table 6. Research Activities Tax Credit Claims Paid as Refunds

Tax Year	Corporation Income Tax				Individual Income Tax			
	Total RAC Claims	RAC Claims Paid as Refunds	Refunds Percentage of Total RAC Claims	Percentage of RAC Filers Receiving Refund	Total RAC Claims	RAC Claims Paid as Refunds	Refunds Percentage of Total RAC Claims	Percentage of RAC Filers Receiving Refund
2006	\$39,026,024	\$36,704,577	94.1%	72.6%	\$6,671,744	\$6,498,428	97.4%	92.6%
2007	\$49,581,042	\$46,971,735	94.7%	75.0%	\$6,758,984	\$3,662,073	54.2%	31.4%
2008	\$46,429,344	\$42,726,049	92.0%	78.6%	\$6,735,174	\$3,486,102	51.8%	34.7%
2009	\$45,421,669	\$41,173,822	90.6%	78.7%	\$6,894,051	\$3,712,224	53.8%	37.6%
2010	\$49,527,230	\$34,626,814	69.9%	73.0%	\$6,913,083	\$3,404,180	49.2%	32.5%
2011	\$52,389,340	\$34,190,269	65.3%	67.6%	\$6,797,439	\$3,498,304	51.5%	33.0%
2012	\$50,474,203	\$36,204,413	71.7%	70.8%	\$7,026,463	\$3,066,441	43.6%	28.2%
2013	\$50,766,772	\$42,101,041	82.9%	72.2%	\$7,060,321	\$3,044,220	43.1%	27.3%
2014	\$50,465,162	\$43,900,486	87.0%	78.3%	\$7,141,770	\$2,464,522	34.5%	21.4%
Total	\$434,080,786	\$358,599,206	82.6%	73.7%	\$61,999,029	\$32,836,494	53.0%	37.2%

Source: Iowa Department of Revenue Tax Credit Tracking and Analysis System (TCTAS)

RAC claim amounts include Supplemental RAC.

Tax year 2014 is incomplete.

Table 7. Data Source for Fixed-Base Percentage for ASC Firms for Analysis

Source of Data for Firm's Fixed-Base Percentage	Number of ASC Cases	Included in Analysis
Not available	552	0
Assumed to be 3%	418	418
Other tax documentation (Federal Form 6765 Same Year or IA 128 Different Year)	172	172
Total	1,142	590

Source: Iowa Department of Revenue

Table 8. Regular RAC Earnable by Firms Using the Alternative Simplified Method

Tax Year	Total IA 128S Cases	Total QRE under IA 128S (Millions)	Total RAC Amount under IA 128S (Millions)	IA 128S Cases Included in Analysis*	QRE for IA 128S Cases Included in Analysis (Millions)	RAC for IA 128S Cases Included in Analysis (Millions)	RAC Calculated for Analysis Cases Using Procedures for IA 128 (Millions)	Actual RAC for IA 128S Cases as Percentage of RAC Using IA 128 Procedures
128S Switch Firms								
2010	93	\$684.11	\$17.8	53	\$652.55	\$17.01	\$11.21	152%
2011	115	\$788.06	\$21.4	76	\$713.63	\$19.20	\$11.77	163%
2012	124	\$869.35	\$24.2	71	\$249.65	\$6.65	\$5.53	120%
2013	131	\$860.99	\$21.7	73	\$241.28	\$5.81	\$5.70	102%
2014	123	\$735.61	\$24.2	70	\$426.40	\$9.53	\$11.31	84%
Total	586	\$3,938.13	\$109.2	343	\$2,283.50	\$58.21	\$45.52	128%
128S New Firms								
2010	50	\$52.12	\$1.6	29	\$20.96	\$0.63	\$0.46	138%
2011	92	\$90.65	\$2.3	38	\$29.18	\$0.68	\$0.42	165%
2012	103	\$90.99	\$2.3	44	\$31.34	\$0.69	\$0.40	172%
2013	121	\$111.20	\$2.9	42	\$34.47	\$0.95	\$0.64	147%
2014	143	\$234.78	\$5.7	63	\$158.16	\$3.74	\$4.48	83%
Total	509	\$579.74	\$14.7	216	\$274.10	\$6.70	\$6.40	105%
128 New Firms								
2010	0	\$0.00	\$0.0	0	N/A	N/A	N/A	N/A
2011	3	\$0.62	\$0.0	3	\$0.62	\$0.02	\$0.02	110%
2012	14	\$19.22	\$0.5	8	\$9.15	\$0.28	\$0.28	99%
2013	15	\$46.39	\$1.4	10	\$31.72	\$0.94	\$0.99	94%
2014	15	\$45.23	\$1.2	10	\$31.49	\$0.85	\$0.83	102%
Total	47	\$111.47	\$3.1	31	\$72.98	\$2.08	\$2.12	98%
All Firms*								
2010	143	\$736.24	\$19.3	82	\$673.51	\$17.65	\$11.67	151%
2011	210	\$879.33	\$23.7	117	\$743.42	\$19.91	\$12.20	163%
2012	241	\$979.57	\$26.9	123	\$290.14	\$7.63	\$6.22	123%
2013	267	\$1,018.58	\$26.0	125	\$307.47	\$7.70	\$7.34	105%
2014	281	\$1,015.63	\$31.1	143	\$616.04	\$14.11	\$16.62	85%
Total	1,142	\$4,629.34	\$127.0	590	\$2,630.58	\$66.99	\$54.05	124%

Source: Iowa Department of Revenue

* Data set includes RAC tax credit data reported on the IA 128S only, for tax years 2010 through 2014.

Data for tax year 2014 is incomplete.

N/A: Not applicable.

Table 9. Overview of Comparison of Actual ASC to Calculated Value of Regular RAC

Source of Data for Firm's Fixed-Base Percentage	Number of ASC Cases	RAC for IA 128S Cases Included in Analysis	RAC Calculated for Analysis Cases Using Procedures for IA 128	Number of Cases in which Calculated Regular RAC is Higher than ASC	Number of Cases in which Calculated Regular RAC is Lower than ASC	Percent of Cases in which Calculated Regular RAC is Higher than ASC
Assumed to be 3%	418	\$60,755,169	\$48,447,658	135	283	32%
Other tax documentation*	172	\$6,236,543	\$5,598,646	75	97	44%
Total	590	\$66,991,712	\$54,046,304	210	380	36%

Source: Iowa Department of Revenue

* Other tax documentation includes the Federal Form 6765 or an IA 128 filed by the same firm for a different tax year.

Table 10. Detailed Comparison of Actual ASC to Calculated Value of Regular RAC, Includes Cases for Which Fixed-Based Percentage is Either Assumed to be 3% or Available from Tax Documentation

Overview of Cases Included in Analysis					Cases in Which Calculated RAC is Higher than Claimed ASC					
Tax Year	Number of ASC Cases	Cases in which Calculated Regular RAC is Higher than ASC	Percent of Cases in which Calculated Regular RAC is Higher than ASC	Minimum Value of Difference (Calculated RAC - Actual ASC)	Median Value of Difference (Calculated RAC - Actual ASC)	Maximum Value of Difference (Calculated RAC - Actual ASC)	Average Value of Difference (Calculated RAC - Actual ASC)	Minimum Percentage of Difference (Calculated RAC - Actual ASC)	Maximum Percentage of Difference (Calculated RAC - Actual ASC)	Average Percentage of Difference (Calculated RAC - Actual ASC)
2010	82	28	34.1%	\$303	\$5,108	\$591,460	\$54,765	8.20%	168%	50%
2011	117	48	41.0%	\$218	\$2,980	\$714,369	\$29,584	1.50%	331%	51%
2012	123	45	36.6%	\$89	\$2,381	\$745,631	\$21,246	0.80%	704%	51%
2013	125	46	36.8%	\$38	\$3,519	\$1,146,335	\$33,502	1.00%	273%	47%
2014	143	43	30.1%	\$23	\$3,849	\$3,324,897	\$112,381	0.30%	436%	43%
Total	590	210	35.6%	\$23	\$3,184	\$3,324,897	\$28,220	0.30%	704%	47%

Source: Iowa Department of Revenue

Table 11. Detailed Comparison of Actual ASC to Calculated Value of Regular RAC, Includes Only Cases for Which Fixed-Based Percentage is Available from Tax Documentation

Overview of Cases Included in Analysis					Cases in Which Calculated RAC is Higher than Claimed ASC					
Tax Year	Number of ASC Cases	Cases in which Calculated Regular RAC is Higher than ASC	Percent of Cases in which Calculated Regular RAC is Higher than ASC	Minimum Value of Difference (Calculated RAC - Actual ASC)	Median Value of Difference (Calculated RAC - Actual ASC)	Maximum Value of Difference (Calculated RAC - Actual ASC)	Average Value of Difference (Calculated RAC - Actual ASC)	Minimum Percentage of Difference (Calculated RAC - Actual ASC)	Maximum Percentage of Difference (Calculated RAC - Actual ASC)	Average Percentage of Difference (Calculated RAC - Actual ASC)
2010	28	7	25.0%	\$1,324	\$5,108	\$127,233	\$31,961	43.07%	168%	80%
2011	41	21	51.2%	\$218	\$3,136	\$56,062	\$7,468	1.51%	143%	35%
2012	40	20	50.0%	\$89	\$2,215	\$20,219	\$4,195	1.86%	67%	25%
2013	39	19	48.7%	\$38	\$3,216	\$28,687	\$6,364	0.98%	273%	48%
2014	24	8	33.3%	\$252	\$1,601	\$15,174	\$3,754	10.39%	48%	24%
Total	172	75	43.6%	\$38	\$2,994	\$127,233	\$8,206	0.98%	273%	39%

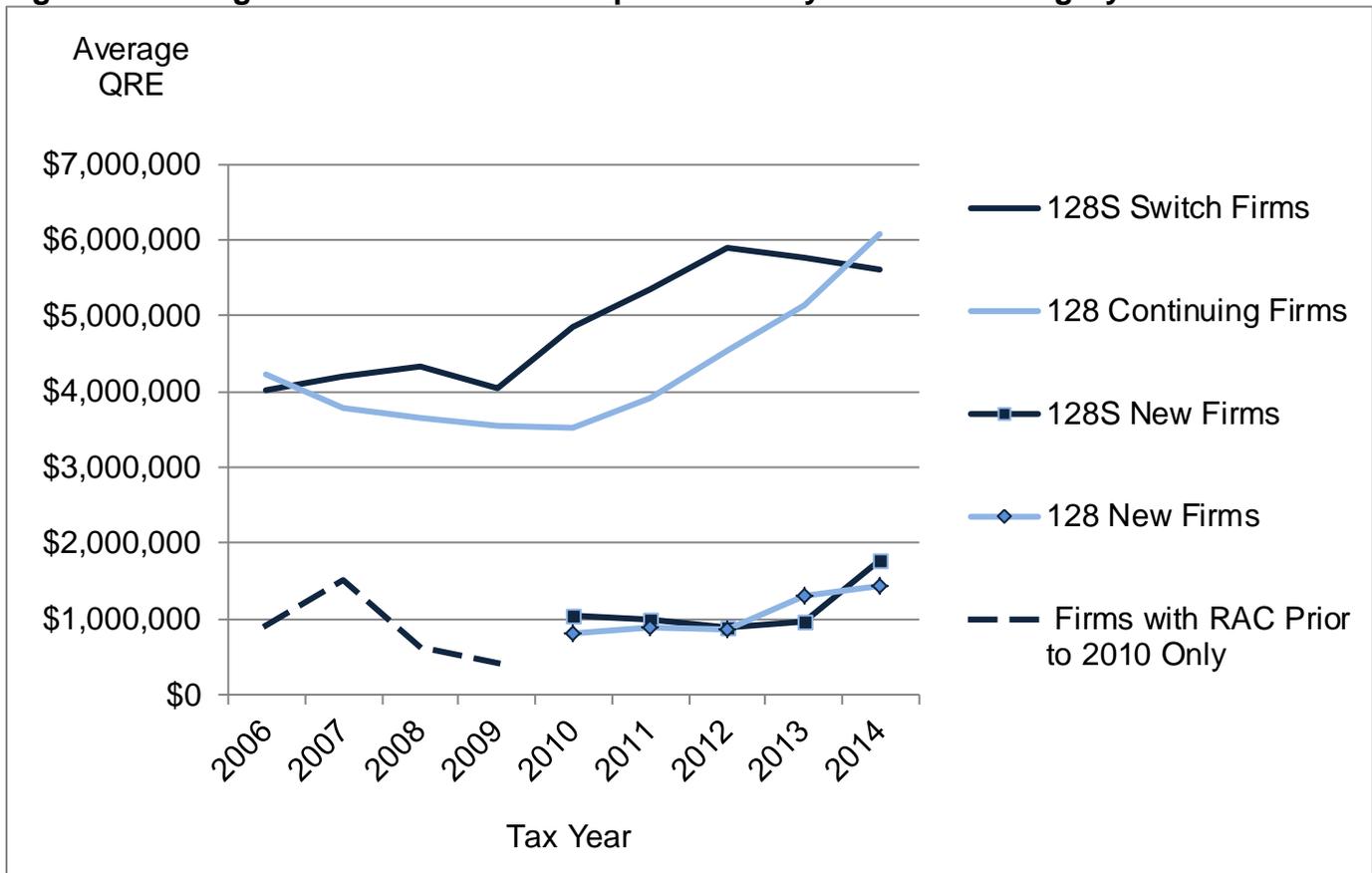
Source: Iowa Department of Revenue

Table 12. Number of Firms, Research Expenditures, and RAC Amounts by Form-Use Category

	Count of Firms	Aggregate Qualified Research Expenditures	Aggregate RAC Amount All Years	Aggregate Supplemental RAC Amount All Years
128S Switch Firms (Firms whose first RAC was prior to 2010 and switched to 128S in 2010 or after)	185	\$6,533,267,773	\$177,019,009	\$70,588,915
128 Continuing Firms (Firms whose first RAC was prior to 2010 and <i>did not</i> switch to 128S in 2010 or after)	168	\$4,887,361,522	\$156,028,289	\$35,687,805
128S New Firms (Firms whose first RAC was in 2010 or after and first form used was the IA 128S)	247	\$642,218,641	\$16,560,635	\$1,170,065
Firms that had filed an Iowa tax return prior to 2010	174	\$413,891,372	\$10,846,726	\$744,260
Firms that were new taxpayers in Iowa in 2010 or after	73	\$228,327,269	\$5,713,909	\$425,805
128 New Firms (Firms whose first RAC was in 2010 or after and first form used was the IA 128)	189	\$461,186,214	\$13,923,676	\$1,106,669
Firms that had filed an Iowa tax return prior to 2010	83	\$160,329,047	\$4,976,704	\$111,939
Firms that were new taxpayers in Iowa in 2010 or after	106	\$300,857,167	\$8,946,972	\$994,730
Firms with RAC Prior to 2010 Only	295	\$463,501,768	\$13,227,827	\$1,729,002
Total	1,084	\$12,987,535,918	\$376,759,437	\$110,282,456

Source: Iowa Department of Revenue
Data set includes RAC tax credit data for tax years 2006 through 2014.
Dollar amounts are not inflation-adjusted.
RAC data for tax year 2014 is incomplete.

Figure 1. Average Qualified Research Expenditures by Form Use Category



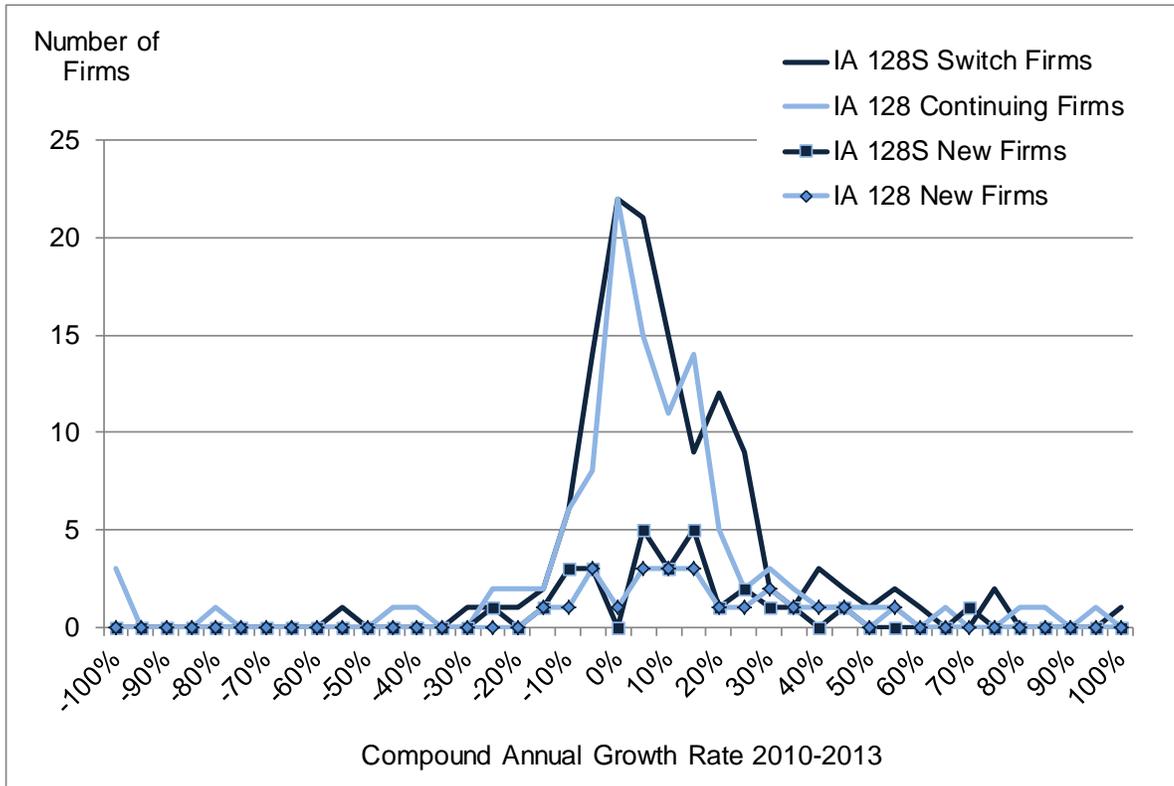
Source: Iowa Department of Revenue
 Data for tax year 2014 is incomplete.

Table 13. Compound Annual Growth since 2010 in Qualified Research Expenditures by Form Use Category

	Compound Annual Growth in Qualified Research Expenditures						
	Total Number of Firms	2010 through 2011		2010 through 2012		2010 through 2013	
		Number of Firms	Average Growth	Number of Firms	Average Growth	Number of Firms	Average Growth
IA 128S Switch Firms	185	136	7.3%	134	6.9%	129	7.8%
(Firms whose first RAC was prior to 2010 and switched to IA 128S in 2010 or after)							
Firms that filed <i>only</i> the IA 128S since 2010	105	68	12.2%	70	9.0%	65	8.1%
Firms that filed the IA 128 in at least one year after 2010	80	68	2.4%	64	4.7%	64	7.4%
IA 128 Continuing Firms	168	123	7.3%	118	3.0%	108	2.5%
(Firms whose first RAC was prior to 2010 and <i>did not</i> switch to IA 128S in 2010 or after)							
IA 128S New Firms	247	39	7.1%	31	8.8%	32	7.3%
(Firms whose first RAC was in 2010 or after and first form used was the IA 128S)							
Firms that filed <i>only</i> the IA 128S since 2010	230	33	5.3%	25	7.7%	26	7.1%
Firms that filed the IA 128 in at least one year after 2010	17	6	16.6%	6	13.2%	6	8.5%
IA 128 New Firms	189	31	11.5%	27	11.5%	23	12.4%
(Firms whose first RAC was in 2010 or after and first form used was the IA 128)							
Firms that filed <i>only</i> the IA 128 since 2010	166	22	12.0%	17	12.8%	13	16.0%
Firms that filed the IA 128S in at least one year after 2010	23	9	10.2%	10	9.4%	10	7.8%

Source: Iowa Department of Revenue

Figure 2. Number of Firms by Percentage Change in Qualified Research Expenditures between 2010 and 2013



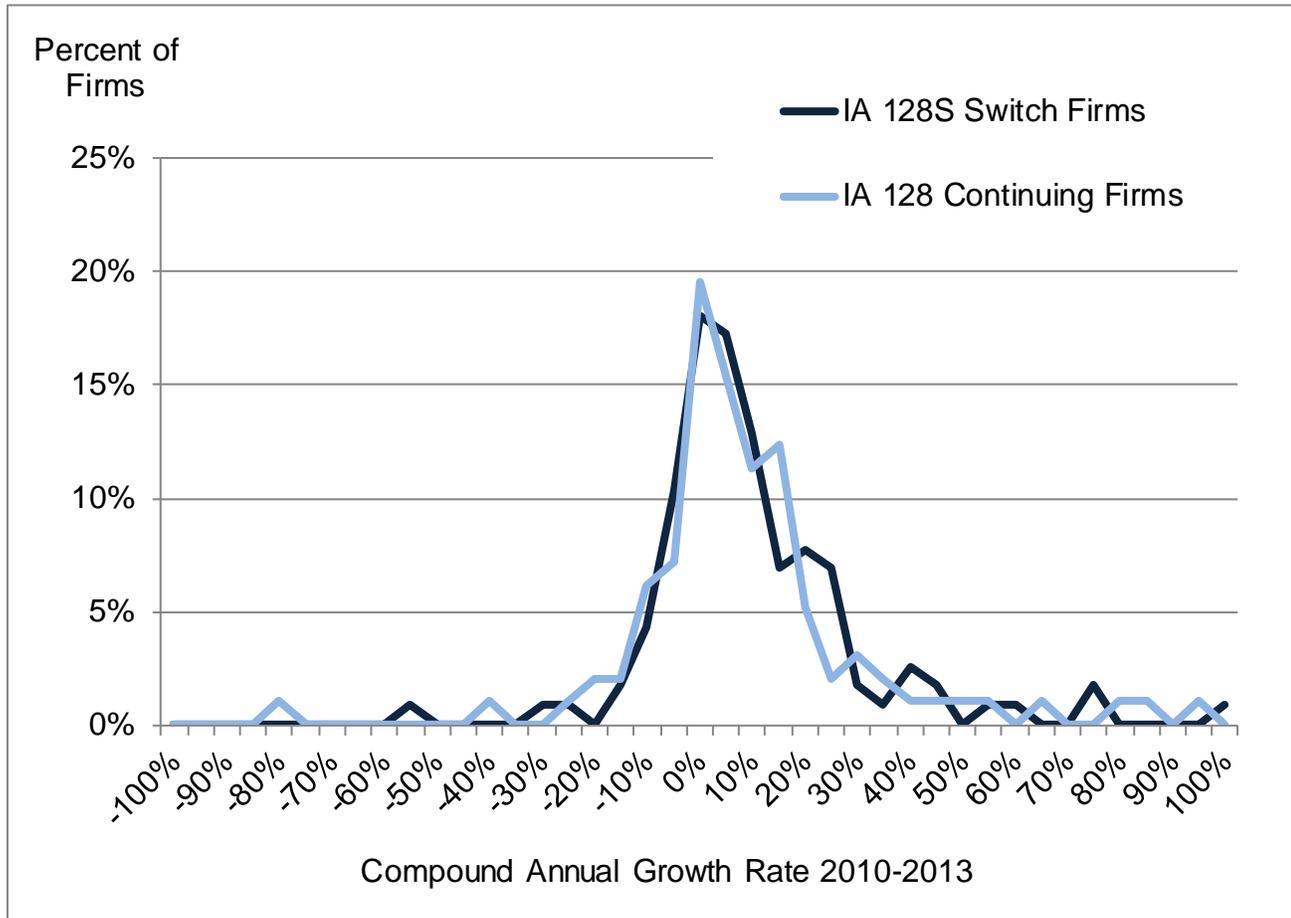
Source: Iowa Department of Revenue

Table 14. Compound Annual Growth since 2010 in Qualified Research Expenditures by Form Use Category Among Firms That Have Claimed the RAC in All Four Years

	Total Number of Firms	Total Number of Firms that Earned RAC in All Four Years	Compound Annual Growth in Qualified Research Expenditures			
			First Tax Year	2010	2010	2010
			Last Tax Year	-	-	-
			2011	2012	2013	
			Average Growth	Average Growth	Average Growth	
IA 128S Switch Firms (Firms whose first RAC was prior to 2010 and switched to IA 128S in 2010 or after)	185	116	8.4%	8.5%	7.5%	
IA 128 Continuing Firms (Firms whose first RAC was prior to 2010 and <i>did not</i> switch to IA 128S in 2010 or after)	168	100	8.5%	4.4%	6.4%	
IA 128S New Firms (Firms whose first RAC was in 2010 or after and first form used was the IA 128S)	247	23	15.5%	11.8%	11.0%	
IA 128 New Firms (Firms whose first RAC was in 2010 or after and first form used was the IA 128)	189	20	14.1%	13.3%	10.9%	

Source: Iowa Department of Revenue

Figure 3. Percent of Firms by Percentage Change in Qualified Research Expenditures between 2010 and 2013



Source: Iowa Department of Revenue

Note: (Includes only firms that claimed the RAC in all four years 2010 through 2013.)

Table 15. Supplemental Research Activities Tax Credit Awards by Firm Size and Time Frame of Award

Year of Award	Supplemental RAC Awards					
	Number of Supplemental Awards			Amount of Supplemental Awards		
	Total Number of Awards	Average Awards per Year	Percent of Total	Total Amount of Awards	Average Amount of Award	Percent of Total
2005-2010						
Firm's Average Annual Gross Revenues						
Less than \$20 Million	10	1.7	21%	\$3,284,434	\$328,443	6%
Greater Than than \$20 Million	22	3.7	46%	\$43,941,231	\$1,997,329	82%
Not Identified	16	2.7	33%	\$6,375,586	\$398,474	12%
Total	48	8.0	100%	\$53,601,251	\$1,116,693	100%
2011-2014						
Firm's Average Annual Gross Revenues						
Less than \$20 Million	14	3.5	29%	\$1,527,459	\$109,104	8%
Greater Than than \$20 Million	14	3.5	29%	\$11,588,530	\$827,752	63%
Not Identified	20	5.0	42%	\$5,135,007	\$256,750	28%
Total	48	12.0	100%	\$18,250,996	\$380,229	100%
2005-2014						
Firm's Average Annual Gross Revenues						
Less than \$20 Million	24	2.4	25%	\$4,811,893	\$50,124	7%
Greater Than than \$20 Million	36	3.6	38%	\$55,529,761	\$578,435	77%
Not Identified	36	3.6	38%	\$11,510,593	\$119,902	16%
Total	96	9.6	100%	\$71,852,247	\$748,461	100%

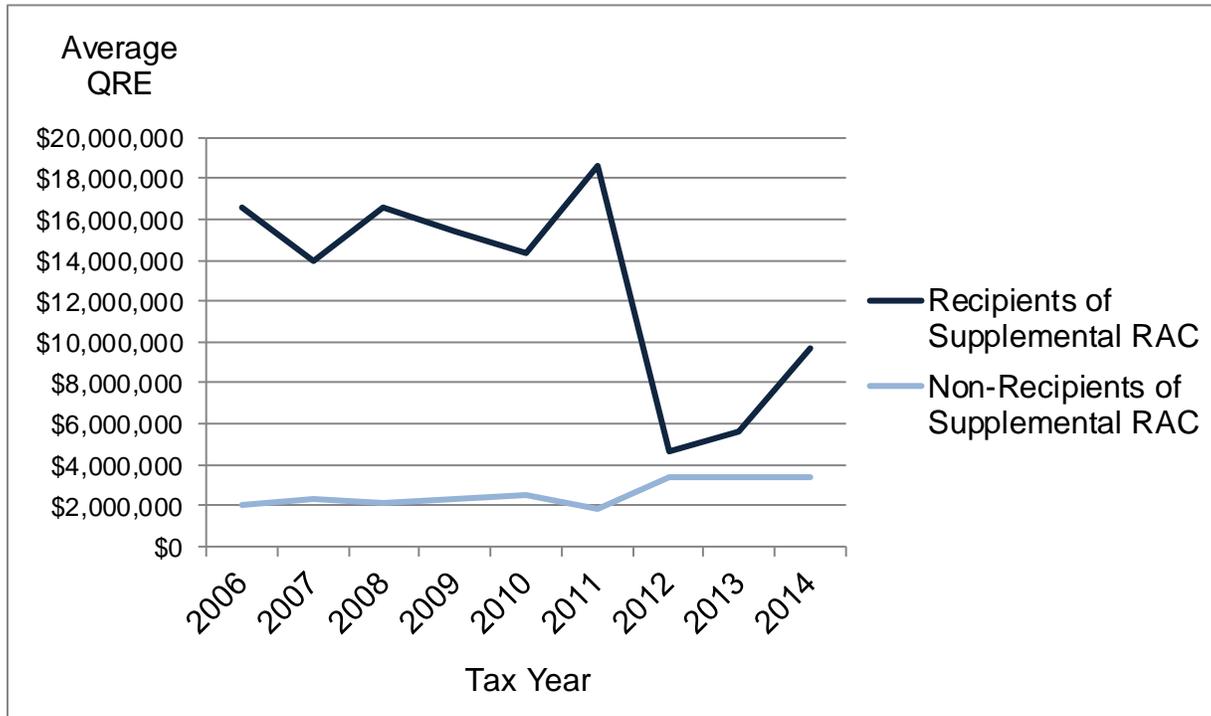
Source: Iowa Economic Development Authority and Iowa Department of Revenue

Table 16. Supplemental Research Activity Tax Credit Claims by Firm Size and Time Frame of Award

Year of Award	Supplemental RAC Claims					
	Number of Supplemental Claims			Amount of Supplemental Claims		
	Total Number of Claims	Average Claims per Year	Percent of Total	Total Amount of Claims	Average Amount of Claim	Percent of Total
2005-2010						
Firm's Average Annual Gross Revenues						
Less than \$20 Million	21	3.5	40%	\$6,782,164	\$322,960	14%
Greater Than than \$20 Million	31	5.2	60%	\$42,432,541	\$1,368,792	86%
Total	52	8.7	100%	\$49,214,705	\$946,437	100%
2011-2014						
Firm's Average Annual Gross Revenues						
Less than \$20 Million	16	4.0	62%	\$557,105	\$34,819	20%
Greater Than than \$20 Million	10	2.5	38%	\$2,186,572	\$218,657	80%
Total	26	6.5	100%	\$2,743,677	\$105,526	100%
2005-2014						
Firm's Average Annual Gross Revenues						
Less than \$20 Million	37	3.7	47%	\$7,339,269	\$198,359	14%
Greater Than than \$20 Million	41	4.1	53%	\$44,619,113	\$1,088,271	86%
Total	78	7.8	100%	\$51,958,382	\$666,133	100%

Source: Iowa Economic Development Authority and Iowa Department of Revenue

Figure 4. Average Expenditures for Recipients and Non-Recipients of Supplemental Research Activities Tax Credit



Source: Iowa Department of Revenue

Data for tax year 2014 is incomplete.

Note: Based on IA128 and IA 128S data filed each tax year split by whether the taxpayer reported a Supplemental RAC award as part of the earned RAC.

Table 17. Estimated Marginal R&D Spending Induced by the RAC

TaxYear	Total QRE (Millions)	Incremental QRE above Base Amount (Millions)	RAC Credit Amount* (Millions)	Estimated Average Effective Rate	Marginal Effective Rate**	Estimated Price Elasticity of Research	Estimated Amount of R&D Spending Per Tax Credit Dollar
Regular Method							
2010	\$626.4	\$300.8	\$19.6	3.12%	7.4%	-1.50	\$1.71
2011	\$628.3	\$302.9	\$19.7	3.13%	7.4%	-1.50	\$1.71
2012	\$699.0	\$339.6	\$22.1	3.16%	7.4%	-1.50	\$1.71
2013	\$773.5	\$379.9	\$24.7	3.19%	7.4%	-1.50	\$1.71
2014	\$794.8	\$374.9	\$24.4	3.07%	7.4%	-1.50	\$1.71
All Years	\$3,522.0	\$1,704.4	\$110.8	3.15%	7.4%	-1.50	\$1.71
Alternative Simplified Credit							
2010	\$736.2	\$423.7	\$19.3	2.63%	5.1%	-1.50	\$1.67
2011	\$879.3	\$507.1	\$23.3	2.65%	5.1%	-1.50	\$1.66
2012	\$979.6	\$577.5	\$26.6	2.72%	5.1%	-1.50	\$1.65
2013	\$1,018.6	\$557.3	\$25.7	2.52%	5.1%	-1.50	\$1.65
2014	\$1,015.6	\$526.0	\$24.3	2.40%	5.1%	-1.50	\$1.65
All Years	\$4,629.3	\$2,591.7	\$119.3	2.58%	5.1%	-1.50	\$1.66
Total Research Activity Credit							
2010	\$1,362.7	\$724.5	\$38.9	2.85%	6.3%	-1.50	\$1.69
2011	\$1,507.6	\$810.1	\$43.0	2.85%	6.1%	-1.50	\$1.68
2012	\$1,678.6	\$923.4	\$49.1	2.93%	6.1%	-1.50	\$1.66
2013	\$1,792.1	\$937.2	\$50.4	2.81%	6.2%	-1.50	\$1.68
2014	\$1,810.4	\$900.8	\$48.7	2.69%	6.2%	-1.50	\$1.68
All Years	\$8,151.3	\$4,296.1	\$230.1	2.82%	6.2%	-1.50	\$1.68

Source: Iowa Department of Revenue

*Excludes RAC earned on the basis of basic research and payments to energy consortia and Supplemental RAC.

** The estimated marginal effective rate for both RAC calculation methods combined is weighted by RAC amounts for the respective methods.

Data for tax year 2014 is incomplete.

Table 18. Estimated Marginal R&D Spending Induced by the RAC at Various Price Elasticities (Tax Years 2010 through 2014 Combined)

Value of PED	IA 128 - Regular Method		IA 128S - Alternative Simplified Method		Total	
	Estimated Amount of R&D Spending Per RAC Dollar at Given PED*	Estimated R&D as a Result of RAC at Given PED (Millions)	Estimated Amount of R&D Spending Per RAC Dollar at Given PED**	Estimated R&D as a Result of RAC at Given PED (Millions)	Estimated Amount of R&D Spending Per RAC Dollar at Given PED	Estimated R&D as a Result of RAC at Given PED (Millions)
-1.0	\$1.14	\$126.4	\$1.10	\$131.6	\$1.12	\$258.0
-1.1	\$1.25	\$139.0	\$1.21	\$144.8	\$1.23	\$283.8
-1.2	\$1.37	\$151.7	\$1.32	\$157.9	\$1.35	\$309.6
-1.3	\$1.48	\$164.3	\$1.43	\$171.1	\$1.46	\$335.4
-1.4	\$1.60	\$177.0	\$1.54	\$184.3	\$1.57	\$361.2
-1.5	\$1.71	\$189.6	\$1.66	\$197.4	\$1.68	\$387.0
-1.6	\$1.83	\$202.2	\$1.77	\$210.6	\$1.79	\$412.8
-1.7	\$1.94	\$214.9	\$1.88	\$223.7	\$1.91	\$438.6
-1.8	\$2.05	\$227.5	\$1.99	\$236.9	\$2.02	\$464.4
-1.9	\$2.17	\$240.2	\$2.10	\$250.1	\$2.13	\$490.2
-2.0	\$2.28	\$252.8	\$2.21	\$263.2	\$2.24	\$516.0

Source: Iowa Department of Revenue

* Assumes marginal effective rate of 7.4 percent.

** Assumes marginal effective rate of 5.1 percent.

Note: Excludes RAC earned on the basis of basic research and payments to energy consortia. Excludes Supplemental RAC.

Data for tax year 2014 is incomplete.

Appendix 1. Time Line of Major Program Changes by Tax Year

1985	The RAC is first available.
1997	The Supplemental RAC is first available as a component of the Enterprise Zone Program.
2000 - 2009	The Alternative Incremental RAC is available.
2005	The Renewable Energy Components RAC is first available, capped at \$1 million. The Supplemental RAC as a component of the High Quality Jobs Program becomes available.
2009	The Supplemental RAC is made subject to an annual tax credit award cap for all EDA tax credit incentives. This cap is set at \$185 million per fiscal year. The cap on the Renewable Energy Components Research Activities Credit is increased to \$2 million Taxpayers making Research Activities Tax Credit claims exceeding \$500,000 filed after July 1, 2009 must be reported annually to the Iowa Legislature.
2010	The Alternative Simplified RAC is first available. Calculation of the Supplemental RAC is made conditional on the gross revenues of the eligible business. The EDA tax incentive award cap including the Supplemental RAC is reduced to \$120 million.
2012	The EDA tax incentive award cap including the Supplemental RAC is increased to \$170 million.
2014	The Enterprise Zone Program is repealed.
2017-2021	The EDA tax incentive award cap including the Supplemental RAC is reduced to \$105 million.

Appendix 2. 2016 Iowa Research Activities Credit Form IA 128



2016 IA 128

Iowa Research Activities Tax Credit

<https://tax.iowa.gov>

Name(s) _____ SSN or FEIN _____

Pass-Through Entity (if applicable) _____

Pass-Through FEIN _____ Tax Period Ending Date _____

PART I – Calculation of U.S. Qualified Research Expenses

- 1. Certain amounts paid or incurred to energy consortia..... 1. _____
- 2. Basic research payments to qualified organizations 2. _____
- 3. Qualified organization base period amount 3. _____
- 4. Wages for qualified research services..... 4. _____
- 5. Cost of supplies used in conducting qualified research..... 5. _____
- 6. Rental or lease costs of computers used in conducting qualified research 6. _____
- 7. Applicable portion of contract research expenses 7. _____
- 8. Total qualified research expenses. Add lines 4 through 7 8. _____
- 9. Fixed-base percentage to four decimals, but not more than 16.00% 9. _____ %
- 10. Average U.S. annual gross receipts for tax years 2012 through 2015 10. _____
- 11. Base amount. Multiply line 10 by the percentage on line 9 11. _____
- 12. Subtract line 11 from line 8. If zero or less, enter zero 12. _____
- 13. Multiply line 8 by 50% (0.5) 13. _____
- 14. Enter the smaller of line 12 or line 13 14. _____
- 15. Total allowable U.S. qualified research expenses. Add lines 1 and 14 15. _____

PART II – Calculation of Tax Credit Based on Percentage of Research Occurring within Iowa

- 16. Basic research payments to qualified organizations in Iowa 16. _____
- 17. Iowa apportioned qualified organization base period amount 17. _____
- 18. Subtract line 17 from line 16. If zero or less, enter zero 18. _____
- 19. Multiply line 18 by 6.5% (0.065) 19. _____
- 20. Certain amounts paid or incurred to energy consortia in Iowa 20. _____
- 21. Wages for qualified research services performed in Iowa 21. _____
- 22. Cost of supplies used in conducting qualified research in Iowa 22. _____
- 23. Rental or lease costs of computers used in conducting qualified research in Iowa 23. _____
- 24. Applicable portion of contract research expenses incurred in Iowa 24. _____
- 25. Total Iowa qualified research expenses. Add lines 20 through 24 25. _____
- 26. Total U.S. qualified research expenses. Add lines 1 and 8 26. _____
- 27. Iowa share of research. Divide line 25 by line 26, enter percentage to four decimals (ex. 72.18%) 27. _____ %
- 28. Expenses allocable to Iowa. Multiply line 15 by line 27 28. _____
- 29. Multiply line 28 by 6.5% (0.065) 29. _____
- 30. Iowa Research Activities Tax Credit. Add lines 19 and 29. Enter in column K of Part II on the IA 148 Tax Credits Schedule 30. _____
- 31. Supplemental Research Activities Tax Credit. See instructions. Enter in column K of Part II on the IA 148 and include the tax credit certificate number in column J. 31. _____
- 32. Pass-through Iowa Research Activities Tax Credit received from partnership, LLC, S corporation, estate, or trust. Enter on Part II and Part IV of the IA 148. 32. _____
- 33. Pass-through Supplemental Research Activities Tax Credit received from partnership, LLC, S corporation, estate, or trust. Enter on Part II and Part IV of the IA 148 and include the tax credit certificate number 33. _____

IA 148 Tax Credits Schedule must be completed.

2016 IA 128 Research Activities Tax Credit Instructions

Form IA 128 is used if the taxpayer elects to claim the regular Research Activities Tax Credit. Form IA 128S is used only if the taxpayer elects to claim the Alternative Simplified Research Activities Tax Credit. The taxpayer may elect to use this method regardless of the method used in computing the federal research tax credit. The taxpayer is not required to use this method in computing the Research Activities Tax Credit for subsequent years.

Research expenses qualified for the Iowa Research Activities Tax Credit are based on the rules governing the federal research tax credit, see section 41 of the Internal Revenue Code (IRC). The Iowa credit equals 6.5% of increased research expenses plus 6.5% of increased basic research expenses in Iowa. Any tax credit in excess of tax liability can be refunded or credited to tax liability for the following year.

Innovative Renewable Energy Generation

Effective July 1, 2009, eligible research activities under the High Quality Jobs Program or under the Enterprise Zone Program include the development and deployment costs of innovative renewable energy generation components manufactured or assembled in Iowa. This cannot include components with more than 200 megawatts of installed effective nameplate capacity. These costs are not eligible for the federal research tax credit. A separate form IA 128 must be completed to account for these costs, which can be included on lines 4 and 21 of the separate form. The amount of the additional tax credit relating to these costs is not eligible for the Supplemental Research Activities Tax Credit.

Example: An eligible business with gross receipts of \$20 million or less earns an Iowa Research Activities Tax Credit of \$50,000, excluding any costs relating to innovative renewable energy generation components. The business is allowed a supplemental credit of \$76,923, which would result in an Iowa tax credit of \$126,923. The Iowa tax credit relating to innovative renewable energy generation components is \$25,000. This can be added to the regular and supplemental tax credit, resulting in a total Iowa Research Activities Tax Credit of \$151,923.

Trades or Businesses under Common Control

For a group of trades or businesses under common control (whether or not incorporated), the Iowa Research Activities Tax Credit is calculated as if all the organizations are one trade or business. The tax credit calculated for the group must be shared among the members on the basis of each member's proportionate contribution to the increase in research expenses.

Adjustments for Certain Acquisitions and Dispositions

If a major portion of a trade or business is acquired or disposed of, adjustments must be made to research expenses for the period before or after the acquisition or disposition.

Short Tax Year

For any short tax year, qualified research expenses are annualized.

Apportionment of Tax Credit

The tax credit calculated on lines 1 through 30 by a partnership, LLC, S corporation, estate, or trust is apportioned to the members. The pass-through entity must file the IA 128 with its return. On Schedule K-1 or on an attachment to Schedule K-1, report the tax credit for each member and instruct the members to report the apportioned tax credit on line 32 of form IA 128 and include it with their tax returns.

If the taxpayer earns a tax credit by conducting research and is a member of a business that has passed through a tax credit to the taxpayer, calculate the tax credit on form IA 128, lines 1 through 30. Also enter the pass-through tax credit on line 33. Report each separately on the IA 148 Tax Credits Schedule.

Supplemental Research Activities Tax Credit

Businesses with tax incentive contracts under the High Quality Jobs Program or the Enterprise Zone Program can be awarded a Supplemental Research Activities Tax Credit by the Iowa Economic Development Authority (IEDA). The total eligible supplemental tax credit claim is provided in the contract along with the tax credit certificate number. For awards issued by the IEDA prior to July 1, 2010, the amount of the supplemental tax credit cannot exceed the tax credit amount shown on line 30. For awards made by the IEDA on or after July 1, 2010, the maximum supplemental tax credit cannot exceed 10% of the sum of lines 18 and 28 for businesses with annual gross receipts of \$20 million or less (as reported on line 10). The maximum supplemental tax credit cannot exceed 3% of the sum of lines 18 and 28 for businesses with annual gross receipts exceeding \$20 million.

If the Supplemental Research Activities Tax Credit is earned by a pass-through entity, report the supplemental tax credit separately on Schedule K-1 and provide the tax credit certificate number. Instruct members to report their tax credit on line 33 of form IA 128 and include it with their tax returns.

2016 IA 128 Instructions

Provide your name, SSN or FEIN, and tax period ending date.

Lines 1 through 7: U.S. qualified research expenses - Enter amounts from the Federal Credit for Increasing Research Activities, federal form 6765. Lines 1-3 are the same as federal lines 1-3; lines 4-7 equal federal lines 5-8.

Line 9: Fixed-base percentage - Use the same fixed-base percentage calculated for the federal research tax credit, rounding to four decimal places ($1/100^{\text{th}}$ of 1%), not to exceed 16.00%.

Line 10: U.S. annual gross receipts - Enter the average U.S. annual gross receipts for the four tax years preceding the tax year for which the tax credit is being determined. For any short year you may be required to annualize gross receipts. See IRC sections 41(c)(1)(B) and 41(f)(4) for details. Use this value to determine the calculation of the Supplemental Research Activities Tax Credit, if applicable.

Line 16: Iowa basic research payments - Corporations other than S corporations, personal holding companies, service organizations, LLCs, and partnerships, enter cash payments, pursuant to a written contract, made to a qualified university or scientific research organization in Iowa for basic research. See IRC section 41(e) for details.

Line 17: Iowa base period amount - Enter the qualified organization base period amount based on minimum basic research amounts for the preceding three years, see IRC section 41(e) for details. For purposes of apportionment, multiply the amount on line 3 by the amount on line 16 divided by the amount on line 2.

Line 20: Iowa energy consortia research expenses - Enter the amounts paid or incurred to energy research consortia in Iowa. In general, an energy research consortium is any organization described in IRC section 501(c)(3) exempt from tax under section 501(a), organized and operated primarily to conduct energy research, and not a private foundation. These amounts cannot be included elsewhere on the return.

Line 21: Iowa expenses on research wages - Enter any wages paid to an employee for qualified research services performed in Iowa.

Line 22: Iowa expenses on research supplies - Enter the amounts paid or incurred for supplies used to conduct qualified research in Iowa.

Line 23: Iowa research expenses on computers - Enter the amount paid or incurred to another person for the right to use computers to conduct qualified research in Iowa. This entry must be reduced by any amount received or accrued from any other person for the right to use substantially identical personal property.

Line 24: Iowa contract research expenses - Include 65% of qualified research performed on your behalf in Iowa. Use 75% for payments made to a qualified research consortium and 100% for payments made for qualified energy research performed by an eligible small business, university, or federal laboratory. Include payments to those same entities to the extent they are included as basic research payments on line 16, not to exceed the base period amount on line 17, subject to the 65% or 75% limitation.

Line 30: Research Activities Tax Credit - Individuals and C corporations must enter this amount on the IA 148 Tax Credits Schedule in column K of Part II; use tax credit code 58 in column I and leave column J blank.

Line 31: Supplemental Research Activities Tax Credit - Individuals and C corporations must enter this amount on the IA 148 Tax Credits Schedule in column K of Part II; use tax credit code 59 in column I and report in column J the tax credit certificate number from the tax credit certificate issued by IEDA.

Line 32: Pass-through Research Activities Tax Credit - If the taxpayer has received any pass-through Research Activities Tax Credit from a partnership, LLC, S corporation, estate, or trust, indicate that amount on this line. Also enter the amount in column K of Part II on the IA 148 Tax Credits Schedule; use tax credit code 58 in column I and leave column J blank. Provide the pass-through name in column M and Federal Employer Identification Number (FEIN) in column N of Part IV on the IA 148 as well as on the top of this form. File a separate IA 128 for each pass-through Research Activities Tax Credit received. Also list the claims separately on Part II of the IA 148 Tax Credits Schedule, providing each pass-through name and FEIN in Part IV.

Line 33: Pass-through Supplemental Research Activities Tax Credit - If the taxpayer has received any pass-through Supplemental Research Activities Tax Credit from a partnership, LLC, S corporation, estate, or trust, indicate that amount on this line. Also enter the amount of line 33 in column K of Part II on the IA 148 Tax Credits Schedule; use tax credit code 59 in column I. Include the tax credit certificate number reported on Schedule K-1 in column J, and provide the pass-through name in column M and FEIN in column N of Part IV on the IA 148. File a separate IA 128 for each pass-through Supplemental Research Activities Tax Credit received. Also list the claims separately on Part II of the IA 148 Tax Credits Schedule, providing each pass-through name and FEIN in Part IV.

Appendix 3. 2016 Iowa Research Activities Credit Form IA 128S



Name(s) _____ SSN or FEIN _____

Pass-Through Entity (if applicable) _____

Pass-Through FEIN _____ Tax Period Ending Date _____

PART I - Background Information – U.S. Qualified Research Expenses

- 1. Certain amounts paid or incurred to energy consortia 1. _____
- 2. Basic research payments to qualified organizations 2. _____
- 3. Qualified organization base period amount 3. _____
- 4. Wages for qualified research services 4. _____
- 5. Cost of supplies used in conducting qualified research 5. _____
- 6. Rental or lease costs of computers used in conducting qualified research 6. _____
- 7. Applicable portion of contract research expenses 7. _____
- 8. Average U.S. annual gross receipts for tax years 2012 through 2015 8. _____

PART II – Calculation of Tax Credit Based on Iowa Qualified Research Expenses

- 9. Basic research payments to qualified organizations in Iowa 9. _____
- 10. Iowa apportioned qualified organization base period amount 10. _____
- 11. Subtract line 10 from line 9. If zero or less, enter zero 11. _____
- 12. Multiply line 11 by 6.5% (0.065) 12. _____
- 13. Certain amounts paid or incurred to energy consortia in Iowa 13. _____
- 14. Wages for qualified research services performed in Iowa 14. _____
- 15. Cost of supplies used in conducting qualified research in Iowa 15. _____
- 16. Rental or lease costs of computers used in conducting qualified research
in Iowa 16. _____
- 17. Applicable portion of contract research expenses incurred in Iowa 17. _____
- 18. Total Iowa qualified research expenses. Add lines 13 through 17 18. _____
- 19. Total qualified research expenses in Iowa for the prior three years. If you had
no qualified research expenses in Iowa during all of those years, enter zero
and skip lines 20 and 21 19. _____
- 20. Divide line 19 by six (6.0) 20. _____
- 21. Subtract line 20 from line 18. If zero or less, enter zero 21. _____
- 22. Multiply line 21 by 4.55% (0.0455)
If you skipped lines 20 and 21, multiply line 18 by 1.95% (0.0195) 22. _____
- 23. Iowa Alternative Simplified Research Activities Tax Credit. Add lines 12 and 22.
Enter in column K of Part II on the IA 148 Tax Credits Schedule 23. _____
- 24. Supplemental Research Activities Tax Credit. See instructions. Enter in column K
of Part II on the IA 148 and include the tax credit certificate number in column J .. 24. _____
- 25. Pass-through Alternative Simplified Research Activities Tax Credit received
from partnership, LLC, S corporation, estate, or trust. Enter on Part II and
Part IV of the IA 148 Tax Credits Schedule 25. _____
- 26. Pass-through Supplemental Research Activities Tax Credit received from
partnership, LLC, S corporation, estate, or trust. Enter on Part II and Part IV of
the IA 148 and include the tax credit certificate number 26. _____

IA 148 Tax Credits Schedule must be completed.

2016 IA 128S Alternative Simplified Research Activities Tax Credit Instructions

Form IA 128S is used only if the taxpayer elects to claim the Alternative Simplified Research Activities Tax Credit. Form IA 128 should be used if the regular Research Activities Tax Credit is claimed. The taxpayer may elect to use this alternative method regardless of the method used in computing the federal research credit. The taxpayer is not required to use this alternative method in computing the Research Activities Tax Credit for subsequent years.

Research expenses qualified for the Iowa Research Activities Tax Credit are based on the rules governing the federal research tax credit; see Section 41 of the Internal Revenue Code (IRC). The Iowa credit equals 4.55% of increased research expenses plus 6.5% of increased basic research expenses in Iowa. Any tax credit in excess of tax liability can be refunded or credited to tax liability for the following year.

Innovative Renewable Energy Generation

Effective July 1, 2009, eligible research activities under the High Quality Jobs Program or under the Enterprise Zone Program include the development and deployment costs of innovative renewable energy generation components manufactured or assembled in Iowa. This cannot include components with more than 200 megawatts of installed effective nameplate capacity. These costs are not eligible for the federal research tax credit. A separate form IA 128S must be completed to account for these costs, which can be included on line 14 of the separate form. The amount of the additional tax credit relating to these costs is not eligible for the Supplemental Alternative Simplified Research Activities Tax Credit.

Example: An eligible business with annual gross receipts of \$20 million or less earns an Iowa Alternative Simplified Research Activities Tax Credit of \$50,000, excluding any costs relating to innovative renewable energy generation components. The business is allowed a supplemental tax credit of \$76,923, which would result in an Iowa tax credit of \$126,923. The Iowa tax credit related to innovative renewable energy generation components is \$25,000. This can be added to the regular and supplemental tax credit, resulting in a total Iowa Alternative Simplified Research Activities Tax Credit of \$151,923.

Trades or Businesses under Common Control

For a group of trades or businesses under common control (whether or not incorporated), the Iowa Alternative Simplified Research Activities Tax Credit is calculated as if all the organizations are one trade or business. The tax credit calculated for the group must be shared among the members of the group on the basis of each member's proportionate contribution to

the increase in research expenses.

Adjustments for Certain Acquisitions and Dispositions

If a major portion of a trade or business is acquired or disposed of, adjustments must be made to research expenses for the period before or after the acquisition or disposition.

Short Tax Year

For any short tax year, qualified research expenses are annualized.

Apportionment of Tax Credit

The tax credit calculated on lines 1 through 23 by a partnership, LLC, S corporation, estate, or trust is apportioned to the members. The pass-through entity must file the IA 128S with its return. On Schedule K-1 or on an attachment to Schedule K-1, report the tax credit for each member and instruct members to report the apportioned tax credit on line 25 of form IA 128S and include it with their tax returns.

If the taxpayer earns a tax credit by conducting research and is a member of a business that has passed-through a tax credit to the taxpayer, calculate the tax credit on form IA 128S, lines 1 through 23. Also enter the pass-through tax credit on line 25. Report each separately on the IA 148 Tax Credits Schedule.

Supplemental Research Activities Tax Credit

Businesses with tax incentive contracts under the High Quality Jobs Program or the Enterprise Zone Program can be awarded a Supplemental Research Activities Tax Credit by the Iowa Economic Development Authority (IEDA). The maximum eligible supplemental tax credit is provided in the contract along with the tax credit certificate number. For awards made by IEDA prior to July 1, 2010, the supplemental tax credit cannot exceed the amount shown on line 23. For awards made on or after July 1, 2010, the maximum supplemental tax credit is calculated by multiplying line 21 by 7% or line 18 by 3% for businesses with annual gross receipts of \$20 million or less (as reported on line 8) plus 10% of line 11. For businesses with annual gross receipts exceeding \$20 million, the maximum supplemental tax credit is calculated by multiplying line 21 by 2.1% or line 18 by 0.9%, plus 3% of line 11.

If the Supplemental Research Activities Tax Credit is earned by a pass-through entity, report the supplemental tax credit separately on Schedule K-1, including the tax credit certificate number. Instruct members to report the apportioned supplemental tax credit on line 26 of form IA 128S and include it with their tax returns.

2016 IA 128S Instructions

Provide your name, SSN or FEIN, and tax period ending date.

Lines 1 through 7: U.S. qualified research expenses - Enter amounts from the Federal Credit for Increasing Research Activities, federal form 6765. Lines 1-3 are the same as federal lines 1-3; lines 4-7 equal federal lines 5-8.

Line 8: Average U.S. annual gross receipts - Enter the average U.S. annual gross receipts for the four tax years preceding the tax year for which the tax credit is being determined. For any short year you may be required to annualize gross receipts. See IRC sections 41(c)(1)(B) and 41(f)(4) for details. Use this value to determine the calculation of the Supplemental Research Activities Tax Credit if applicable.

Line 9: Iowa basic research payments - Corporations other than S corporations, personal holding companies, service organizations, LLCs, and partnerships, enter cash payments, pursuant to a written contract, made to a qualified university or scientific research organization in Iowa for basic research. See IRC section 41(e) for details.

Line 10: Iowa base period amount - Enter the qualified organization base period amount based on minimum basic research amounts for the preceding three years, see IRC section 41(e) for details. For purposes of apportionment, multiply the amount on line 3 by the amount on line 9 divided by the amount on line 2.

Line 13: Iowa energy consortia research expenses - Enter the amounts paid or incurred to energy research consortia in Iowa. In general, an energy research consortium is any organization described in IRC section 501(c)(3) exempt from tax under section 501(a), organized and operated primarily to conduct energy research, and not a private foundation. These amounts cannot be included as Iowa expenses elsewhere on the form.

Line 14: Iowa expenses on research wages - Enter any wages paid to an employee for qualified research services performed in Iowa.

Line 15: Iowa expenses on research supplies - Enter the amounts paid or incurred for supplies used to conduct qualified research in Iowa.

Line 16: Iowa research expenses on computers - Enter the amount paid or incurred to another person for the right to use computers to conduct qualified research in Iowa. This entry must be reduced by any amount received or accrued from any other person for the right to use substantially identical personal property.

Line 17: Iowa contract research expenses - Include 65% of qualified research performed on your behalf in

Iowa. Use 75% for payments made to a qualified research consortium and 100% for payments made for qualified energy research performed by an eligible small business, university, or federal laboratory. Include payments to those same entities to the extent they are included as basic research payments on line 9, not to exceed the base period amount on line 10, subject to the 65% or 75% limitation.

Line 19: Prior research - Enter the total qualified research expenses in Iowa for the three years before the year in which the tax credit is being determined.

Line 23: Alternative Simplified Research Activities Tax Credit - Individuals and C corporations must enter this amount in column K of Part II on the IA 148 Tax Credits Schedule; use tax credit code 58 in column I and leave column J blank.

Line 24: Supplemental Research Activities Tax Credit - Individuals and C corporations must enter this amount in column K of Part II on the IA 148; use tax credit code 59 in column I and report in column J the tax credit certificate number from the tax credit certificate issued by IEDA.

Line 25: Pass-through Alternative Simplified Research Activities Tax Credit - If the taxpayer has received any pass-through Alternative Simplified Research Activities Credit from a partnership, LLC, S corporation, estate, or trust, indicate that amount on this line. Also enter the amount in column K of Part II on the IA 148 Tax Credits Schedule; use tax credit code 58 in column I and leave column J blank. Provide the pass-through name in column M and FEIN in column N of Part IV on the IA 148 as well as on the top of this form. File a separate IA 128S for each pass-through Alternative Simplified Research Activities Tax Credit received. Also list the claims separately on Part II of the IA 148, providing each pass-through name and FEIN in Part IV.

Line 26: Pass-through Supplemental Research Activities Tax Credit - If the taxpayer has received any pass-through Supplemental Alternative Simplified Research Activities Credit from a partnership, LLC, S corporation, estate, or trust, indicate that amount on this line. Also enter the amount in column K of Part II on the IA 148; use tax credit code 59 in column I. Include the tax credit certificate number reported on Schedule K-1 in column J and provide the pass-through name in column M and FEIN in column N of Part IV on the IA 148. File a separate IA 128S for each pass-through Supplemental Research Activities Tax Credit received. Also list the claims separately on Part II of the IA 148, providing each pass-through name and FEIN in Part IV.