2017
Indiana Tax Incentive Evaluation

Office of Fiscal and Management Analysis
Indiana Legislative Services Agency

Office of Fiscal and Management Analysis

The Office of Fiscal and Management Analysis (OFMA) is a division of the Legislative Services Agency that performs fiscal, budgetary, and management analysis for the Indiana General Assembly.

Jim Landers, Director
Jessica Harmon, Deputy Director
Heath Holloway, Deputy Director

Christopher Baker, Incentive Review Team
Whitney Bross, Incentive Review Team
Bill Brumbach
Mark Goodpaster
Corrin Harvey
Randhir Jha, Incentive Review Team
Allison Leeuw, Incentive Review Team
David Lusan
Kathy Norris
Seth Payton, Incentive Review Team
Karen Firestone Rossen
Kasey Salt
Lauren Tanselle, Incentive Review Team
Ravi Shah
Robert J. Sigalow, Incentive Review Team
Austin Spears, Incentive Review Team
Lia Treffman

Contents

Preface

IC 2-5-3.2-1 establishes an annual review, analysis, and evaluation process for state and local tax incentives. The annual review will be conducted over a five-year cycle during which each state and local tax incentive will be reviewed at least one time. The annual tax incentive review is conducted by the Office of Fiscal and Management Analysis, Legislative Services Agency. The Office of Fiscal and Management Analysis must submit an annual report of the tax incentive review to the Legislative Council and the Interim Study Committee on Fiscal Policy. The five-year review cycle began in 2014. The prior-year reports can be found on the Indiana General Assembly's website at https://iga.in.gov/legislative/2017/publications/tax_incentive_review/. Pursuant to IC 2-5-3.2-1, this report:

- Specifies the review schedule for 2018
- Reviews, analyzes, and evaluates the following tax incentives and incentive programs:
    - Economic development for a growing economy (EDGE)
    - Research expense credit
    - Research and development property sales tax exemption
    - Patent-derived income exemption
    - Hoosier business investment credit
    - Venture capital investment credit
    - Headquarters relocation credit
    - Economic revitalization area real property tax abatement
    - Economic revitalization area personal property tax abatement
    - Infrastructure development zone deduction
    - Maritime opportunity district deduction
    - Special rate for income derived inside a military base
    - Certified technology parks
        - Certified technology park property tax deduction
    - Professional sports and convention development areas
- Provides descriptive information and data relating to the tax incentives and incentive programs subject to review in 2017
- Analyzes and evaluates the effectiveness and economic impacts of the tax incentives and incentive programs subject to review in 2017

We would like to acknowledge the following agencies for their assistance in providing data that is presented and analyzed in this report:

- Department of State Revenue
- Indiana Economic Development Corporation
- Marion County Capital Improvement Board of Managers
- VisitIndy
- Allen County War Memorial Coliseum
- Evansville Otters
- South Bend Cubs
- All the local officials who provided data and talked with us

Executive Summary

The tax incentives we analyzed this year were created to encourage economic development by reducing the cost of hiring, investment, business relocation and formation, and research and development (R&D). Tax incentives are more likely to influence firms that are already contemplating carrying out the targeted action, or are on the margin. Our research suggests the discount provided by a single incentive may be small relative to the cost of a particular project. However, for an incentive to be effective, it only has to reduce the firm's cost enough to convince them to execute the project.

The Indiana Economic Development Corporation (IEDC) and other local economic development organizations refer to the "tools in the toolbox" they have available. This term refers to the suite of incentives, both tax and nontax, they could potentially offer to a prospective business. Our analysis found multiple instances where more than one incentive was employed for a project. This was especially true for the following tax incentive programs: Economic development for a growing economy (EDGE) tax credit, Indiana's property tax abatements, and the Hoosier business investment (HBI) tax credit. Even if a firm did not receive multiple incentives, the recipient most likely had characteristics in common with other incentive recipients. The majority of the firms that received those incentives were large manufacturers or firms involved in wholesale trade or logistics. We were unable to determine whether market conditions, one incentive, multiple incentives, or all the above contributed to the economic activity we observed for those recipients.

The venture capital investment (VCI) credit was established to attract additional investment in early-stage Indiana businesses by reducing an investor's cost to invest. Our research suggests that the VCI credit is not increasing Indiana's share of venture capital compared to the rest of the nation, but it may be attracting investments that would have gone to other Midwestern states.

An incentive must be used in order to be evaluated. Infrastructure development zones and maritime opportunity districts have yet to be established. The patent-derived income exemption and the headquarters relocation tax credit have been used infrequently. These incentives may have influenced some firms on the margin, but they do not appear to be nurturing the activities they were created to promote.

However, Indiana's incentives created to promote private R&D are utilized. Since 2010, taxpayers have claimed more research expense tax credits than any other economic development income tax incentive. Indiana also has a sales tax exemption for certain R&D equipment. This provides firms with an immediate tax savings when purchasing tangible goods used for qualifying R&D activities. Our research was unable to discern whether these incentives increased R&D conducted in state or caused R&D conducted out of state to be shifted to Indiana.

The last two programs evaluated are mechanisms for Indiana to invest in local infrastructure projects. The professional sports and convention development areas (PSCDAs) are special zones where certain state and local tax revenue is diverted to fund capital improvements. Our research suggests the state is at least recouping its investment through tax revenue collected from out-of-state visitors that attend events within the PSCDAs. The certified technology park (CTP) program was created to encourage high-tech firms to move to Indiana. The program qualifications allow local units the flexibility to tailor CTPs to fit particular needs. Because of the diverse nature of the CTPs, each CTP should be evaluated based on its business plan.

Introduction

A tax incentive is a provision of the tax code aimed at encouraging a taxpayer to conduct specified activities or undertake certain behavior by reducing the taxpayer's tax liability in relation to the targeted activity or behavior. Over the course of the last 30 to 40 years, tax incentives have become a significant and growing part of local tax laws, state tax codes, and the federal Internal Revenue Code. At the forefront of this expansion in tax incentive use has been the growth in the number and scale of economic development tax incentives tied to business employment, wages, and investment. In contrast to direct spending programs, tax incentive programs direct public funding to certain purposes by foregoing tax revenue. Moreover, tax incentive programs are different than direct-spending programs because tax incentives typically are not subject to the periodic scrutiny that direct-spending programs are subject to through the normal budgetary process.

Tax Incentive Review Process

IC 2-5-3.2-1 establishes an annual review, analysis, and evaluation process for state and local tax incentives. Appendix D contains the text of IC 2-5-3.2-1. The tax incentive review is conducted by the Office of Fiscal and Management Analysis, Legislative Services Agency. The annual tax incentive review is to be conducted over a five-year cycle with each tax incentive being reviewed at least one time during that review cycle. The statute requires the Legislative Services Agency to develop and publish a multiyear review schedule specifying the year in which each tax incentive will be reviewed.

The five-year review cycle must be conducted twice. The first five-year review cycle began during the 2014 legislative interim and will be completed with the tax incentive review conducted during the 2018 interim.

The statute requires the Legislative Services Agency to submit a report containing the results of the annual tax incentive review to the Legislative Council and the Interim Study Committee on Fiscal Policy. The report must be submitted before October 1 each year. The statute requires the Committee to hold at least one public hearing between September 30 and November 1 at which the Legislative Services Agency presents its report and the Committee receives information concerning tax incentives. In addition, the Committee is required to submit to the Legislative Council its recommendations relating to the tax incentive review. The statute requires the General Assembly to use the Legislative Services Agency's report and the Committee's recommendations to determine whether a tax incentive (1) is successful, (2) is provided at a cost that can be accommodated by the state's biennial budget, and (3) should be continued, amended, or repealed.

Definition of Tax Incentive

IC 2-5-3.2-1 defines a tax incentive as a benefit provided through a state or local tax that is intended to alter, reward, or subsidize a particular action or behavior by the tax incentive recipient, including a tax incentive providing a benefit intended to encourage economic development.

A tax incentive includes an exemption, deduction, credit, preferential rate, or other tax benefit that reduces a taxpayer's state or local tax liability or results in a tax refund. A tax incentive also includes a program where revenue is dedicated by a political subdivision to pay for improvements in an economic or sports development area, a community revitalization area, an enterprise zone, a tax increment financing district, or a similar area or district.

Tax Incentive Review Purposes and Approaches

IC 2-5-3.2-1 essentially specifies that the purpose of the annual tax incentive review is to (1) ensure tax incentives accomplish the purposes for which they were enacted, (2) provide information to allow the inclusion of the cost of tax incentives in the biennial budgeting process, and (3) provide information needed by the General Assembly to make policy choices about the efficacy of tax incentives. IC 2-5-3.2-1 lists a variety of descriptive and analytical information that could accomplish these tax incentive review goals. This information is as follows:

- The attributes and policy goals of the tax incentive.
- The tax incentive's equity, simplicity, competitiveness, public purpose, adequacy, and conformance with the purposes of the legislation enacting the incentive.
- The activities the tax incentive is intended to promote and the effectiveness of the tax incentive in promoting those activities.
- The number of taxpayers applying for, qualifying for, or claiming the tax incentive, and the tax incentive amounts (in dollars) claimed by taxpayers.
- The tax incentive amounts (in dollars) claimed over time.
- The tax incentive amounts (in dollars) claimed by industry sector.
- The amount of income tax credits that could be carried forward for the ensuing five-year period.
- An estimate of the economic impact of the tax incentive, including a return on investment calculation, cost-benefit analysis, and direct employment impact estimate.
- The estimated state cost of administering the tax incentive.
- The methodology and assumptions of the tax incentive review, analysis, and evaluation.
- The estimated leakage of tax incentive benefits out of Indiana.
- Whether the tax incentive could be made more effective through legislative changes.
- Whether measuring the economic impact of the tax incentive is limited due to data constraints and whether legislative changes could facilitate data collection and improve the review, analysis, or evaluation.
- An estimate of the indirect economic activity stimulated by the tax incentive.

Tax Incentive Review Report

IC 2-5-3.2-1 requires the Legislative Services Agency to submit a report containing the results of the annual tax incentive review to the Legislative Council and the Interim Study Committee on Fiscal Policy. The report must be submitted before October 1 each year.

The report must include at least the following:

- A detailed description of the review, analysis, and evaluation for each tax incentive reviewed.
- Information to be used by the General Assembly to determine whether a reviewed tax incentive should be continued, modified, or terminated, the basis for the recommendation, and the expected impact of the recommendation on the state's economy.
- Information to be used by the General Assembly to better align a reviewed tax incentive with the original intent of the legislation that enacted the tax incentive.

Tax Incentive Review Schedule

A total of 33 tax incentives and 4 incentive programs were scheduled for review from 2017 to 2018, and 28 incentives were evaluated between 2014 and 2016. The tax incentives included on the review schedule are associated with the corporate income tax and individual income tax (27 tax incentives), the property tax (21 tax incentives), the sales tax (6 tax incentives), and other taxes (1 tax incentive). The 6 incentive programs are tax increment financing (TIF), enterprise zones (EZs), community revitalization enhancement districts (CREDs), professional sports and convention development areas (PSCDAs), certified technology parks (CTPs), and the motorsports investment district. Table 1 specifies the tax incentives and incentive programs reviewed during the 2017 interim.

Table 1: Tax Incentives and Incentive Programs Scheduled for Review in 2017

Tax	Tax Provision
2017	
Corporate Income Tax (C)/ Individual Income Tax (I)	• Economic Development for a Growing Economy (EDGE) Credit (C)(I) • Headquarters Relocation Credit (C)(I) • Hoosier Business Investment Credit (C)(I) • Patent-Derived Income Deduction (C)(I) • Research Expense Credit (C)(I) • Special Rate for Income Derived Inside a Military Base (C) • Venture Capital Investment Credit (C)(I)
Property Tax	• Certified Technology Park Deduction • Economic Revitalization Area Personal Property Tax Abatement • Economic Revitalization Area Real Property Tax Abatement • Infrastructure Development Zone Deduction • Maritime Opportunity District Deduction
Sales Tax	• R&D Property
Other	• Certified Technology Park • Professional Sports and Convention Development Areas

The remaining schedule for 2018 is specified in Table 2. Appendix E contains a list of tax incentives and incentive programs on the review schedule, including descriptions.

Table 2: Tax Incentives and Incentive Programs Scheduled for Review in 2018

Tax	Tax Provision
2018	
Corporate Income Tax (C)/ Individual Income Tax (I)	• Adoption Tax Credit (Effective 2015) (I) • Alternative Fuel Vehicle Manufacturing Investment Credit (C)(I) • Coal Gasification Technology Investment Credit (C)(I) • Natural Gas-Powered Vehicles (C)(I)
Property Tax	• Aircraft Deduction • Brownfields Revitalization Zone Deduction • Coal Combustion Product Deduction • Deduction for Purchases of Investment Property by Manufacturers of Recycled Components • Geothermal Energy Heating or Cooling Device Deduction • Hydroelectric Power Device Deduction • Intrastate Aircraft Deduction • Resource Recovery/Coal or Oil Shale System Deduction • Solar-Energy Systems Deduction • Wind-Powered Devices Deduction
Sales Tax	• Aircraft Parts • Aviation Fuel • Cargo Trailers/RVs Sold to Certain Nonresidents • Certain Aircraft • Certain Racing Equipment
Other	• Motorsports Investment District • Promotional Free-Play Deduction

Economic Development Incentives

Economic development can be defined as policies and programs that attempt to improve the economic well-being and quality of life for a community by creating jobs, supporting or growing incomes, and wealth creation. In some ways, both economic development and community development seek the same outcome – increasing incomes in an effort to improve communities and create an overall higher quality of life. There is considerable diversity in both the tax and nontax economic development programs. Nontax programs provide loans, grants, and services to both businesses and individuals to further economic development objectives. For example, Indiana provides training grants through the skills enhancement fund (SEF) and business development loans. This report is focused solely on tax incentives, yet many firms receive both tax and nontax incentives simultaneously or across time.

A tax incentive is a provision that reduces a taxpayer's tax liability with the expectation of a particular outcome. According to LSA's 2016 tax expenditure report, $330 M in state revenue is forgone annually from economic development tax incentives. It is important to note that not all tax changes considered to be business friendly are tax incentives. While a general tax rate reduction will decrease a firm's taxes, it is not an incentive because it impacts all firms and no specific activity is associated with the tax savings. Under the umbrella of economic development, incentives are tailored to promote a specific type of economic activity and thus "reward" or benefit specific firms based on these activities or development. Economic development incentives may be established to foster job creation, increase wages, encourage capital investments, and increase levels of R&D.

Incentive Packages

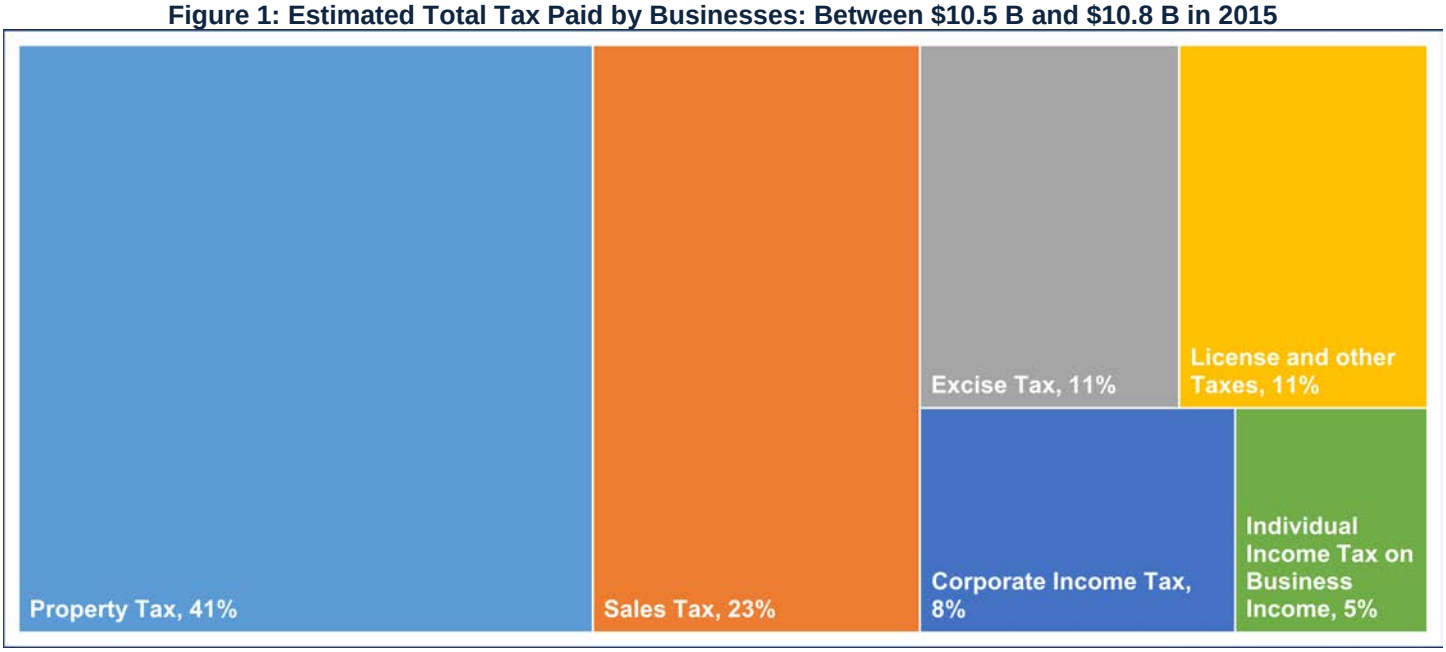
Firms make decisions based on a number of attributes. They consider several factors like the availability of labor, infrastructure, natural resources, access to their supply chain and customers, utility costs, and the costs imposed by government. If a firm would not conduct the activity but for the incentive, then the incentive program is likely effective. An incentive should only influence firms who, after considering all the other factors, were persuaded to conduct the activity. If a firm receives an incentive, but they were going to conduct the activity regardless, it is referred to as a windfall. Determining whether an incentive is effective or providing a windfall is difficult. The incentive must be isolated from the other factors that went into the firm's decision making process.

While this report evaluates the incentives individually, it should be mentioned that it is common for a business to receive multiple tax and nontax incentives for one project. For example, one project can be awarded the EDGE credit, Hoosier business investment (HBI) credit, SEF, and a property tax abatement while claiming a research expense credit. When multiple incentives are awarded for the same project, it obscures the effectiveness of a specific program. It becomes difficult to isolate how one incentive influenced the business's decision. One incentive may have weighed more highly on a firm's ultimate decision, yet it would be unlikely for a business to not pursue all potential incentives to ensure success and lower their cost and tax liability. There may be a selection bias as well for some larger more sophisticated firms with deeper knowledge of the availability of incentives across states and communities.

Taxation of Businesses in Indiana

Tax incentives attempt to encourage economic activity by reducing the cost of business, specifically the cost imposed by governments. To measure the potential effectiveness of Indiana's incentives, it is important to understand the taxes businesses pay in Indiana. Like many other states, businesses pay predominantly property, sales, excise, and income tax. Figure 1 contains two estimates of the state and local taxes paid by Indiana businesses in 2015.

Figure 1: Estimated Total Tax Paid by Businesses: Between $10.5 B and $10.8 B in 2015



Source: Anderson Economic Group and Ernst & Young.

The figure shows that businesses pay more property tax and sales tax than any other tax. Property tax accounts for about 41% of the total tax liability and sales tax is 23%. Income tax, both corporate and individual tax on business income, represents almost 13% of the taxes paid by business. Bartik (2017) reports that while incentives may be large in relation to state business taxes, they comprise a small part of a business' overall costs. In an analysis of enterprise zone programs, Peters and Fisher (2004) estimate the sum of all state and local tax incentives in enterprise zone programs is the equivalent to a wage cut of just 1.6% to 7.1%. Furthermore, they find the typical manufacturing firm in the United States spends about 11 times more on payroll than what the firm would pay in state and local taxes without incentives. Ady (1997) estimates that taxes make up just 4% of the total operating costs for a typical manufacturing firm, while labor (36%), transportation (35%), utilities (17%) and occupancy (8%) all account for much larger shares of a firm's costs. Kenyon et al.'s (2012) calculations show all state and local taxes made up only 1% of the manufacturing sector's total cost from 2004 to 2009.

In Indiana and the rest of the country, the majority of economic development incentives reduce corporate and individual income tax. This may limit the effectiveness of those incentives because they target a relatively small share of the firm's overall state and local tax liability.

The potential impact for an incentive is limited to the discount it provides to the firm's expected tax liability. Ten of the economic development incentives analyzed in this year's report were adopted before 2004. Indiana's tax environment was different when the incentives were enacted. The tax policies enacted in the last 15 years have generally reduced business tax liabilities. Generally speaking, businesses pay less taxes today than they would have paid 15 years ago. As a consequence, the value of the incentive has decreased thus potentially diminishing its effectiveness. As tax liability becomes a shrinking share of business costs, other factors become more significant in determining business development.

Economists have advocated for a tax system with a broad base, low rates and few to no incentives. This type of tax regime benefits all entities equally. They claim awarding incentives provides preferential treatment to some taxpayers that produce inequity and distort the market. However other researchers have found that incentives can help communities achieve goals if they are structured properly.

Bartik (2015) found that tax incentives are most likely to have a positive effect under the following circumstances:

- When incentives are only applied to new investments and new job creation, and not to business activity or property that already exists.
- When the jobs created pay a high wage premium, which boosts both the multiplier effects and increases the average state earnings per worker.
- When a higher percentage of the new jobs go to state residents, which boosts state employment-to-population ratios and tightens state labor markets, thus facilitating occupational upgrading of workers in the state to better-paying jobs.

Changes to Indiana's Tax Structure

Indiana has enacted tax changes intended to simplify and reduce the tax burden, with the exception of sales tax, on Indiana taxpayers. The changes have been implemented incrementally so to minimize the state revenue impact. The list below contains some of the major changes to Indiana's tax structure since 2002.

- Limited property tax liabilities to a fixed percentage of the property's assessed value.
- Consolidated the corporate tax structure from three separate taxes into one.
- Adopted a single sales factor instead of a three factor apportionment formula for corporate income tax.
- Phased-in reduction of the corporate income tax rate from 8.5% to 4.9%.
- Reduced the individual income tax rate from 3.4% to 3.23%.
- Increased the sales tax rate from 5% to 7%.
- Repealed the property tax on inventory.
- Repealed the inheritance tax.

Structure of the Report

With all these factors in mind, we evaluated nine of Indiana's tax incentives designed to encourage economic development. The incentives are analyzed individually, but efforts were made to address interactions between the programs whenever possible. The report is organized by the type of economic activity the incentive is intended to encourage. The first incentive is the economic development for a growing economy (EDGE) tax credit whose primary goal is job creation. Then, incentives that reduce investment and R&D costs are discussed. The report concludes with a look at six of Indiana's geographically-based economic development programs.

EDGE Tax Credit (IC 6-3.1-13)

Program Goals and Attributes

The economic development for a growing economy (EDGE) credit is a discretionary tax incentive established to encourage businesses to invest in capital projects in Indiana that either create new jobs or retain existing jobs in the state. The EDGE credit is administered by the Indiana Economic Development Corporation (IEDC), and a business must apply to request an allocation of EDGE credits. The credits may be awarded to applicants who meet project, employment, and other criteria as determined by the IEDC. If a business is awarded a credit, it must enter into a tax incentive agreement with the IEDC before the credits are awarded.

All EDGE credits have the following characteristics:

- The duration of the EDGE credit is limited to 10 taxable years for any project.
- The credit amount is set as a percentage of the incremental income tax withholdings attributable to the jobs created or retained by the project. The credit amount may also be limited to a fixed dollar amount.
- EDGE credits for job creation projects cannot exceed the incremental income tax withholdings of the new employees.
- The EDGE credit may be claimed against a taxpayer's tax liability and, at the discretion of the IEDC, the credit is also refundable.

The incentive agreement specifies the project details, the duration of the credit, the amount of credits to be awarded, and employment requirements. Table 3 contains the number of EDGE projects and credits. EDGE credit awards are based on performance. Therefore, the business must provide proof to the IEDC that it is fulfilling its agreement before the IEDC will certify any credit. The IEDC only approves the full credit amount if the business fulfills its hiring obligation stated in the credit agreement. If the business hires less people, then the certified credits are adjusted accordingly.

Table 3: EDGE Credit Project and Certification History

Contract Year	Projects	Contract Amount	Certified on Contracts	Average of Tax Credit (% of incremental withholdings)
2005	31	$42,038,000	$26,163,275	92.3%
2006	52	56,343,323	36,354,562	89.3
2007	53	49,695,000	25,932,501	79.2
2008	62	102,629,090	57,586,284	79.8
2009	80	68,226,200	38,337,816	70.9
2010	109	84,114,881	40,331,486	72.4
2011	123	122,255,000	36,398,436	73.1
2012	179	146,682,000	46,863,183	71.5
2013	181	232,577,154	68,815,865	69.1
2014	235	232,122,843	34,489,345	66.8
2015	242	197,058,489	10,758,567	67.6
2016	196	158,585,000	2,877,480	61.0
2017	42	37,068,000	259,968	59.6
Grand Total	**1,679**	**$1,960,723,174**	**$701,400,519**	**71.5**

Source: Raw data provided by the Indiana Economic Development Corporation, data analysis by the Office of Fiscal and Management Analysis.

Businesses can qualify to receive credits three ways. The primary method to qualify for EDGE credits, and its original purpose when it was enacted in 1994, is job creation. About 99% of all EDGE projects are selected to create new jobs either through business attraction or expansion. In 2003, the EDGE credit was expanded to include job retention projects. Credits awarded for job retention are limited to $10 M per fiscal year, and the IEDC has only awarded 11 projects to date. In 2014, the credit was again expanded to include businesses that employ students from qualifying cooperative education programs with an annual maximum of $2.5 M in credit. The IEDC has not awarded credits under this condition to date.

The IEDC determines the tax credit percent based on project outcomes and the wages of the expected new jobs. The determined tax credit share of the incremental income tax withholdings attributable to the jobs created by the project has ranged from 10% to 100% with an average of 71.5%. As the total number of projects has grown in recent years, the average tax credit percent that the IEDC sets has been declining. Total projects reached a high of 246 in 2015, and the average tax credit percent fell to 61% in 2016.

It is difficult to estimate an exact cost per job for recipients of EDGE credits. Each project has a contracted amount that is chosen for the agreement between the business and the IEDC, a certified amount which the IEDC verifies by observing reported jobs, and the total amount claimed by a firm. Also, most contracts extend over 10 years, making it impossible to have total certified dollar amounts for many recent projects. Certified dollars do not provide a true estimate of program cost. Reporting by the IEDC has changed over time, and certified dollars do not always equate to the totals claimed by the firms. It is also unclear why firms do not claim 100% of certified dollars. From 2005 to 2016, there have been 129 projects on average annually with an average of $970,000 contracted per project, for a total of $1.5 B in contracted dollars. This has equated to a cost of approximately $10,000 in total contracted dollars per expected job. The average share of certified dollars is approximately 60% of the contracted amount, which would make the cost closer to $6,000 per job.

Background Research/Summary Literature Review

This section highlights published research estimating the employment effects of job growth tax incentives like the EDGE credit. This is only a brief summary and is not an exhaustive review that analyzes in detail the differences in the tax incentives or the study methodologies.

Hicks and LaFaive (2011) estimated the impact of the Michigan Economic Growth Authority (MEGA) job creation tax credit on county income, employment, and unemployment rates using a county panel from 1990 to 2003. The MEGA program ran from 1995 to 2011 and provided discretionary tax credits to businesses that created or retained jobs in Michigan. Over the life of the program, the average credit totaled almost $2,300 per job, and the average duration of a credit agreement between the Michigan Economic Development Corporation and a credit recipient was 15.75 years (Bartik & Erickcek, 2014). To examine the relationship between MEGA credits and county employment, Hicks and LaFaive specify an expansive regional econometric model controlling for the impact of economic trends, the business cycle, labor force participation, and adjoining county influences on county employment. The estimation results suggest that the MEGA tax credit failed to have a discernible impact on employment in the manufacturing or wholesale sectors, even though the credits are targeted to businesses in these sectors. Nevertheless, the research suggests that the credits may have indirectly impacted employment levels in the construction sector, although the impact was economically small.

Faulk (2002) and Gabe and Kraybill (2002) employ firm-level data in separate studies to correct for selection bias and the research finds conflicting results. Faulk uses econometric modeling techniques and these estimation results suggest that firms receiving the tax credit in Georgia created 23% to 28% more jobs than nonparticipating firms in Georgia's jobs tax credit from 1993 to 1995. Gabe and Kraybill examined employment growth of firms receiving incentives in Ohio from 1993 to 1995. Their estimation results suggest that the tax incentives failed to have a positive impact on employment by incentive recipients. Conversely, the estimates suggest that the incentives may have dampened the employment growth of firms receiving the incentives in the first two years of an expansion.

Lester et al. (2014) estimate the employment impacts of employment tax incentives provided in North Carolina from 1996 to 2006 for job recruitment and job retention projects. The study employs a quasi-experimental design technique such that businesses receiving incentives are compared to similar businesses not receiving incentives. The job recruitment and job retention incentives provided in North Carolina are shown by the study to result in statistically discernible and economically significant employment growth. Specifically, the researchers estimate that businesses receiving a recruitment incentive on average added about 11.5 more jobs over the time period of the incentive relative to similar businesses not receiving incentives. For job retention projects, the researchers

estimate that businesses receiving incentives grew at a 20% faster rate than similar businesses not receiving incentives.

The following analysis of the EDGE credit in Indiana examines firm-level data from businesses receiving incentives and compares them to businesses not receiving incentives in comparable cohorts. The differences are examined in isolation by firm size class, industry, and contract start date. The firms' size and industry has been shown to be the greatest predictor in determining which firms have been likely to apply for and receive this credit. The strength and importance of manufacturing to Indiana's economy also contribute to a sectoral bias in evaluating this program. The likelihood of a large manufacturing firm to be an EDGE credit recipient is roughly 50% at the time of this analysis.

Firm Selection (and Bias)

There are two stages of selection in the process of obtaining an EDGE credit that may influence which firms receive the credit. First, firms self-determine whether or not to apply initially. The application process involves extensive reporting requirements to verify employment and wages and working with an IEDC project manager who gathers evidence to confirm that the project is "competitive." The IEDC indicated that many firms may be deterred by the paperwork and the length of the contract reporting requirements. Firms must report and verify employment and wages for 12 years (which includes two post-term reporting years). Smaller firms, or those less sure of hiring plans, are not as likely to apply for this program. Also, the definition of competitiveness may be subject to determination by each individual project manager. Firms with the initiative to apply are likely sophisticated enough to make a valid case to justify their competiveness. Therefore, businesses that decide to go through with the application process may be more resourceful, organized, or successful than those that do not apply and may be more likely to add jobs regardless of being awarded a credit. This selection bias may be driving the job growth that EDGE firms exhibit after receiving a credit because firms with no immediate business plans to expand or hire would not be seeking this credit. The lengthy application process may also be a barrier for smaller, less resourceful, or less successful firms.

Once firms apply to the IEDC for an EDGE credit, the IEDC controls the second level of selection when choosing who will be awarded the credits. A listing of EDGE credits from the IEDC in May 2017 only included 6 declined contracts. This further supports the theory that firms only apply if they know they are going to be successful at creating jobs. The final approved tax credit is an award for planned job growth as determined by the business plan and initial application. Some contracts are terminated over time due to a firm's lack of performance, or the business attraction or expansion may never have come to fruition or located in Indiana.

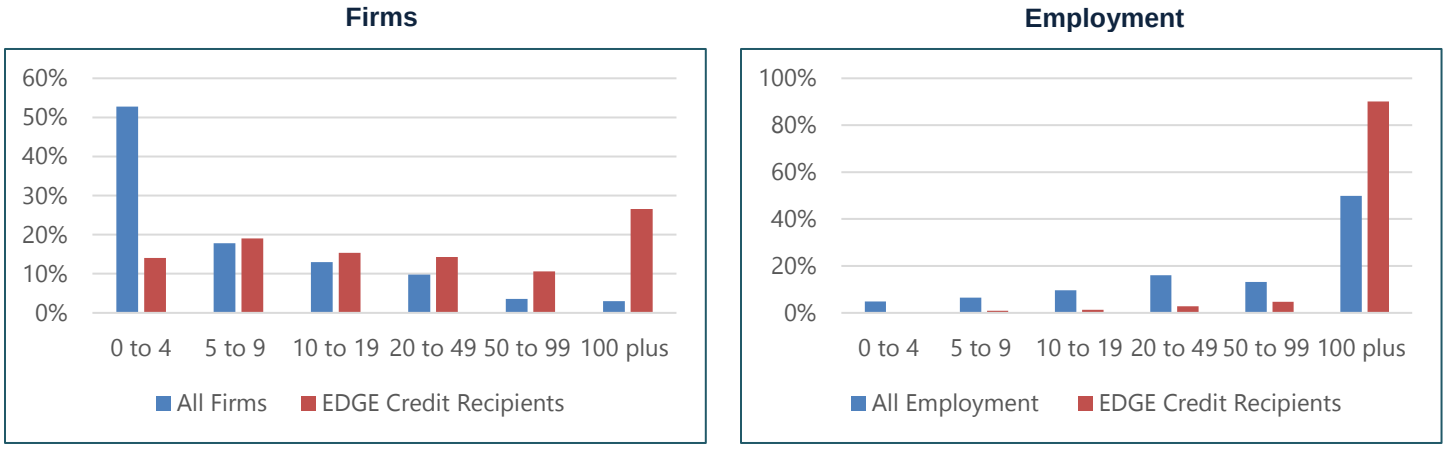
EDGE Firm Descriptions: Wages, Size Class, Industry

The firms receiving EDGE credits are found to be highly concentrated among large firms and within industries paying above-average wages. The average wage plays a role in the overall eligibility and the computation of the credit. The vast majority of firms in the EDGE credit program are firms with 100 or more employees in the trade and manufacturing industries. Manufacturing has the highest employment for EDGE credit recipients and pays an average weekly wage of over $1,200 which is about $340 above the average private sector weekly wage.

The make-up of firms receiving EDGE credits looks very different from the average Indiana employer. Over a quarter of all firms receiving EDGE credits are employers with over 100 employees, and yet those large employers make up only 3% of Indiana firms overall. The employment totals from these large firms make up 90% of total employment by EDGE credit recipients. Also, while small firms with less than 10 employees make up 71% of Indiana firms, these firms make up just a third of firms that have contracted to receive EDGE credits.

Given that job growth is the ultimate goal of this program, the data suggest the incentive attracts and provides the greatest benefit to Indiana's larger employers. Figure 2 illustrates EDGE credit recipients and employment in red, in contrast to all Indiana firms (blue).

Figure 2: All Indiana Firms Compared to EDGE Credit Recipients by Size Class Illustration

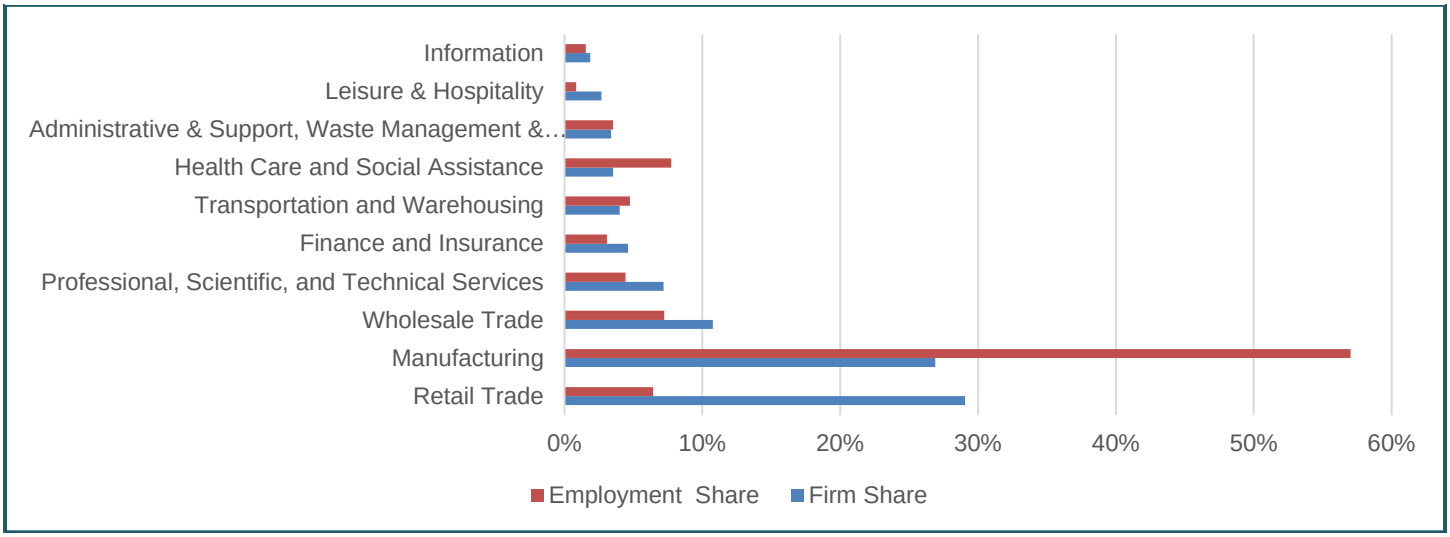


EDGE Firm Employment Concentration by Industry:

- Manufacturing: 57% of employment and 27% of firms
- Wholesale Trade : 7% of employment and 11 % of firms
- Healthcare and Social Assistance: 8% of employment and 3.5% of firms
- Retail Trade: 6% of employment and 29% of firms

Figure 3 illustrates the industries with the largest share of EDGE firms and employment, and the manufacturing and trade sectors clearly receive the most projects. The high concentration of EDGE firms involved with the retail trade industry illustrated here may be surprising given that the IEDC has stated they do not award the credit directly to retail trade firms. However, these firms are connected to wholesale, warehousing, and manufacturing operations. For example, there are projects where a distribution center may be expanding and receives an EDGE credit, and many of these firms receive packaged incentives.

Figure 3: Firms Receiving (Connected to) EDGE Credit Projects



Source: Raw data provided by the Indiana Economic Development Corporation, data analysis by the Office of Fiscal and Management Analysis.

EDGE credit recipients are also concentrated in Indiana's larger counties where population centers and larger employers are located. More than a third of all recipients are located in the central Indiana counties of Marion, Hamilton, Boone, and Johnson County. Table 4 illustrates the top 10 counties based on the number of projects and certified credits to date.

Table 4: Top 10 Counties by EDGE Credit Projects and Certifications

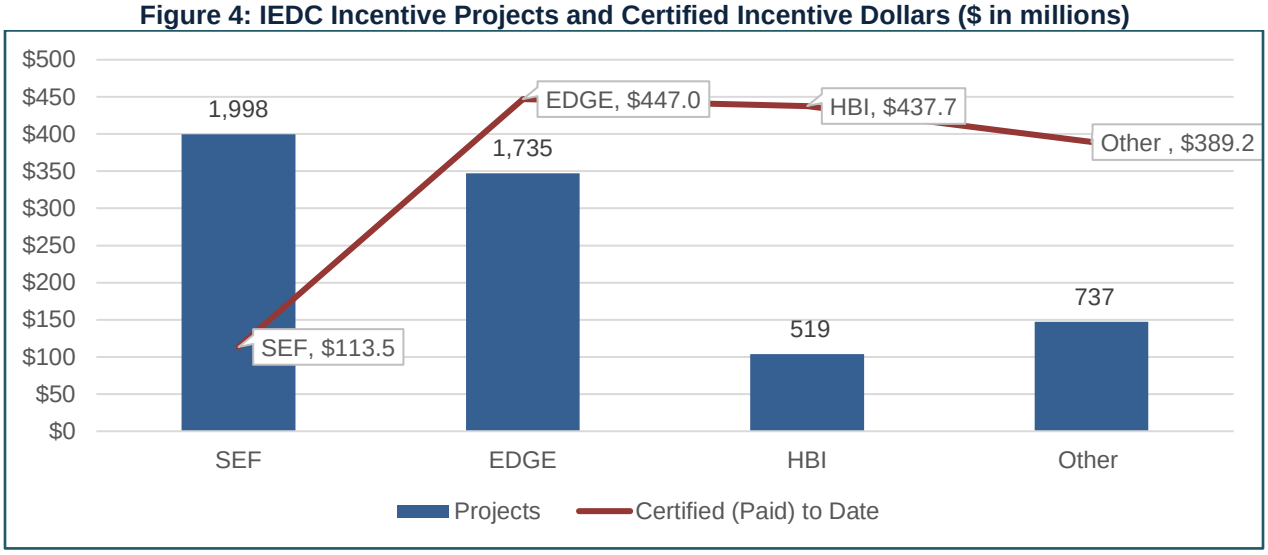
County	Number of Projects	County	Certified Credits to Date
Marion	408	Marion	$111,237,575
Hamilton	130	Hamilton	28,872,743
Elkhart	107	Decatur	23,069,773
Allen	96	Vanderburgh	21,504,650
Hendricks	52	Kosciusko	19,993,667
Clark	48	Elkhart	19,893,916
Lake	42	Allen	18,906,316
Boone	41	Bartholomew	13,562,577
Johnson	40	Boone	12,473,863
Vanderburgh	33	Tippecanoe	12,436,349
Share of Total	**57%**		**63%**

Source: Raw data provided by the Indiana Economic Development Corporation, data analysis by the Office of Fiscal and Management Analysis.

Incentive Packages

Over the last 10 years, EDGE credit recipients have comprised roughly a third of all the IEDC incentive recipients, and they involve the majority (53%) of total contracted incentive dollars and represent a third of tax credits certified to date. This is the largest incentive program for the IEDC in terms of certified incentive dollars. The second largest program by dollars certified is the Hoosier business investment (HBI) tax credit, followed by the skills enhancement fund (SEF) training grants. The SEF program contains the greatest number of projects overall. Combined, these three incentives made up 85% of awarded firms from 2005 to 2016 and 72% of dollars paid or certified credits to date from the IEDC.

Figure 4: IEDC Incentive Projects and Certified Incentive Dollars ($ in millions)



Source: Raw data provided by the Indiana Economic Development Corporation, data analysis by the Office of Fiscal and Management Analysis.

The vast majority of firms receiving EDGE credits have also received either SEF grants or HBI credits. Of the 1,735 EDGE credit recipients as of this review, 1,322 (76%) were also SEF participants at least once during 2005 to 2016. They were awarded an additional $82 M in SEF grants. An additional 322 EDGE credit recipients also received HBI credits over this time frame with $280 M certified to date. This brings an additional $363 M paid to date to these firms from additional incentive programs since 2005.

Skills Enhancement Fund (SEF) Training Grant Program

The SEF grant program provides employers with training assistance. The funds must be used to train employees to support new capital investment. The grant may be provided to reimburse a portion of the eligible training costs over a period of two years. The typical reimbursement rate is 50%. This program is administrated by the IEDC.

These incentivized firms represent 1.1% of the estimated total 162,519 firms in Indiana. In the manufacturing industry, about 10% of firms are receiving EDGE credits, and among large employers (50 or more employees), 40% receive EDGE credits. Table 5 is a snapshot of firms receiving both EDGE credits and HBI credits from 2005 to 2015 with certified payments to date alongside the actual firm investment. This helps to illustrate the significant certification and investment amounts for so few projects. The qualified investment is an outcome measure for the HBI credit and is discussed further in that section of this report.

Table 5: EDGE and HBI Project and Credit Certification History

Contract Year	EDGE and HBI Credit Projects	Certified EDGE Credits to Date	HBI Actual Qualified Investment
2005	18	$14,236,162	$289,680,224
2006	39	17,839,229	258,102,108
2007	34	19,870,184	538,166,128
2008	34	14,727,445	797,398,148
2009	35	20,660,025	619,073,050
2010	42	19,147,428	667,558,170
2011	18	9,169,841	218,194,423
2012	18	12,006,947	460,139,928
2013	9	12,493,254	79,737,020
2014	7	1,436,047	112,576,861
2015	5	182,082	101,229,813
Total	**259**	**$141,768,644**	**$4,141,855,873**

Source: Raw data provided by the Indiana Economic Development Corporation, data analysis by the Office of Fiscal and Management Analysis.

Credit Cost

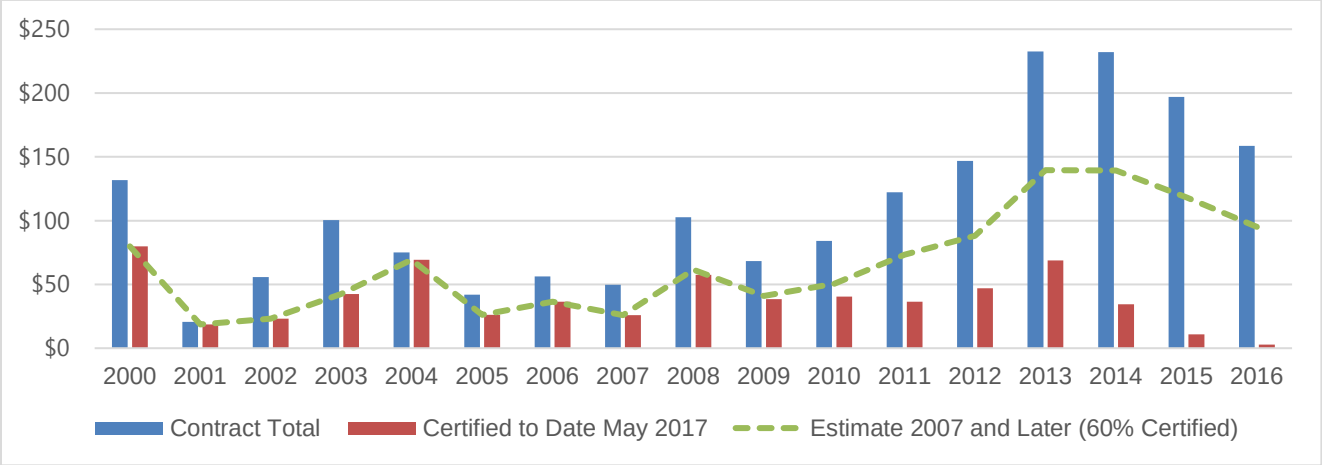
Representing 1% of Hoosier firms that employ one out of every four Hoosier workers, the EDGE credit program is among the largest incentive programs administered by the IEDC. As the IEDC evaluates the projects and certifies the award amounts, the share of unrealized jobs is part of the reality. This is illustrated by the difference between the original total contracted amount and the total certified dollars after reporting. Beyond the amount certified by the IEDC, the firm must still claim that amount with the Department of State Revenue, and this represents the true dollar cost. The EDGE credit is refundable, therefore the discount provided by EDGE credits is not limited by tax liability. It overcomes the disadvantage of other nonrefundable tax incentive programs where the full value of the incentive may not be realized in the first year of the activity. On average, 77% of the EDGE credits annually certified by the IEDC are claimed by taxpayers in the same taxable year. It seems unlikely the firm is unaware of the EDGE credit given the high level of participation and reporting required, yet a few firms do not claim a portion of their certified dollars. Table 6 shows the amount of EDGE credits claimed on annual tax returns, and Figure 5 shows the potential cost if 60% of the contracted EDGE credits were claimed.

Table 6: EDGE Credit Claims History, 2008-2014

Tax Year	Claims			Credits		
	Individual	Corporation	Total	Individual	Corporation	Total
2008	493	266	798	$1,188,167	$32,173,231	$33,361,398
2009	696	359	1,021	1,275,882	31,980,216	33,256,098
2010	692	250	1,021	2,000,062	31,041,330	33,041,392
2011	850	386	1,236	2,491,308	35,390,412	37,881,720
2012	1,024	469	1,493	3,826,246	39,286,673	43,112,919
2013	801	438	1,239	4,834,959	38,147,581	42,982,540
2014	883	474	1,357	6,322,207	44,876,258	51,198,465

Source: Raw data provided by the Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis.

Figure 5: Cost Estimate Based on Certified Credits as 60% of Original Contract Credits ($ in millions)



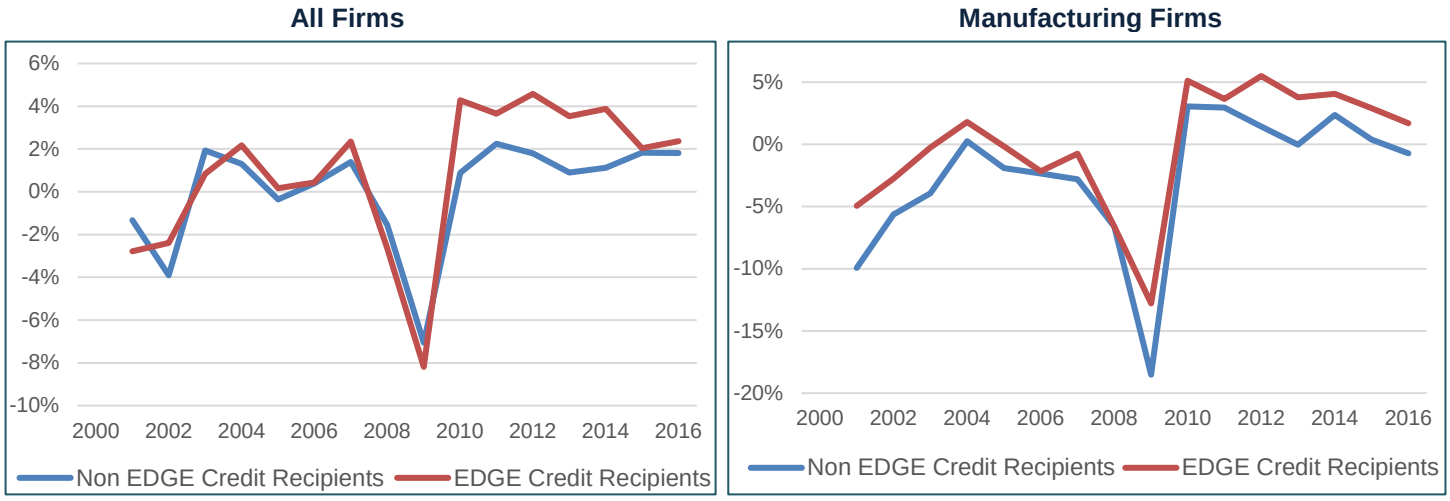
Source: Raw data provided by the Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis.

Credit Effectiveness

This section summarizes LSA's current research on the effectiveness of EDGE credits on employment growth by offering a comparison to employment growth for all Indiana firms from 2000 to 2016. The data are based on preliminary data from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW). Although we cannot control for the potential selection or sectoral biases mentioned earlier, we do expand upon previous EDGE credit evaluations by expanding the sample of EDGE credit recipients and non-EDGE credit recipients that we are able to track over time and include in the analysis.

Business cycles are dynamic, and firms are frequently changing names, addresses, and even their primary industry code as they transform, grow, or shrink over time. In order to track EDGE credit recipients over time and understand the full impact of the project on the entire business and all of the related business locations, LSA matched EDGE credit recipients provided by the IEDC to current and historical establishment level data. The firms were matched to their predecessor and successor accounts and linked across time not just by location or business identification number. This matching process attempts to account for business transitions like sales, mergers, and acquisitions, to gain a better understanding of the firms' employment history over time. The analysis only examines private sector firms, and this same data were also used in the HBI credit review in this report.

Figure 6: Annual Employment Change (%) for EDGE Credit Recipients and all Firms



Source: Raw data provided by the Indiana Economic Development Corporation and Bureau of Labor Statistics, data analysis by the Office of Fiscal and Management Analysis.

EDGE credit recipients in total follow the same basic trends as the full economy. Figure 6 illustrates the decline in employment during the recession for those firms that received EDGE credits and those firms that did not. It can also be seen that the EDGE credit recipients start to see increases to employment at a quicker rate following the recession and continuing for a few years into the recovery from 2010 to 2015. Not accounting for when the firm was under contract, the total trend illustrates sharp declines during the recession for all businesses followed by above average employment growth for EDGE credit recipients. All firms grew by 0.9% in 2010, compared to 4.3% over-the-year growth for EDGE credit recipients during the first year of the recovery.

Since this does not account for when the firm received EDGE credits, it illustrates the differences between firms that apply for EDGE credits and those that do not. These are larger firms more likely tied to trade and manufacturing. These firms appear more likely to be successful over the long run regardless of the timing of the EDGE credit contract. Additionally, since the manufacturing sector rebounded strongly in the first few years of the recovery, the above described difference post-recession could be driven by the difference in business composition among the EDGE credit recipients and the cohort that did not receive credits and the strength and concentration of manufacturing in Indiana.

Table 7: Year to Year % Change in Employment: All Firms

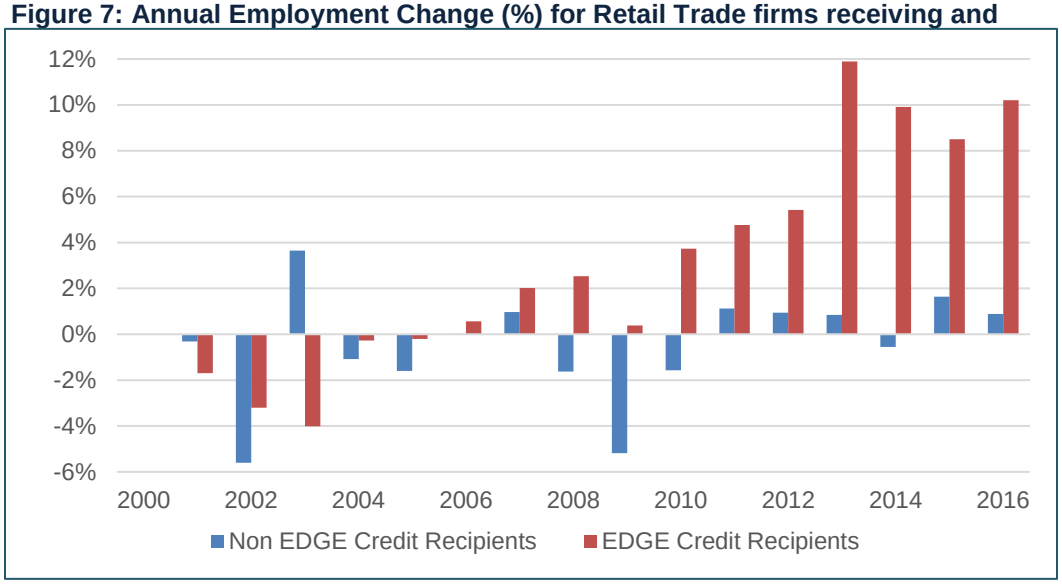
Year	Non-EDGE Firms	EDGE Firms
2001	(1.3%)	(2.8%)
2002	(3.9)	(2.4)
2003	1.9	0.8
2004	1.3	2.2
2005	(0.4)	0.2
2006	0.4	0.4
2007	1.4	2.4
2008	(1.6)	(2.6)
2009	(7.1)	(8.2)
2010	0.9	4.3
2011	2.2	3.7
2012	1.8	4.6
2013	0.9	3.5
2014	1.1	3.9
2015	1.8	2.0
2016	1.8	2.4

Source: Raw data provided by the Indiana Economic Development Corporation and Bureau of Labor Statistics, data analysis by the Office of Fiscal and Management Analysis.

To attempt to account for this sectoral bias, we next compare only large manufacturing firms. When isolating for large manufacturing firms, both EDGE credit and all other firms were hit hard during the recession. They lost 14% and 24% of jobs respectively in 2009 alone (see Figure 6). However, EDGE credit recipients in manufacturing did slightly better than their counterparts, weathering the recession and coming back slightly stronger. Similar trends can be seen for wholesale trade and retail trade, the other industrial sectors with high concentrations of EDGE credit recipients. Retail trade firms seem to have the strongest employment growth trend over time. The retail industry has been showing signs of slower growth in recent years (see Figure 7). However, EDGE credit recipients in this industry grew by an average of 10% year-over-year since 2013, exhibiting much stronger growth than retail firms that did

not receive EDGE credits and all other industries. This may be due to the fact that retail firms that received EDGE credits are more likely to be large employers with in-state warehousing and distribution centers.

Figure 7: Annual Employment Change (%) for Retail Trade firms receiving and

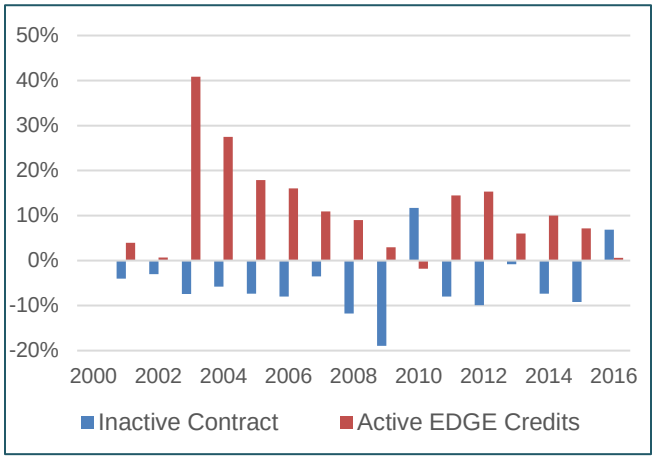


Source: Raw data provided by the Indiana Economic Development Corporation and Bureau of Labor Statistics, data analysis by the Office of Fiscal and Management Analysis.

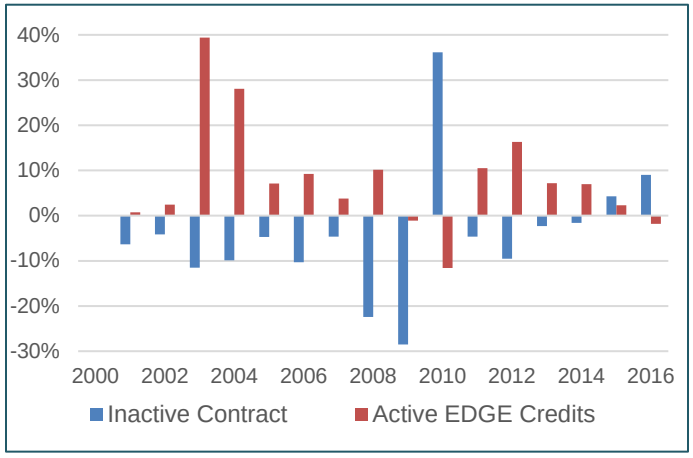
The positive employment growth trends for firms that receive EDGE credits, regardless of when the contract was initiated, could illustrate that these firms were already more likely to be successful. To better understand the impact, we parsed out the firm's employment growth while under an active contract. An EDGE credit recipient's annual employment change while under contract is significantly higher than that of EDGE credit recipients with an inactive EDGE credit contract. The effects of the incentive towards job growth do not appear to linger beyond the early years of the EDGE credit contract. Figure 8 illustrates the year-over-year percentage change in employment for all EDGE credit recipients and for large manufacturing firms that received EDGE credits. For manufacturing, the 2010 rebound overshadows the job growth for EDGE firms contracted in that year, again pointing to the sectoral impact and overall influence or pull on the total employment change.

Figure 8: Annual Employment Change (%) for Active and Inactive Contract EDGE Credit Recipients

All EDGE Credit Recipients



Manufacturing Firms that Received EDGE Credits

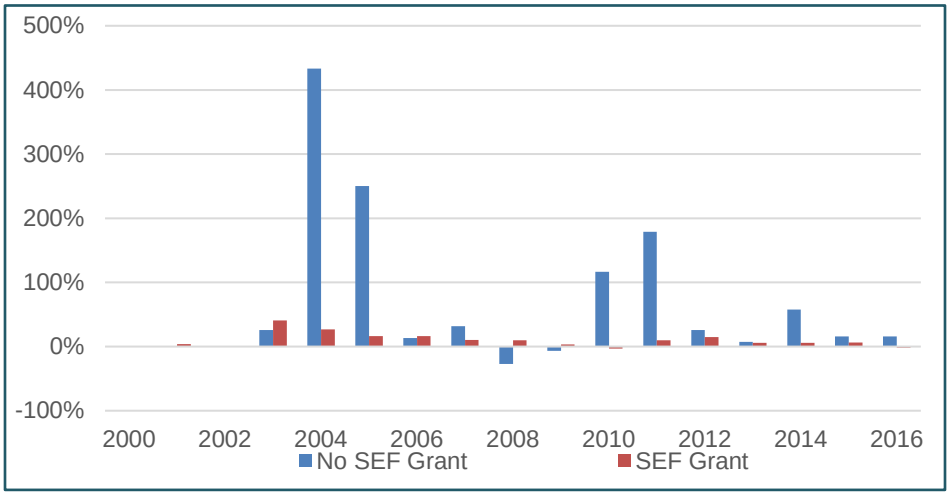


Source: Raw data provided by the Indiana Economic Development Corporation and Bureau of Labor Statistics, data analysis by the Office of Fiscal and Management Analysis.

EDGE Credits and SEF Grants

The interaction between incentive types illustrates a different trend (see Figure 9). For active contract EDGE firms receiving or having received SEF grants, the employment growth may still be positive, but it tends to illustrate slower growth patterns than that of firms that only received EDGE credits. This seems to suggest that for firms receiving packaged incentives over time, the priorities are temporarily different. While undergoing training or making large capital investments, firms may not be hiring new employees at the same expedited rate. The SEF grant program allows a firm to instead prioritize training as a way towards increased productivity. Job growth may slow as firms substitute training for new labor and refine their existing workforce to improve efficiency.

Figure 9: Annual Employment Change (%)

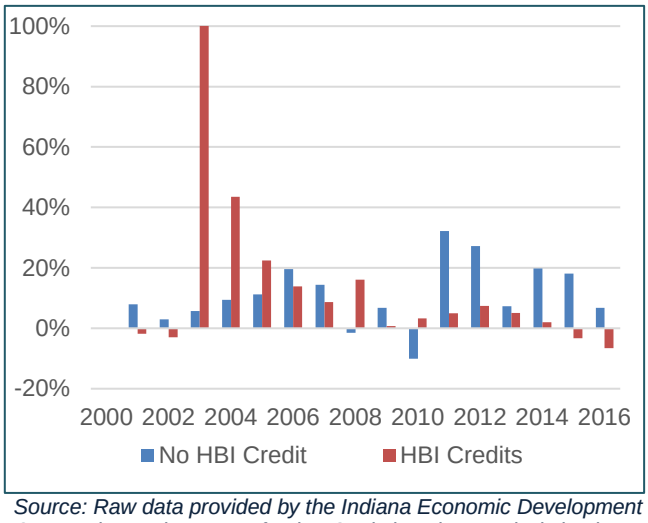


Source: Raw data provided by the Indiana Economic Development Corporation and Bureau of Labor Statistics, data analysis by the Office of Fiscal and Management Analysis.

EDGE Credits and HBI Credits

Aside from one large contract creating an exception early in the program during 2003, the same appears to be true for firms that receive both HBI credits and EDGE credits (see Figure 10). The EDGE credit correlates with job growth and firms with additional incentives exhibit slower job growth. Again, these packages allow firms to increase productivity without immediate job gains, via investments in capital in the case of the HBI credit program. In the most recent years, the active EDGE credit recipients that also received HBI credits illustrate some negative growth. When the EDGE credit is used by itself, firms appear to experience short-term gains in employment. These packaged incentives could allow for greater growth over a longer time frame when increases to capital complement rather than substitute labor. The potential substitution effect between capital and labor is discussed in greater detail in the HBI credit section of this report.

Figure 10: Annual Employment Change (%)

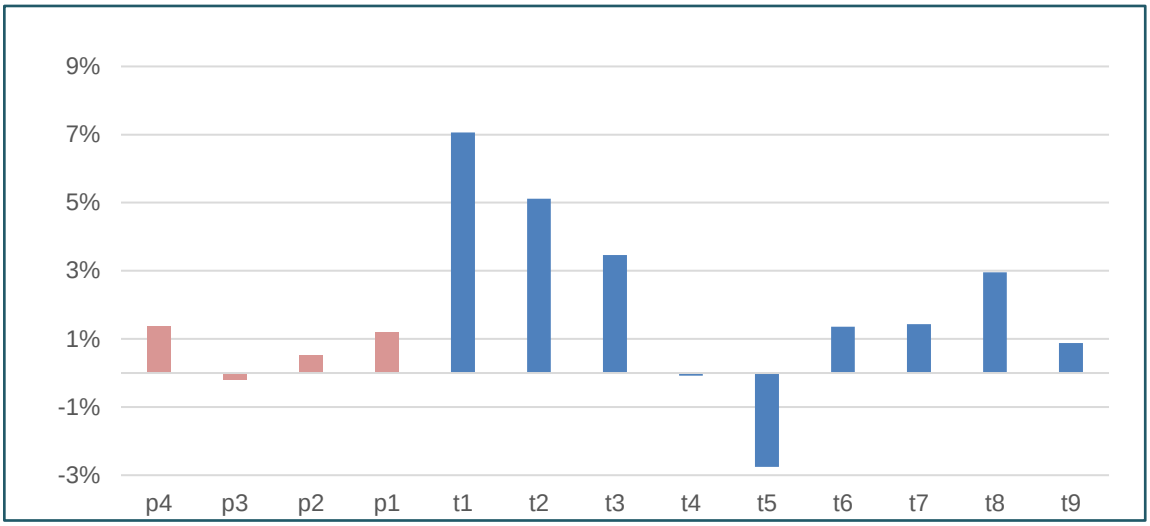


Source: Raw data provided by the Indiana Economic Development Corporation and Bureau of Labor Statistics, data analysis by the Office of Fiscal and Management Analysis.

Positive (if short-term) Employment Growth Trends Post EDGE Credit Contract

Lastly, LSA examined the EDGE credit recipients based on the contract start date. This allows us to examine, in aggregate, their job growth trends before and after receiving an EDGE credit contract. This review was conducted for all firms, large and small, and by industry. There are variations for small firms, and for smaller industries, but the outcome overall demonstrates a positive and short-term correlation between the start of the contract and job growth. During the first three years following the EDGE credit contract application date, job growth over the year increases by 7%, 5%, and 3.5% for all EDGE credit recipients. This is stronger than the average annual job growth for the private sector in Indiana, which has been around 0.4% since 2001, and still exhibits only around 1% annual growth when excluding the recession years. In Figure 11, p1 – p4 indicate pre-EDGE credit contract years one to four, and t1-t9 indicates the years following the EDGE credit contract. Figure 11 illustrates this trend for all firms, and it was essentially unchanged when isolating for large firms within all industries, yet again driven by the overall trends for large manufacturing firms.

Figure 11: Average Annual % Change in Employment: All EDGE Credit Recipients

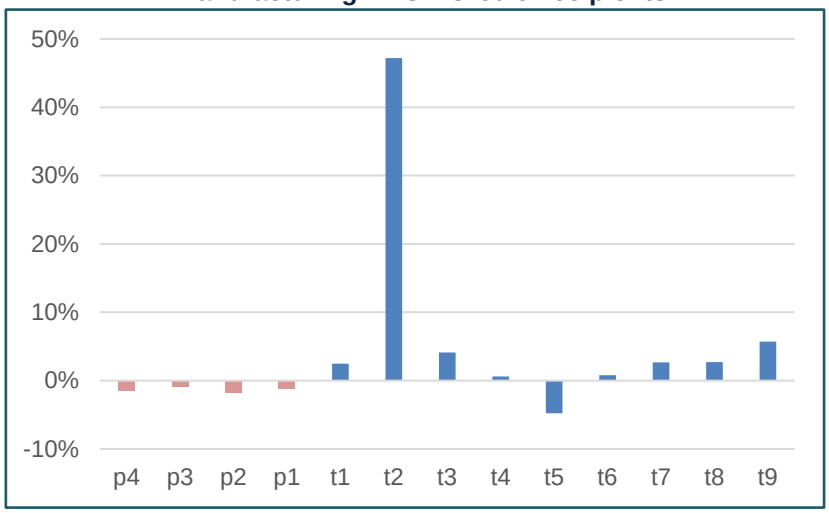


Source: Raw data provided by the Indiana Economic Development Corporation and Bureau of Labor Statistics, data analysis by the Office of Fiscal and Management Analysis.

Smaller firms with EDGE credit contracts appear to experience a different job growth trend. For those firms, there is an observable lag where the employment growth does not immediately follow the EDGE credit contract. If the EDGE credit program is influencing job growth in smaller firms it appears to take a few years to make an impact. Unfortunately, given the modest sample size of small firms receiving the EDGE credit, it may not be entirely meaningful to apply this evaluation more generally to equate failure or effectiveness of small firms using the EDGE credit.

The job growth for manufacturing firms alone after receiving EDGE credits is extremely positive in the second year following the contract. Yet this "effect" is still relatively short-lived. These firms do experience job losses on average prior to receiving EDGE credits, as manufacturing as a whole has been shrinking in Indiana since 2000. Figure 12 illustrates the average job growth is over 40% in the second year of the EDGE credit contract for manufacturing firms. Afterwards, the manufacturers that received EDGE credits follow the same trend as other manufacturers, but at a slightly higher level. These firms applied for EDGE credits with the intention to hire. Given the depth of the recession, particularly for manufacturing, it could be hypothesized that the credit created a boost in confidence and expedited the timing for these firms choosing to hire.

Figure 12: Average Annual % Change in Employment: Manufacturing EDGE Credit Recipients



Source: Raw data provided by the Indiana Economic Development Corporation and Bureau of Labor Statistics, data analysis by the Office of Fiscal and Management Analysis.

While examining EDGE credit recipients within the manufacturing industry, we found that the comparison group for large firms (100+ employees) in manufacturing, but not receiving EDGE credits, has declined by 35% since 2000. In the most recent years of the program following the 2009 recession, the number of large employers in manufacturing not receiving EDGE credits include only 50% of the total population. Yet in 2005, the number of non-EDGE credit recipients exceeded EDGE credit recipients by 25%. The manufacturing industry has been declining nationally. In Indiana, the data illustrates that the successful manufacturing firms remaining are more likely to be EDGE credit recipients.

Overall, the data suggest that firms receiving EDGE credits generally follow the trend of the larger economy, which in Indiana is largely driven by the manufacturing and trade industries. They also show signs of greater resiliency during the recession and while under an active contract. These firms illustrate above-average employment growth in the first few years following the initial EDGE credit application year. The findings prove similar to other reviews of this and similar programs that the discretionary EDGE credit shows a correlation with job growth. Firms that plan to hire and submit an application to the IEDC have proven to show greater-than-average job growth and are thus awarded based on these outcomes. What remains unverified is the extent to which these firms were motivated by the incentive, or if it merely rushed or expedited hiring plans and job growth over a shorter time span. If these employers had plans to hire, it seems logical they would apply for the program. Given the high concentration of EDGE credits awarded to manufacturing firms post-recession, it is likely the EDGE credit also offered some reassurance for cautious firms, and it may have expedited any hesitant hiring decisions.

The IEDC continues to award packaged incentives, and as more time passes beyond the initial years of the recession, the longer term impact of these projects based on a 10-year contract could be a focus of additional future review. Although it is challenging to identify which (if any) incentive among a package stimulated the job growth for a particular firm, this review finds a stronger correlation between the EDGE credit and job growth than that of the SEF grant or the HBI credit. These packages are awarded to an isolated share of Indiana's economy--just 1% of all firms. Thus, identifying the true relationship between the incentives and job growth still comes down to potential partiality amongst Indiana's largest and strongest firms.

Investment

The following six incentives are structured to encourage two types of investment. Capital investment is where a firm spends money within the business to improve or acquire new capital assets. The other type of investment is venture capital. Venture capital is a short-term investment in a startup company or small business. The incentives are structured to reduce the cost of the investment thus stimulating the activity. However, the incentives also have secondary goals of increasing employment, wages, business formation, and firm relocation.

Hoosier Business Investment Tax Credit (IC 6-3.1-26)

The Hoosier business investment (HBI) tax credit was established to encourage capital investments in Indiana. The credit applies to qualified investments made for taxable years beginning after December 31, 2003. In order to receive a credit, a taxpayer must enter into an incentive agreement with the Indiana Economic Development Corporation (IEDC). A recipient may use the credit to offset individual or corporate adjusted gross income (AGI) tax, financial institutions tax, and insurance premiums tax liabilities. The credit is nonrefundable, but unused credits may be carried forward for a number of years determined by the IEDC, up to a maximum of 9 years. The credit would have expired on December 31, 2020, but the sunset provision was removed during the 2017 legislative session.

The HBI credit program has evolved into three distinct programs. Each variation was established for a specific type of investment or project.

Base HBI Credit Program

The HBI credit was created to encourage capital investments directly related to expanding the workforce in Indiana. The HBI credit equals up to 10% of qualifying investments. The definition of a qualifying investment includes a wide range of activities ranging from constructing a new building to purchasing new computer equipment. However, property that could be easily moved outside of Indiana is ineligible for the credit. The IEDC is instructed to evaluate HBI credit applications by how the proposed project will create new jobs or increase wage levels in Indiana, and that receiving the credit is a major factor in the applicant's decision to make the investment. In addition, the average wage paid to employees at the location after the credit is given will be at least 150% of the hourly minimum wage. The IEDC may approve up to $50 M in credits per state fiscal year under this program.

This is the most commonly awarded variation of the HBI credit.

Initial Credit Calculation Method

When the credit was initially established in 2004, it was computed differently. The original credit was equal to the lesser of 30% of the qualified investment, or the taxpayer's state tax liability growth. State tax liability growth was defined as the difference between a taxpayer's state tax liability and the greater of either the state tax liability in the prior taxable year where the credit was last claimed, or the year preceding the qualified investment. The current credit computation method began after May 14, 2005.

HBI Credit for Logistics

Firms making capital investments that will enhance Indiana's logistics industry can apply for the HBI credit for logistics variant. For logistics investments, the HBI credit equals up to 25% of the difference of the logistics investment made in the taxable year and 105% of the average logistics investment made in the prior two years. The statute defining a logistics investment lists a number of improvements that could potentially qualify. For example, constructing a new distribution facility, upgrading permanent waterside docks, replacing bridges, improving a fueling facility, and new distribution equipment could all qualify as a logistics investment. Expenditures for maintenance expenses are ineligible for the credit. When evaluating an application involving a logistics investment, the IEDC must determine whether the project will create more jobs, preserve existing jobs, increase wages, or improve Indiana's economy. HBI Credits awarded for logistics investments are not counted towards the base HBI credit cap. The IEDC can offer up $10 M per year in HBI credit for logistics. As of August 30, 2017, this incentive has never been used.

HBI Accelerated Credit

Generally, the HBI credit is nonrefundable and unused credits may be carried forward to offset a future tax liability. However, the IEDC was authorized, under specific conditions, to pay a taxpayer for unused credits at a discount through the HBI credit - accelerated program. To qualify, the taxpayer must propose at least $500 M in total investment over a five-year period. They must enter into an agreement with the IEDC before January 1, 2017, and agree to claim tax credits for only $170 M of the total investment. The total amount of credits the IEDC can discount and remit is limited to $17 M per fiscal year. Any credits the IEDC agrees to reimburse are counted towards the total the HBI credit the IEDC is authorized to approve in a fiscal year.

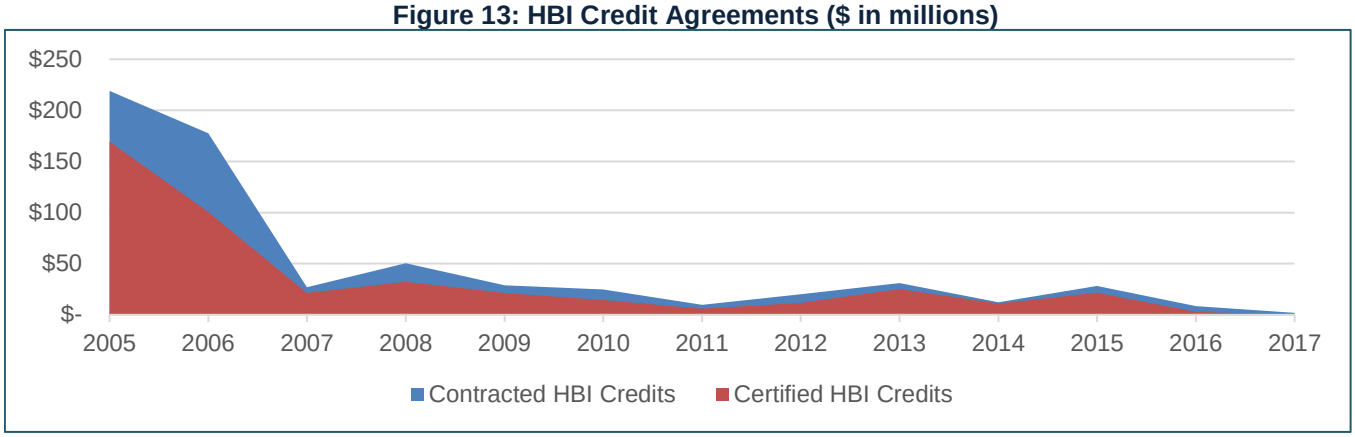
This program was utilized once for the Rolls-Royce Corporation. According to the incentive agreement, they intend to invest over $584 M at their Indianapolis facility. The amount of HBI credit offered was $17 M, but the accelerated credit amount, after the discount, is $15.5 M. The investment deadline is December 31, 2020, and $11.3 M has been paid as of August 29, 2017.

Credit Agreements

The IEDC and the taxpayer must enter into a credit agreement before the investment begins. The applicant must first agree to maintain operations at the project location for at least ten years. The agreement will contain the total qualifying investment and the maximum amount of HBI credit the taxpayer could potentially receive for the project. The amount of HBI credits offered in the agreement is referred to as the contract amount. The agreement will specify how long the taxpayer is eligible to receive HBI credits. Most agreements give the taxpayer two to four years to make the qualifying investment after executing the agreement. The taxpayer is not authorized to claim any credits until the IEDC certifies the investment has been made. The agreement will also contain provisions requiring the taxpayer to report employment information to the IEDC. The reporting requirements will usually extend beyond the investment timeframe because the taxpayer could have their HBI credits recaptured if the firm violates the terms of the agreement. Figure 13 contains information on the HBI credit agreements by year. As of August 29, 2017, the IEDC has entered into 519 HBI credit agreements. The cumulative contract amount for the program is $639 M and about $438 M in HBI credits have been certified to date.

The largest HBI contracts, in terms of tax credits, were executed in the initial years of the program. This is largely because the HBI credit was computed differently in 2004 and is likely not attributable to increased levels of investment. After 2005, the IEDC has the authority to award a HBI credit of up to 10% of the investment. An analysis of HBI credit contracts found the IEDC infrequently awarded the maximum HBI credit allowed under statute. About 78% of the contracts received a HBI credit for 5% of the investment or less. In addition, the IEDC does not certify all the HBI credits they offer. They usually certify, on average, 67% of the contract amount. There

Figure 13: HBI Credit Agreements ($ in millions)



Source: Raw data provided by the Indiana Economic Development Corporation, data analysis by the Office of Fiscal and Management Analysis.

are 65 active contracts where the taxpayers are still eligible to receive HBI credits. Out of the active projects, the amount of credits that will likely be certified is estimated to be around $6.7 M to $8.9 M.

HBI credit projects have occurred in 78 counties across the state. Marion County has the highest number of projects, but it is not the largest in terms of qualified investment and credits. Table 8 illustrates counties by qualified investment. The last column shows the mean HBI credit percentage for the computation of the HBI credit in each county. The counties with the most certified HBI credits all had a greater concentration of projects awarded in the first year of the program when the credit was computed differently than it is today. However, neither the credits awarded nor the number of projects seem to be related to the amount of eligible investment.

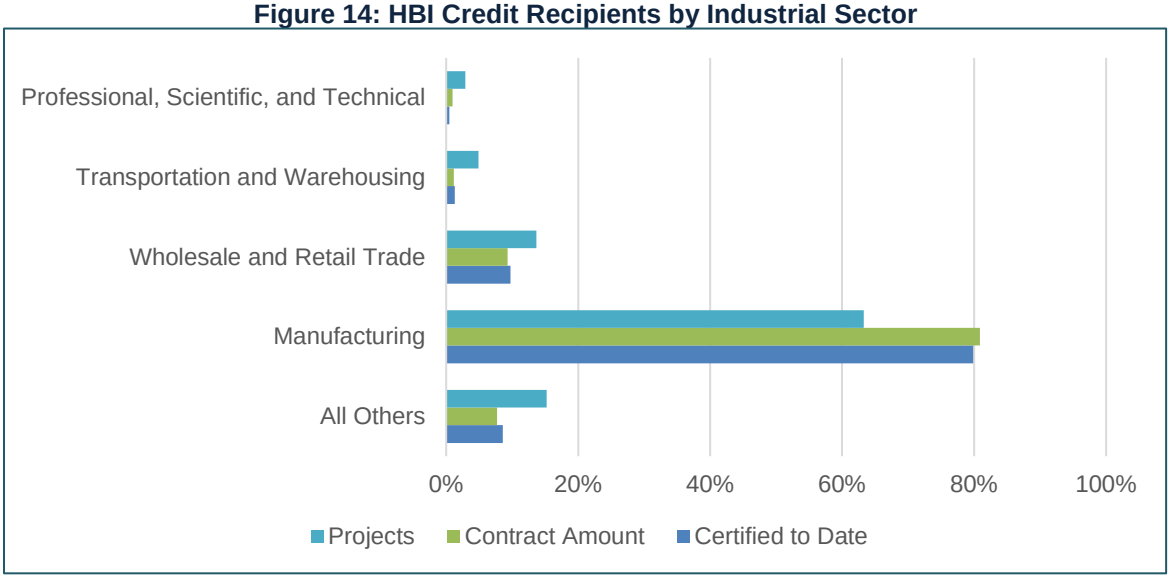
Table 8: HBI Investment by County, Top 10

County	Number of Projects	Eligible Investment	Certified Credits	Mean Credit Percentage
Tippecanoe	18	$644,953,340	$26,398,847	5.6%
Marion	69	409,225,726	24,650,472	11.5
Lake	11	357,790,537	20,869,594	5.5
Kosciusko	11	297,920,800	36,618,825	9.7
Whitley	8	270,419,643	10,174,051	6.0
Porter	11	247,525,917	66,050,507	10.1
Boone	9	218,336,568	14,230,112	4.8
Vanderburgh	12	210,604,954	45,294,792	7.6
Madison	11	204,624,460	8,468,022	13.4
Allen	27	189,505,591	12,157,224	9.4

Source: Raw data provided by the Indiana Economic Development Corporation, data analysis by the Office of Fiscal and Management Analysis.

HBI credit projects are concentrated into a few industrial sectors. Figure 14 shows the distribution of projects, contract amounts, and certified credits by industrial sector. About 63% of all HBI credit recipients are primarily involved in manufacturing, and those firms received the largest credit amounts. This is not surprising because the HBI credit is designed to encourage capital investment, and manufacturing is a capital-intensive industry. The HBI credits awarded to wholesale and retail trade projects are misleading. An analysis of the projects found those locations are distribution centers, headquarters, warehouses, or in some cases, production facilities. While the HBI credit recipients are primarily retailers, the activity occurring at those project locations could be classified under a different industrial classification.

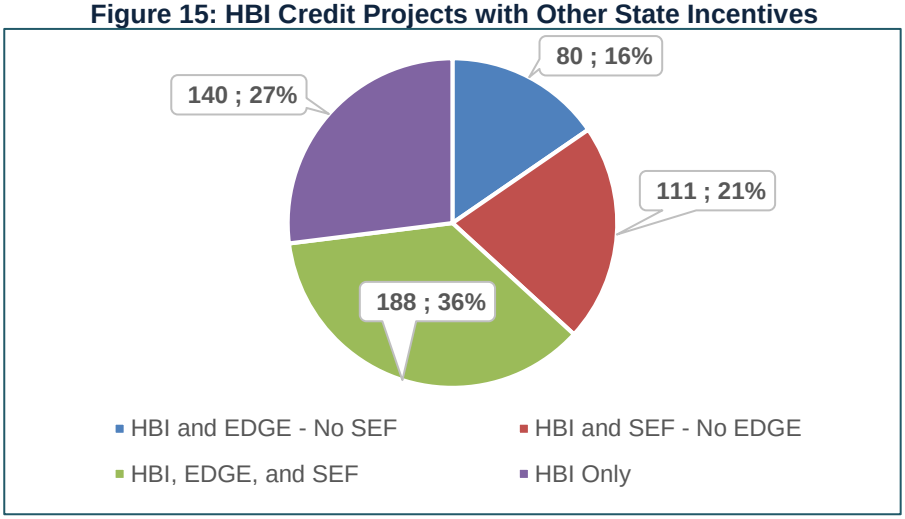
Figure 14: HBI Credit Recipients by Industrial Sector



Source: Raw data provided by the Indiana Economic Development Corporation and Bureau of Labor Statistics, data analysis by the Office of Fiscal and Management Analysis.

Like other economic development incentives, the HBI credit is not the only incentive employed in these projects. The EDGE credit was offered in 52% of the HBI credit projects, and a SEF grant was part of the incentive package for 58% of the projects. About 36% of the HBI credit projects were awarded both EDGE tax credit and SEF training grants (see Figure 15). It is unknown whether these projects also received other federal or local incentives. This phenomenon is not unique to the HBI credit program. Our research found multiple incentives employed in one project.

Figure 15: HBI Credit Projects with Other State Incentives



Source: Raw data provided by the Indiana Economic Development Corporation, data analysis by the Office of Fiscal and Management Analysis.

Credits Claimed

The IEDC has certified $408 M in HBI credits between 2004 and 2014. An estimated 31%, or $127 M, in certified credits have been claimed by taxpayers over that same time period. Taxpayers are allowed to carry forward any unused credits for up to nine years after the year of the qualified investment. The data are not available to precisely account for the amount of unclaimed HBI credits. Using historical information, the total estimated unused balance of HBI credits that could have been claimed in tax year 2015 was about $126 M to $140 M. The amount of eligible credits that may be carried forward continues to decrease as more HBI credits expire and less contracts are awarded. The estimated balance of unclaimed credit for tax year 2017 may be between $32 M and $55 M.

The inability for taxpayers to fully utilize the incentive may hinder its effectiveness. The HBI credit was intended to decrease the cost of the capital investment by 10%, but given the utilization rate, the average discount is closer to 3%.

Table 9: HBI Credit Claims History, 2008-2014

Tax Year	Claims			Credits		
	Individual	Corporation	Total	Individual	Corporation	Total
2008	315	27	342	$1,250,830	$10,457,201	$11,707,857
2009	91	29	120	1,428,944	5,451,620	6,880,564
2010	93	37	130	405,845	12,488,412	12,894,257
2011	108	30	138	620,660	6,240,277	6,860,937
2012	101	38	139	603,866	7,355,525	7,959,391
2013	104	31	135	1,604,217	8,091,173	9,695,390
2014	64	12	76	1,137,393	812,546	1,949,939

Source: Raw data provided by the Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis.

Qualifying Investment

The HBI credit provides tax savings for qualified investments. The total HBI credit related investment is about $5,690 M. The investment amount is based on the certified credits for projects awarded between 2004 and 2016. The average qualifying HBI credit investment per year is $437 M. Precise state level information on the amount of private nonresidential fixed investment is not available. However, an estimate can be computed using Indiana's gross state product as a percentage of national GDP and national investment data reported by the Bureau of Economic Analysis. The manufacturing and transportation industries are estimated to invest, on average, about $11,000 M per year in structures and equipment. Thus, the annual HBI credit related investment represents about 4% of the estimated annual investment by those two sectors.

Employment

The HBI credit was established to encourage investment in capital, but statute instructs the IEDC to award credits based on job creation and wage growth. This can be problematic because of the relationship between capital and labor. Research has found that capital can either be a substitute for labor or a complement to labor.

In situations where capital is a substitute for labor, the investment results in a decrease in jobs or labor income, or both. For example, a business may have six machines on their production floor. The firm purchases four new high-tech machines that can produce more output to replace their existing six machines. The firm's productivity will increase, but they require two less machine operators. Recent literature has argued that an increase in capital is responsible for decreases in labor in certain industrial sectors. (Piketty & Zucman, 2014). However, capital is more likely to be a substitute for unskilled labor but a complement for skilled labor.

Capital can also be complementary and result in an increase in wages and skilled labor. Researchers have found evidence that capital is more likely to be complementary if the investment is in high-tech equipment (Correa, Lorca, & Parro, 2014). For example, the firm that bought the four new high-tech machines now needs to hire a programmer and technician to support the machines. In addition, the operators for the four new high-tech machines require additional skills which may result in an increase in their wages. Whether capital is a substitute or a complement depends on the type of investment and industry. Researchers have found evidence suggesting capital and wages are complements in a large portion of the economy (Arrow et al., 1961; Antras, 2004; Chirinko, 2008; Lawrence, 2015).

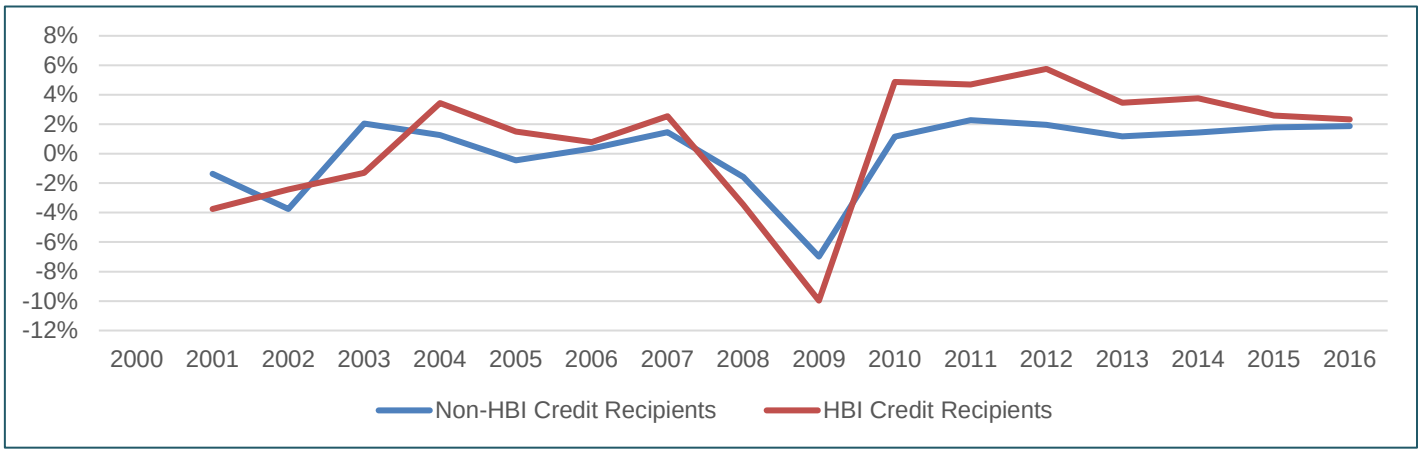
The relationship between capital and labor is important to consider when evaluating tax incentives that provide a discount to investment especially if the desired outcome of the incentive is additional jobs and wages. Ideally, only projects where the capital is a complement to labor should be incentivized. However, the nature of the investment is not easy to discern.

In the example, the investment of the four machines was both a substitute and a complement. The firm decreased the number of machine operators but hired additional technical support positions. In addition, the remaining machine operators could experience an increase wages because their jobs require more skill. It is possible that a HBI credit related investment could have a positive, negative, or no impact on jobs and wage growth.

To determine if the HBI credit related capital investment did ultimately result in additional jobs, the recipients were matched with preliminary data from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW). In addition, LSA employed a matching algorithm to the data to address issues of firm succession and to observe changes in employment for those firms. This is the same algorithm used in the EDGE credit analysis.

Figure 16 shows the firms that received HBI credits followed the same employment trends as all other types of businesses. This shows that the HBI credit recipients were affected by the same macroeconomic forces as all other firms. However, the HBI credit recipients exhibit a larger decrease during the recession and had stronger growth following the recession. The growth rates of firms that received both EDGE credits and HBI credits suggest they were better able to weather the recession than firms that just received HBI credits. The EDGE and HBI credit recipients also had a faster post-recession recovery. This could be attributable to the characteristics of businesses that receive EDGE credits. Firms that only received HBI credits experienced greater employment increases a few years after the recession. This may be because the HBI credit recipients did not hire as many people while making the qualified investment, and the growth in hiring occurs after the investment.

Figure 16: Annual Employment Change (%) of HBI Credit Recipients and All Other Firms



Source: Raw data provided by the Indiana Economic Development Corporation and Bureau of Labor Statistics data analysis by the Office of Fiscal and Management Analysis.

The employment trend of HBI credit recipients resembles manufacturing firms with more than 50 employees. The majority of HBI credit projects went to firms engaged in manufacturing. Figure 17 shows the employment patterns are similar to firms that only receive HBI credits. The slightly above average hiring for HBI credit recipients could either be attributable to the incentive, or more successful firms choosing to apply for the credit and would have made the investment regardless. It should also be noted that the HBI credit recipients in Figure 18 are demonstrating a trend closely associated with a firm that received EDGE credits.

Figure 17: Annual Employment Change (%) of Large Manufacturers

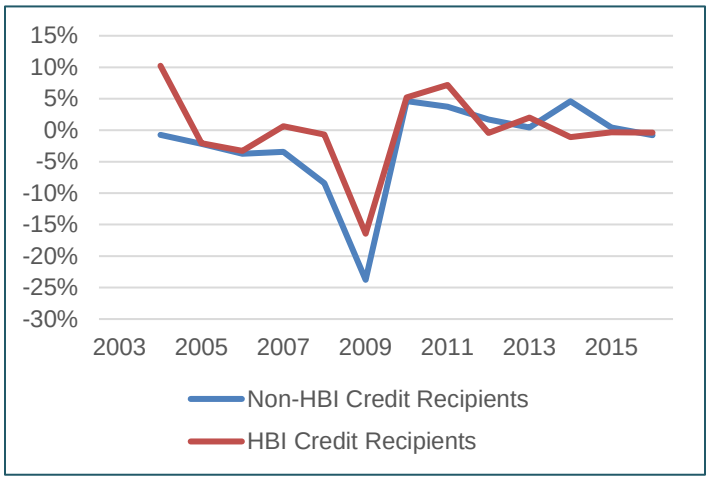
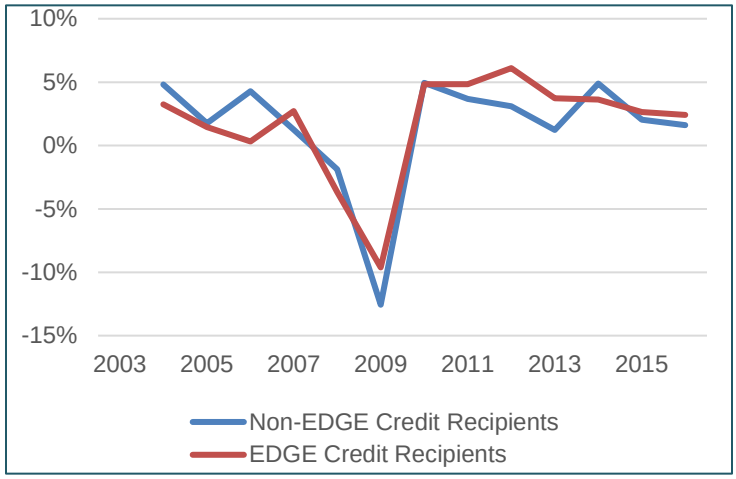


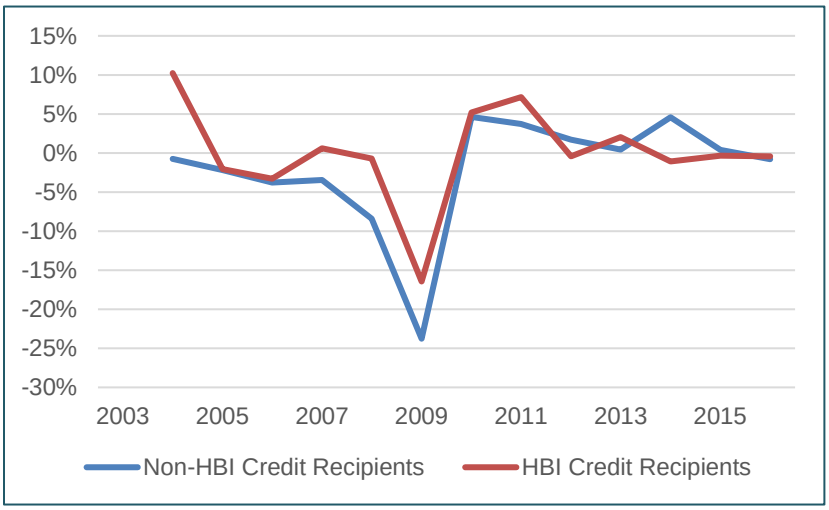
Figure 18: Annual Employment Change (%) of HBI Credit Recipients that also Received EDGE Credits



Source: Raw data provided by the Indiana Economic Development Corporation and Bureau of Labor Statistics data analysis by the Office of Fiscal and Management Analysis.

It is interesting in the later years the firms not receiving an incentive eventually began hiring at higher levels. It is almost as if the firms receiving the incentives accelerated hiring in the early years of the recession. The incentives may not be increasing total jobs, but shifting the timing of the hiring. Figure 19 removes the firms that receive EDGE credits from both groups. The HBI credit recipients were slower to reduce jobs prior to the recession, but they recovered at the same rate as non-recipients. Again, there is a possible observable shift in hiring by the HBI credit recipients. However, the data is insufficient to confirm that hypothesis. The volatility we are observing in the HBI credit recipients could easily be associated with their limited number of projects with a few large manufacturing firms responsible for the observed trend.

Figure 19: Annual Employment Change (%) Large Manufacturers,



Source: Raw data provided by the Indiana Economic Development Corporation and Bureau of Labor Statistics data analysis by the Office of Fiscal and Management Analysis.

Conclusion

Based on the available information, the impact of the HBI credit on the business decision making process is ambiguous. Evidence suggests that the size of any impact is likely to be small. HBI credits attempt to encourage capital investments that will result in additional employment. So, the desired outcome of the program appears to be new jobs, and it attempts to accomplish this goal by subsidizing capital. Research has found those goals may sometimes be contradictory because capital can be a substitute for labor. In industries where that relationship is complementary, the investment incentivized by the credit may create high-skilled and high-wage jobs.

However, a robust number of new jobs may not be created due to technological investments in those industries. The study detected that the qualified investment supported by the HBI credit is small compared to the overall business investment in Indiana. This points to low utilization of this tax credit.

HBI credit recipients would have to increase capital investment in a facility in order to increase the number of jobs. Whereas, it is likely that these capital investments would increase skilled labor, it is also common for these investments in technology to be a substitute for unskilled labor. This could be one of the constraints built into the effect of this credit. In addition, other incentives may be more enticing for firms considering hiring more people. The EDGE credit is a refundable job creation credit, so the discount is not limited by the firm's tax liability. Our investigation found 73% of the HBI credit projects were also awarded either EDGE credits, SEF training grants, or both. It is difficult to measure HBI's impact on business activity considering there have only been 140 pure HBI credit projects in 12 years. The credit's structure and the project claims data suggests it is unlikely solely responsible for additional employment and increases in overall business investment throughout the state. The credit may have influenced a few firms on the margin, and it is more likely to be effective when used with other incentives.

Property Tax Abatements (IC 6-1.1-12.1)

Indiana's property tax abatements were enacted in 1977. Abatements are granted to attract businesses, create jobs, increase income, and in some cases, rehabilitate distressed properties. This analysis will compare Indiana's abatement program to other programs across the nation, examine claims data, provide a brief overview of the literature on abatements, and analyze the effectiveness of Indiana's property tax abatements.

Indiana's Abatement Programs

There are three abatement programs in Indiana:

1. Personal property
2. Real property
3. Residentially distressed area

Each of these programs has unique requirements on what property can be abated and the maximum length of the abatement. However, they all have the following characteristics in common. Each abatement requires the designating body, which is the fiscal body of the county, city, town (or in Marion County, the Metropolitan Redevelopment Commission), to find that a given area is undesirable to develop or occupy based on the broad guidelines established in statute.

Once the designating body makes this finding, it may then decide to declare the area an economic revitalization area (ERA). This can be done proactively by the designating body or after it has received an application for an abatement. When an application for an abatement is to be considered, it must also go through a process that is open to public scrutiny. The designating body may include additional rules for ERA designation or the granting of an abatement. These include but are not limited to:

A. Limiting the number of years an ERA may be in effect.
B. Limiting what type of abatements may be granted in an ERA.
C. Limiting the maximum abatement amount available in an ERA.

Once an abatement is granted, the property owner must continue to comply with the statement of benefits provided as part of the application process. Otherwise, the abatement may be terminated or reduced.

An abatement is transferrable to a new property owner, as long as the new owner uses the property for commercial or industrial uses. The transferability of the abatement may make the abatement more attractive to a firm or developer. If for some reason the firm that owns the property decides to leave the location before the abatement has ended, the abatement could be used to attract a buyer. Also, the designating bodies may impose a fee based on the property tax savings that resulted from the abatement. The fee is the lesser of $100,000 or up to 15% of the tax savings. If the designating body chooses to impose a fee, it must be agreed upon when the abatement is initially approved. The revenue from the fee must go to a public or nonprofit entity that focuses on economic development.

The abatements for residentially distressed areas attempt to encourage a different type of investment activity. For this reason, they will be addressed in a separate section.

Personal Property

The personal property abatement is available for the following types of new equipment:

- Manufacturing
- R&D
- Logistical distribution
- Information technology

In order to receive the abatement, the applicant must submit a statement of benefits to the designating body. The statement of benefits must contain the following information:

1. A description of the new equipment.
2. An estimate of the number of people who will be employed or whose jobs will be retained as a result of the installation of new manufacturing equipment.
3. An estimate of the cost of the new equipment.
4. Any other benefits about which the designating body requests information.
5. If the equipment is new manufacturing equipment used to convert solid or hazardous waste into energy, the amount of waste that will be converted.

If the designating body finds that the estimates provided in the statement of benefits are reasonable and the benefits from the new equipment justify the deduction, it will designate the property as an ERA, adopt an abatement schedule, and award the applicant a deduction.

The deduction amount is equal to the assessed value of the new equipment multiplied by a percentage in the abatement schedule adopted by the designating body. For abatement schedules approved before July 1, 2013, the deduction can last for no more than 10 years. The percentage abatement for each year was established in Indiana Code. For abatements approved after June 30, 2013, but before July 1, 2015, the deduction can last for no more than 10 years, but the designating body chooses the abatement schedule. For abatements approved after June 30, 2015, the deduction can last for up to 20 years.

Real Property

Like a personal property abatement, an applicant must submit a statement of benefits to the designating body before rehabilitating a property. The statement of benefits must include the following:

1. A description of the proposed redevelopment or rehabilitation.
2. An estimate of the number of individuals who will be employed or whose employment will be retained by the person as a result of the redevelopment or rehabilitation and an estimate of the annual salaries of these individuals.
3. An estimate of the value of the redevelopment or rehabilitation.

If the designating body determines that the estimates provided in the statement of benefits are reasonable and the benefits justify the deduction, it will designate the property as an ERA and award the applicant a deduction.

The deduction amount equals the assessed value increase from the rehabilitation made to the property multiplied by a percentage in the abatement schedule adopted by the designating body. For abatement schedules approved before July 1, 2013, the deduction can last for no more than 10 years. The percentage abatement for each year was established in Indiana Code. For abatements approved after June 30, 2013, the deduction can last for no more than 10 years. The deduction percentage is now determined by the designating body.

Comparison of Abatements in Indiana and to Other States

All of Indiana's abatement programs are stand-alone property tax abatements, meaning that they are not a part of a larger economic development program, such as enterprise zones. The number of states allowing stand-alone property tax abatement programs has increased over the past few decades. Kenyon et al. (2012) estimate there were just 15 states in 1964 offering a stand-alone abatement program. In 2010, the estimate climbed to 37 states offering 82 stand-alone abatement programs. The programs across the country are heterogeneous on a number of attributes. Table 10 compares Indiana's property tax abatements to other states' abatement programs. Two differences worth exploring further are how the maximum abatement value is computed and which taxing units bear the cost of the abatement.

Table 10: Comparison of Indiana's Abatement Programs and Those in Other States

		Indiana's Property Tax Abatements	Count of Other Stand-Alone Programs in the U.S.
Maximum Duration of Abatement in Years	<5		7
	5-10	✓	44
	>10	✓	19
	Local Decision		4
	Not Specified		8
Designating Body	Local Government[1]	✓	59
	State		26
	Other		23
Who Bears the Cost?	Local Unit		43
	Overlapping Government Units	✓	28
	State		15
Eligible Property	Industrial/ Manufacturing	✓	50
	Commercial	✓	43
	Housing or Residential	✓	12
	Research		9
	Other	✓	47
Property Tax Abated	Land		69
	Personal Property	✓	45
	Improvements	✓	23
Maximum Abatement	50% of AV		4
	51%- 99% of AV		2
	100% of AV		34
	50%-75% Value Added		3
	100% Value Added	✓	10
	Other		28
Limiting Provisions	None		42
	Termination	✓	28
	Clawback	✓	15
	Sunset		6

Source: Kenyon, et al. (2012)

[1] Kenyon et al separated counties from local government. The two are combined here.

There is a wide variety of maximum abatement amounts allowed across all the abatement programs. The most common and most generous approach is to abate all the assessed value of the property. Indiana's property tax abatements take a different approach. They only abate the increased assessed value of a given property. For example, if a business purchases a vacant factory and makes repairs and improvements to the building, the abatement would only apply to the increased assessed value that results from the repairs and improvements. Wassmer (2009) contends that this approach most effectively connects the size of the abatement to the possible benefits the abated property might provide.

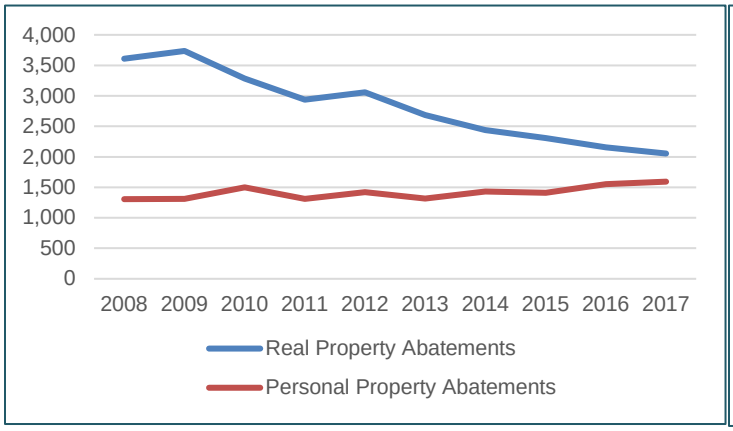
Indiana's abatements can be approved by a county, city, town, or in Marion County, the metropolitan development commission. An abatement granted by one local governmental unit impacts all the taxing units in which the property is located. For example, if a city chooses to grant an abatement, the abated assessed value for that property is not added to the tax base for the county, city, school corporation, or any other taxing unit whose boundaries include the property. In 43 of the 82 abatement programs, only the awarding taxing unit forgoes the tax associated with the abatement. In these cases, each individual taxing unit must decide if it wants to abate the property.

Using the previous example, if a city chooses to offer an abatement, the assessed value the city abated will still be included when computing property taxes for the county, school corporation, or any other taxing unit. In the programs that operate this way, the taxing units would need to work together to decide whether or not to abate all the firm's property taxes.

Indiana Abatement Claims Data

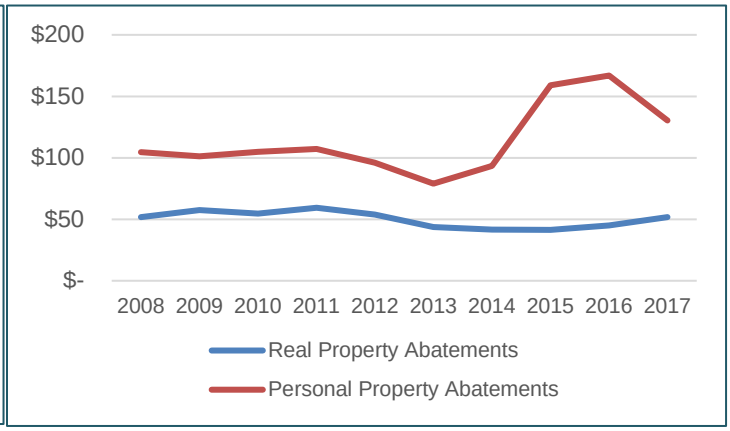
Since 2008, an abatement has been claimed at least once in every county except Pike. As Figure 20 shows, abatements are claimed on real property more often than personal property, although the gap has been decreasing. While most of the claims are real property, personal property has a larger share of the tax savings as seen in Figure 21.

Figure 20: Count of Real and Personal Property Abatements



Source: Office of Fiscal and Management Analysis Property Tax Database.

Figure 21: Total Tax Savings from Real and Personal Property Tax Abatements ($ in millions)



Source: Office of Fiscal and Management Analysis Property Tax Database.

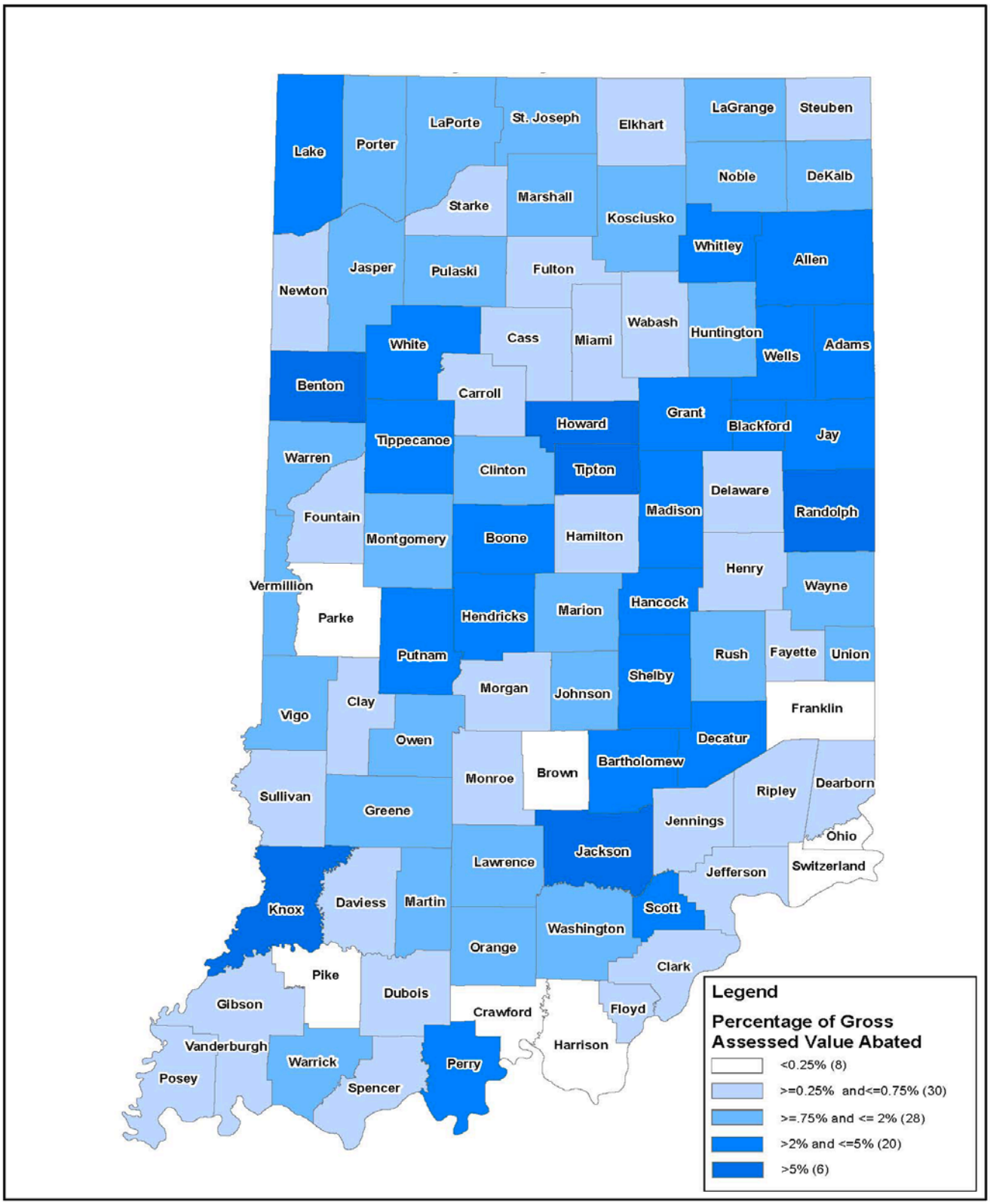
Since 2008, 79 counties had at least one abatement in every year, and more than $74 B in gross assessed value was abated. As Table 11 shows, personal property has not only accounted for a larger share of the total savings, but a much larger portion of its total assessed value has been abated. While real property has had less than 1% of its assessed value abated, personal property has had more than 10% of its gross assessed value abated for each of the past three years. Map 1 illustrates the percentage of total gross assessed value that was abated per county in 2017.

Table 11: Property Tax Abatement History, 2012-2017

	Real Property			Personal Property			Total		
Year	Count	% of Real Gross AV Abated	Tax Savings	Count	% of P.P. Gross AV Abated	Tax Savings	Count	% of Total Gross AV Abated	Tax Savings
2012	3,057	0.6%	$53,855,680	1,420	9.9%	$96,046,399	4,477	1.5%	$149,902,079
2013	2,686	0.5	43,604,543	1,315	8.1	78,984,080	4,001	1.3	122,588,622
2014	2,439	0.5	41,573,358	1,432	9.2	93,401,194	3,871	1.4	134,974,552
2015	2,310	0.5	41,384,146	1,411	12.3	158,974,938	3,721	1.9	200,359,084
2016	2,153	0.5	45,064,743	1,551	12.9	166,898,132	3,704	2.0	211,962,875
2017	2,054	0.5	51,803,413	1,593	10.9	130,464,287	3,647	1.8	182,267,701

Source: Office of Fiscal and Management Analysis Property Tax Database.

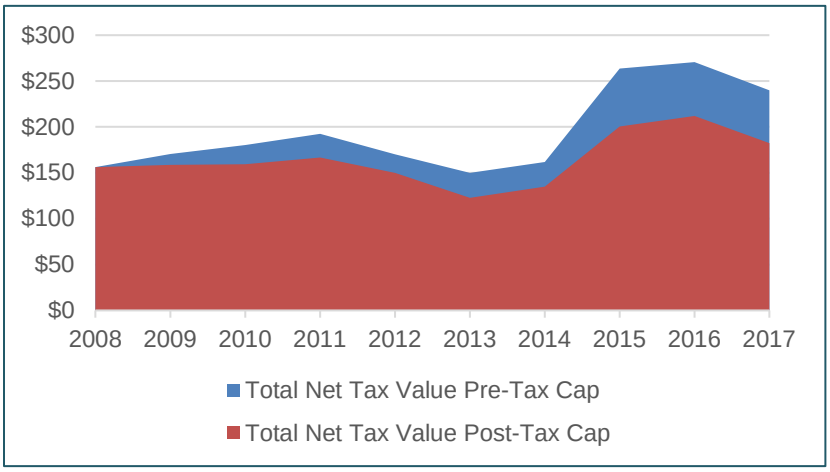
Map 1: Percentage of Gross Assessed Value Abated by County



Source: Raw data provided by the Office of Fiscal and Management Analysis Property Tax Database, data analysis by Office of Census Data.

The tax savings generated by an abatement is impacted by both the property tax rate and the property tax caps. Higher property tax rates make the value of an abatement increase because each abated dollar is being taxed at a higher rate, so the tax savings increase. Property tax caps have the opposite effect. They limit the effective property tax rate. The maximum effective rate for most properties that receive a real or personal property abatement is 3%. In tax districts with lower property tax rates, the effective property tax rate is below the tax cap, and thus the full tax value of the abatement is realized. A tax district could impose a tax rate that results in an effective tax rate greater than the maximum effective rate allowed by the tax caps. When this occurs, a portion of the savings that would have been generated by the abatement are instead generated by the tax cap. In other words, some of the anticipated savings from the abatement are already generated by the tax cap regardless of whether an abatement is granted. Figure 22 illustrates the tax value of the abatements both before the property tax caps are applied and after the tax caps.

Figure 22: Abatement Values Pre- and Post-Tax Cap ($ in millions)



Source: Office of Fiscal and Management Analysis Property Tax Database.

The distribution of abatements by industrial sector is shown in Figures 23 and 24. Like EDGE and HBI, manufacturing firms have received more abatements than businesses in any other industrial sector. Manufacturers have the largest number of claims for both real and personal property. They claim three times more personal property abatements than all the other industries combined. Real property abatements are distributed across more industries as the majority of claims are not from the manufacturing sector. After manufacturing, wholesale trade firms receive the second largest share of both real and personal property abatements. Other industries that had at least 5% of the real property abatement claims were: healthcare; transportation and warehousing; construction; professional, scientific, and technical services; and retail trade.

Figure 23: Personal Property Abatements Claimed by Industry

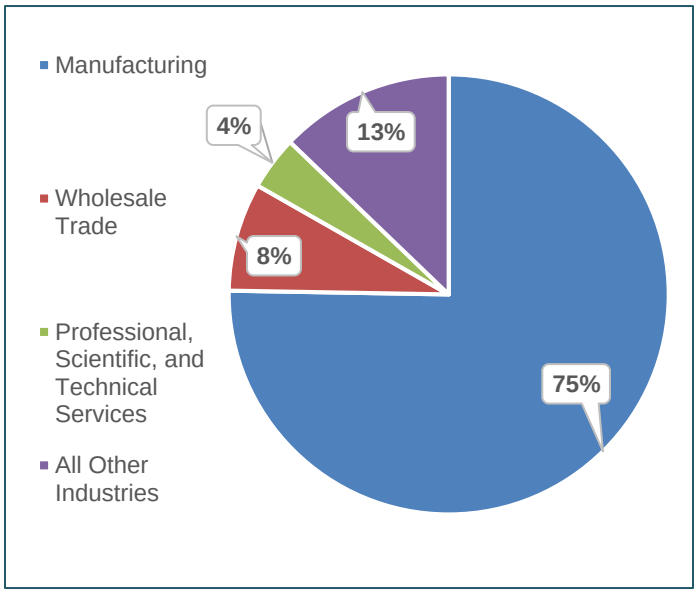
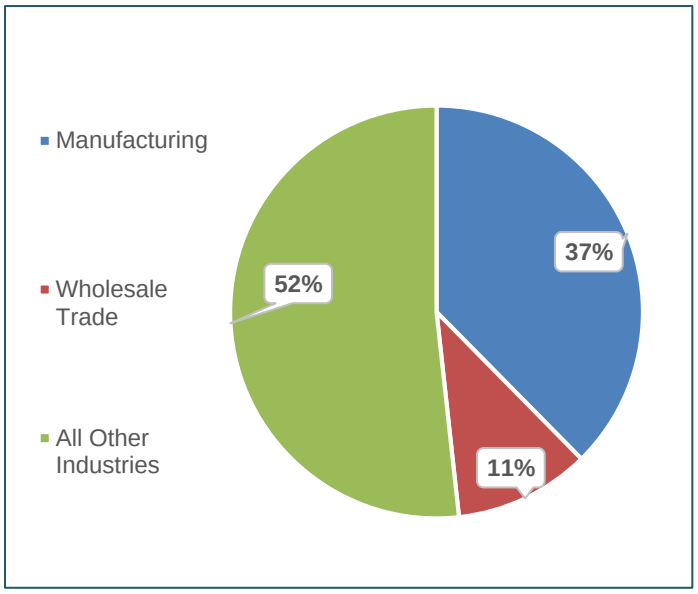


Figure 24: Real Property Abatements Claimed by Industry



Source: Office of Fiscal and Management Analysis Property Tax Database.

To analyze wages, the average wage paid by a firm that received an abatement was compared to the average wage earned by all Indiana workers. Only firms that had one location within a county were used for this analysis to avoid including wages that were not earned at the location that received the abatement. We observed that firms that received either a real or personal property abatement had, on average, paid wages greater than the statewide average. However, it is uncertain whether the higher wages are attributable to the incentive or to the characteristics of the firms that apply for an abatement. Like EDGE, there could be a selection bias. Further research is needed to understand whether abatements affect wages (Indiana Department of Workforce Development, n.d.).

Past Research on Abatements

The scholarly research on the effectiveness of abatements is mixed. The research suggesting that property tax abatements are ineffective usually focus on the diminutive size of property taxes as a share of total business costs.

Evidence that property tax abatements are minimally effective comes from research that shows property taxes are a small portion of a firm's total costs. If property taxes are only a small fraction of a firm's overall costs, even a 100% property tax abatement would have very little impact on the firm's bottom line, and thus would unlikely impact a firm's location decision. Kenyon et al.'s (2012) calculations show property taxes made up less than 0.5% of the manufacturing sector's total cost from 2004 to 2009. Both Gold (1979) and Nunn (1994) find property taxes to be a small portion of a firm's overall costs. In addition, property taxes can be deducted from federal income taxes, thus reducing their costs even more.

The idea that property taxes are too small to frequently sway a firm's location decision appears to be supported by researchers and economic developers who are knowledgeable on the topic of firm location decisions. Anderson and Wassmer (2000) find that abatements are not a factor until the firm decides on a general region. Then, firms try to negotiate with the cities in that region. Ady (1997) describes a three-stage process widely used by site-selection companies. First, the search is narrowed down to broad regions, states, or several counties. This first step is largely driven by an analysis of wages, access to transportation, and any other project-specific needs. State and local taxes may be considered, but only to rule out locations that are clearly uncompetitive. The second stage narrows the potential site to three to five communities by modeling operating costs at each potential location. At this stage, taxes are still of little consequence because they account for only a small portion of the cost variation between sites. It is only in the final stage, when actual properties are scrutinized to ensure they will fit the firm's needs and public service quality is measured, that taxes are examined closely. Ady (1997) concludes that the only time taxes alone would sway a location decision is when the decision is between multiple locations within the same metropolitan area. Other researchers had similar findings (Fouts, 2014).

Some research shows competition between localities can also decrease the effectiveness of abatements. An interesting case is the enterprise zone program in Ohio. While not a stand-alone abatement like Indiana's ERA property tax abatement, Peters and Fisher (2002) state that property tax abatements are the main benefit of the program. The program was originally limited to a few urban areas experiencing high unemployment rates, but over time, the program's purpose shifted from helping economically distressed areas to a general economic development program. With the change in purpose came a vast expansion of the program, which led to greater competition among localities in Ohio. The Ohio Department of Development's study finds that from 1982 to 1996, 446 firms in Ohio proposed closing or reducing operations at their current locations to relocate to enterprise zones elsewhere in the state. Only 97 firms closed a location outside of Ohio to locate in an Ohio enterprise zone. Cassel and Turner (2010) conclude the program was much more effective at getting firms to move within Ohio than it was at achieving the stated objective of making Ohio as a whole more competitive with other states.

Cassell and Turner's (2010) finding is similar to other studies that found as more governments are given the authority to grant abatements, the easier it becomes for firms to threaten to move to another location where an abatement is offered. Research suggests this has a snowball effect.

As more local governments begin granting abatements, other local governments feel more pressure to do the same to stay competitive (Kenyon et al., 2012; Wassmer, 2009). If abatements are more numerous, governments may find themselves providing abatements not to attract firms, but simply to stay competitive. In this environment, the only way to compete is to offer more generous abatements. Cassell and Turner (2010) find that as the number of local governments providing abatements increase, the generosity of abatements increases as well. In an environment where abatements are both more numerous and more generous, local governments may find themselves in a difficult situation.

Other researchers have arrived at a different conclusion. Dalehite, Mikesell, and Zorn's (2005) work concludes, "evidence on abatement effectiveness is mixed and leans toward the tentative conclusion that if abatements are effective, they are only partially, temporarily, or conditionally effective at best."

Some of the most prevalent researchers on the subject of property tax abatements have published work that finds abatements may be partially effective. Bartik (1991), Fisher and Peters (1998), and Anderson and Wassmer (1995) all conclude that when abatements are restricted to economically distressed areas, they can benefit low-income earners and minorities. However, the same researchers have found that if the business receiving the abatement employs people from outside the region, it will mitigate this effect.

Anderson and Wassmer (2000) concluded that abatements can be temporarily effective. They simulated the economic effects of an additional $10 M in abatements in a typical Detroit-area community. Their model found if a $10 M increase in abatements was granted between 1974 and 1977, it could have resulted in a $7.6 M increase in the manufacturing property tax base (although this would not yet be taxable due to the abatement), a small decrease in the poverty rate, and a small increase in the property tax rate.. When they simulated the effects of $10 M in abatements in later years, the results were not statistically significant.

Both Bartik (1991) and Anderson and Wassmer (2000) show abatements can be effective under certain conditions. They find that when locations in different communities provide similar access to labor, suppliers, and markets, high property tax rates could be a deciding factor. Offering abatements could diminish the effect of a high property tax rate, and thus induce a business to locate in a community in which it would not have otherwise located.

Abatement Effectiveness

In order to assess if an abatement would incentivize a business to locate or expand in Indiana, we attempt to measure the savings an abatement provides a firm. We compare the total property tax savings generated by an abatement for a given firm to the total wages of the firm. A high abatement-to-wage ratio would indicate that the abatement represents a cost savings that is more likely to incentivize a firm to locate or expand its operations in Indiana. A low abatement-to-wage ratio would suggest the abatement alone may not have influenced the firm's investment decision. With personal property, we were only able to match the abatement to a business' county. This means that if a firm had multiple locations within a county but only one of those locations received an abatement, we pulled in the wages earned at all the locations. Since this does not represent just the wages earned at the location that received the abatement, we only considered abatements granted from 2010 to 2016 to firms that only had one location in a county. A similar process was used to analyze real property abatements. Table 12 shows the distribution of the abatement-to-wage ratio for this time period.

	Table 12: Abatement Tax Savings as % of Wages	
Percentile Rank	Personal Property	Real
25th percentile	0.04%	0.09%
50th percentile	0.20	0.55
75th percentile	0.68	2.62
95th percentile	2.72	23.51

Source: Raw data provided by the Office of Fiscal and Management Analysis Property Tax Database and Bureau of Labor Statistics, data analysis by the Office of Fiscal and Management Analysis.

The value in the 50th percentile, or median, shows that for half of the firms in our sample, the abatement tax savings represent less than 0.20% of the wages paid by that firm. Even at the 75th percentile, personal property abatements generated a tax savings that represented just 0.68% of the wages paid. It is only at the 95th percentile that the personal property abatements represented 2.72% of the wages paid.

For 83% of the firms that received a personal property tax abatement, the tax savings generated by an abatement would not exceed 1% of wage cost and may not alone be able to sway the firm's location decision. For approximately 17% of the firms in the sample the tax savings would exceed 1% of wage cost. Thus, the abatement in this scenario may affect only a small share of all firms on a cost basis. Also, the small reduction in cost provided by the abatement suggests that tax incentives likely influence firms that are on the margin of making a business decision. We do not know how much tax savings are necessary to influence a particular firm.

The variance of the tax savings-to-wages ratio is much greater for real property abatements. At the 95th percentile rank, the abatement's tax savings are approximately 24% of the wages paid by the firm. While some of these values are valid, there may be data errors from the matching process. The process to match real property abatements to the preliminary data from the Bureau of Labor Statistics' QCEW. was more difficult than personal property abatements. Even if there are not data errors, the wages paid by the firms that have a high tax savings-to-wages ratio is disproportionately low. While accounting for 5% of the claims, these firms paid less than 0.2% of the total wages in our data set. This implies that the firms receiving real property abatements that represent a large total cost savings are small firms with few employees and/or low wages. The 75th percentile rank is likely a much more accurate depiction of a firm receiving a real property abatement that represents a relatively high cost savings.

Utilizing the same scenario from the personal property section, a firm that finds labor costs in an Indiana location are 1% higher than another location, the typical firm's abatement savings alone may not be enough to make the Indiana location more cost effective.

Incentive Packages

It is common for a firm to receive more than one type of incentive for a project. Our analysis of EDGE and HBI found a large percentage of firms were awarded both incentives. We wanted to know if local units were also providing abatements to the same firms. The analysis uncovered 37% of the firms that have a personal property abatement also received either EDGE, HBI, or both. At least 22% of the firms who received a real property abatement were awarded a state incentive. The match was conducted at the firm level. Additional research is required to link abatements to specific state incentive projects.

Conclusion

Indiana's real and personal property abatements are meant to encourage business investments, create jobs, and increase incomes. When evaluating the effectiveness of Indiana's tax abatements, the abatement's ability to induce investments is the most important factor to analyze. If the abatement did incentivize a firm to locate or expand their operations, then the abatement is responsible for the associated job and income growth. If the firm receives an abatement and it did not influence their decision to locate or expand in Indiana, the firm receives a windfall. Any added jobs or increase in income from those projects cannot be attributed to the abatement.

Our findings suggest that both the personal and real property abatements represent a small savings for the typical firm. Even if a firm received both abatements, the savings would typically represent less than 0.8% of its wages. By Ady's (1997) estimate, wages typically account for 36% of a manufacturing firm's costs. This means that abatements typically reduce a manufacturing firm's costs by less than 0.3%. While the savings is small, it could potentially be enough to sway a firm's location decision if two or more locations have nearly identical wage, transportation, and other costs, especially, if additional incentives are awarded to the project. It is challenging for a local unit to know the total costs to the firm of the other locations a firm is considering. Therefore, local units have no way of knowing if an abatement will or will not affect the firm's location decision.

Residentially Distressed Area Abatements

A designating body may choose to designate an area as residentially distressed. The designation allows the designating body to grant abatements for residential property, which is generally not eligible for abatements in ERAs. In order to designate a residentially distressed area, the designating body must first find that the area is an ERA. Then, the body must find that:

1. The area has dwellings for one to four families.
2. Many of the dwellings are unsafe or have major building deficiencies.
3. Many of the properties were sold but not redeemed in a tax sale or are owned by a local unit of government.
4. The number of dwellings in the area has decreased over time, or the area is owned by the United States or Indiana.
5. The area does not exceed 10% of the total area within the designating body's district.

For abatements approved before July 1, 2013, the deduction is allowed for up to five years. The deduction amount is the lesser of the assessed value of the improvement to the property after the rehabilitation or redevelopment has occurred or the amount found in Table 13.

Table 13: Abatement Amounts for Abatements Granted Prior to July 1, 2013

Type of Dwelling	Amount
One family dwelling	$74,880
Two family dwelling	106,080
Three unit multifamily dwelling	156,000
Four unit multifamily dwelling	199,680

For abatements granted after July 1, 2013, the abatement amount is the increase in AV resulting from the rehabilitation multiplied by a percentage in the abatement schedule adopted by the designating body. Like the real property abatement, abatements in residentially distressed areas may be granted for up to 10 years. The abatement will not be allowed unless the dwelling is rehabilitated to meet local code standards. This along with other data issues complicate any analysis on the claims data. However, a hypothetical scenario can be used to evaluate the potential effectiveness of the incentive.

Table 14 illustrates the differences in the return on investment (ROI) of rehabilitating a dilapidated property in a residentially distressed area. In this scenario, the property is in a taxing district with a 3% property tax rate. The property is purchased for $50,000, and after renovations is sold for $90,000. Home-flipping experts estimate that the cost of flipping a home is generally 26.5% of the post-rehabilitation value, so in this case the project cost is $23,850 (RealtyTrac, 2015). While the property tax rate is 3%, the tax cap limits the property tax to 2% of gross assessed value. The abatement saves $300 in property taxes. The total ROI is changed by only 2.1%. It is unclear whether this discount would be enough to influence a person's investment decision.

Table 14: Tax Savings from a Hypothetical Residentially Distressed Area Abatement

	Without Abatement	With Abatement
Assessed Value After Rehab	$90,000	$90,000
Purchase Price	(50,000)	(50,000)
Estimated Project Cost	(23,850)	(23,850)
Total Property Taxes	(1,800)	(1,500)
Property Tax Reduced by Abatement Over 1 Year	0	300
Total Rehab Profit	14,350	14,650
Total ROI over 1 Year	0.190	0.194

Source: Office of Fiscal and Management Analysis Property Tax Database.

The data for abatements granted in residentially distressed areas were not robust enough to make a determination on their effectiveness at inducing rehabilitation of dilapidated residential properties. A hypothetical example showed that the abatement would not typically reduce a project's ROI significantly in one year. However, the net present value of an abatement over 10 years may induce certain rehabilitation projects.

Headquarters Relocation Tax Credit (IC 6-3.1-30)

The Headquarters Relocation Credit was created to encourage businesses to relocate their corporate headquarters, division or subdivision principal office, or research center to Indiana.

An eligible business is a business with at least $50 M in worldwide revenues in the year prior to applying for the credit, has a qualifying facility located outside Indiana, and has not previously maintained a qualifying facility in Indiana. An eligible business that completes a qualifying project, incurs relocation costs, and employs at least 75 employees in Indiana is entitled to a credit against the taxpayer's state tax liability for the year in which the relocation costs are incurred.

The amount of the credit equals up to 50% of the amount of the relocation costs incurred in the taxable year. However, the amount claimed may not result in an Indiana tax liability that is lower than the Indiana tax liability in the taxable year immediately preceding the taxable year in which the taxpayer first incurred the relocation costs. The credit is nonrefundable, but unused credits may be carried forward for up to 9 succeeding taxable years. Unused credits may not be carried back. The tax credit may be applied to individual or corporate AGI tax, financial institutions tax, or insurance premiums tax liabilities.

Table 15: Headquarters Relocation Credit Claims History, 2008-2014

Tax Year	Claims			Credits		
	Individual	Corporation	Total	Individual	Corporation	Total
2008	N/R	0	N/R	7,248	0	7,248
2009	N/R	0	N/R	1,422	0	1,422
2010	N/R	0	N/R	2,018	0	2,018
2011	N/R	0	N/R	N/R	0	N/R
2012	N/R	0	N/R	2,981	0	2,981
2013	N/R	0	N/R	1,349	0	1,349
2014	N/R	0	N/R	3,016	0	3,016

N/R = Five or fewer filers, count not reportable.

Source: Raw data provided by Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis.

The credit was enacted in 2005 and was not used until the General Assembly expanded the eligibility requirements in 2013 to include the relocation of a research center. In addition, the worldwide revenue qualification was reduced from $100 M to $50 M. Since the criteria was modified, the IEDC approved two projects. The total contracted amount is $2.75 M, and $2.4 M has been certified as of July 17, 2017.
One headquarters relocation project also received $10.5 M in EDGE credits and $250,000 in SEF training grants.

An analysis of Mergent Intellect and Business Insights database identified between 38,000 to 40,000 non-subsidiary businesses in the United States that have at least $50 M in revenue or sales. Approximately 2% or 826 are located in Indiana (Mergent, Inc., n.d.) (Gale Group, n.d.). Strauss-Kahn and Vives (2009) found about 5% of the headquarters in their sample migrated between 1996 and 2001. That is about 1% per year. Based on their findings, about 380 to 400 qualifying firms are moving annually, but not all the firms are moving across state borders.

While many companies develop strong ties to the communities where they were established firms do move their headquarters to a different location either from the outcome of a merger or by voluntarily moving their headquarters operations (Klier & Testa, 2002). There are several reasons why a firm will choose to relocate their headquarters. Research shows that headquarters tend to move to cities that contain other headquarters and offer a variety of business service suppliers such as experts in law, advertising, and finance (Davis & Henderson, 2008). Firms benefit from having greater access to these suppliers and the associated skilled professional workforce to draw upon. These services may not be found at the business's production location. Other regional attributes that tend to attract headquarters are good airport facilities, low corporate taxes, low average wages, and the same industry specialization (Strauss-Kahn & Vives, 2009).

Headquarters tend to cluster to exchange information through formal and informal channels. Studies have found this to be especially true for firms that export to foreign markets (Lovely, Rosenthal, & Sharma, 2005), research intensive industries, and firms with rapid product development (Klier & Testa, 2002). The credit reduces the cost of the relocation, but it does not address the regional attributes that may influence a headquarters to relocate in an area.

An incentive's effectiveness cannot be determined by the number of claims. However, this credit has only been approved for two projects in 12 years. It is possible the credit influenced the decision to locate here, but it is not likely enticing businesses to locate their headquarters or research operations to Indiana.

Venture Capital Investment Tax Credit (IC 6-3.1-24)

The venture capital investment (VCI) credit was created to encourage investment in early-stage firms. The credit equals 20% of the annual qualified venture capital investment made by a taxpayer up to a maximum credit of $1M. The IEDC certifies businesses to receive creditable venture capital investment. The investment must be made after 2004. The total new credits awarded may not exceed $12.5 M annually. The credit is nonrefundable, but unused credits may be carried forward for up to five years. Unused credits may not be carried back. The credit may be applied to individual or corporate income tax, financial institutions tax, insurance premiums tax, or sales tax liabilities.

To receive the credit, an early-stage firm must apply to the IEDC to be designated as a qualifying Indiana business (QIB). The firm must be headquartered in Indiana with at least half of its employees living in the state and at least 75% of its business located in Indiana. The primary focus of the business should be on:

- Professional motor vehicle racing
- Commercialization of R&D
- Technology transfers
- New technology.

In addition, the firm must have had average annual revenues of less than $10 M in the two years before they received the capital investment. The statute also excludes firms primarily engaged in real estate and real estate development, insurance, professional services provided by an accountant, lawyer, or physician, retail sales (unless the business is in development or supporting electronic commerce), and oil and gas exploration.

The QIB submits an investment plan with the IEDC, and they determine which investments are eligible for the credit. The qualified debt or equity capital must be preapproved by the IEDC before the investor can receive any credits. The investment must be made within two years of the approved investment plan.

Table 16: VCI Credit Claims History, 2008-2014

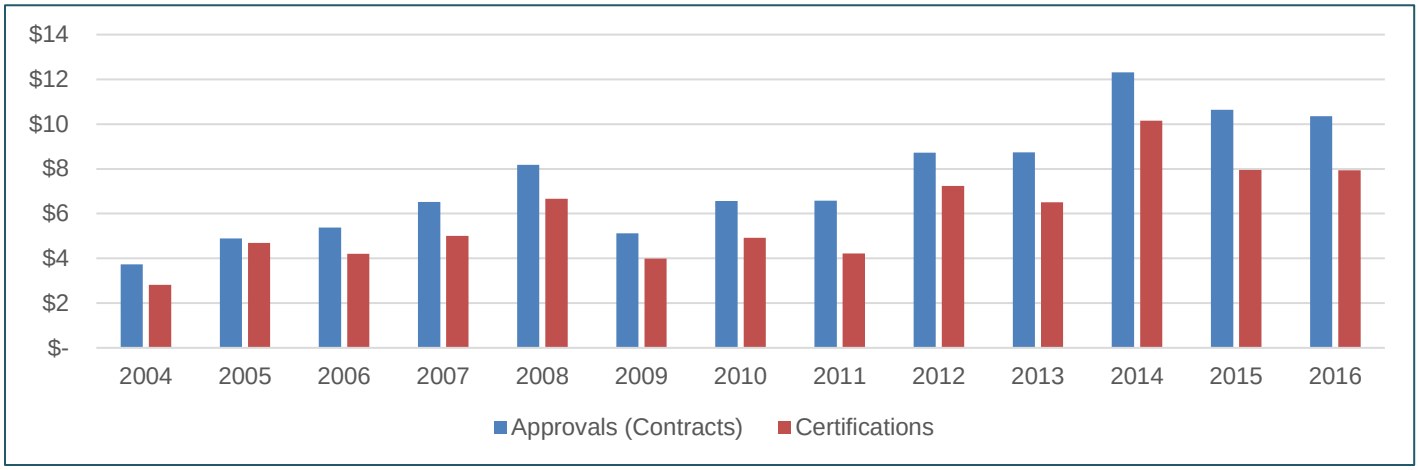
Tax Year	Claims			Credits		
	Individual	Corporation	Total	Individual	Corporation	Total
2008	490	N/R	490	$3,344,229	$25,634	$3,369,863
2009	399	N/R	399	2,418,395	78,257	2,496,652
2010	437	6	443	3,325,526	94,211	3,419,737
2011	418	0	418	3,380,749	0	3,380,749
2012	519	N/R	519	4,792,807	188,847	4,981,654
2013	528	N/R	528	3,716,492	1,148,655	4,865,147
2014	620	6	626	6,084,446	246,383	6,330,829

N/R = Five or fewer filers, count not reportable.

Source: Raw data provided by the Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis.

The credit claims for tax years 2008 through 2014 are contained in Table 16.Taxpayers are allowed to carry any unused balances for up to five years. An average of 65% of the certified credits are claimed on the return. This has resulted in an estimated $10 M in unclaimed credits that have been carried forward each year, and approximately $13 M in expired credits. Figure 25 shows the credit approvals and certifications by year.

Figure 25: VCI Credit Approvals and Certifications ($ in millions)



Source: Raw data provided by the Indiana Economic Development Corporation, data analysis by the Office of Fiscal and Management Analysis.

The credit is intended to increase the amount of in-state venture capital to Indiana early-stage firms. After analyzing the returns, the actual savings the credit provided to investors was 13% over 5 years. The VCI credit provides the optimal discount to firms that have significant tax liability. If an investor is not able to receive the full discount, they may be less likely to use the program again.

Qualified Indiana Businesses

A list of the QIBs provided by the IEDC were joined to the preliminary data from the Bureau of Labor Statistics' QCEW to determine how their employment and wages have changed over time. Unfortunately, we were only able to match 54% of the firms[1]. The matched firms represent 66% of the certified credits.

Of the firms we were able to identify, 46% of the firms provide professional, scientific, and technical services. Within that sector, the following activities were the most common:

- Custom computer programming services 34%
- R&D in physical, engineering, and life sciences 16%
- Computer system design services 15%
- R&D in biotechnology 7%
- All other professional, scientific, and technical services 28%

The following four sectors combined comprise 17% of the firms: Durable good wholesalers, publishers, data processing, and computer/electronic product manufacturing. An analysis of the sample QIBs show that 78% had less than 10 employees at the time the credits were awarded and 3% had over 50 employees.

Table 17 shows the distribution of the QIBs by firm size during two points in time: when they qualified for a VCI allocation, and the most recent year in our data.

[1] There are a few reasons why we were unable to identify the remaining firms. QCEW contains employers. If the business does not eventually begin employing additional people, they will not be in the file. The reason could also be a data quality issue.

Table 17: Qualified Indiana Businesses by Firm Size		
Firm Size (employees)	**At Initial Allocation**	**At Q3 2016**
0 - 4	59.7%	43.2%
5 - 9	18.9	15.3
10 – 19	10.1	16.3
20 – 49	8.3	15.8
50 or More	3.0	9.4

Source: Raw data provided by the Indiana Economic Development Corporation and Bureau of Labor Statistics data analysis by the Office of Fiscal and Management Analysis

Unlike other discretionary incentives, the state does not choose which startups receive an investment. Instead, private investors have control. This arrangement can benefit the state if the investors have more information or are better equipped to select successful startups. Investors claim the subsidy is helpful because it helps mitigate the investment risk and allows them to invest more in the startup. However, firms only benefit if they receive an investment that was induced by the credit going to the investor. Otherwise, the credit is providing a windfall to the investors by rewarding them for actions they would have taken without the credit.

Not all early stage firms succeed. Our analysis found that within the sample of businesses we were able to match, 56% of firms that received a qualifying investment were still in business as of Q3 2016. Out of the surviving firms, 59% had less than 10 employees and 9% had over 50 employees. Overall, the firms in the sample added about 2,730 jobs since the first year they received a credit allocation of VCI credit.

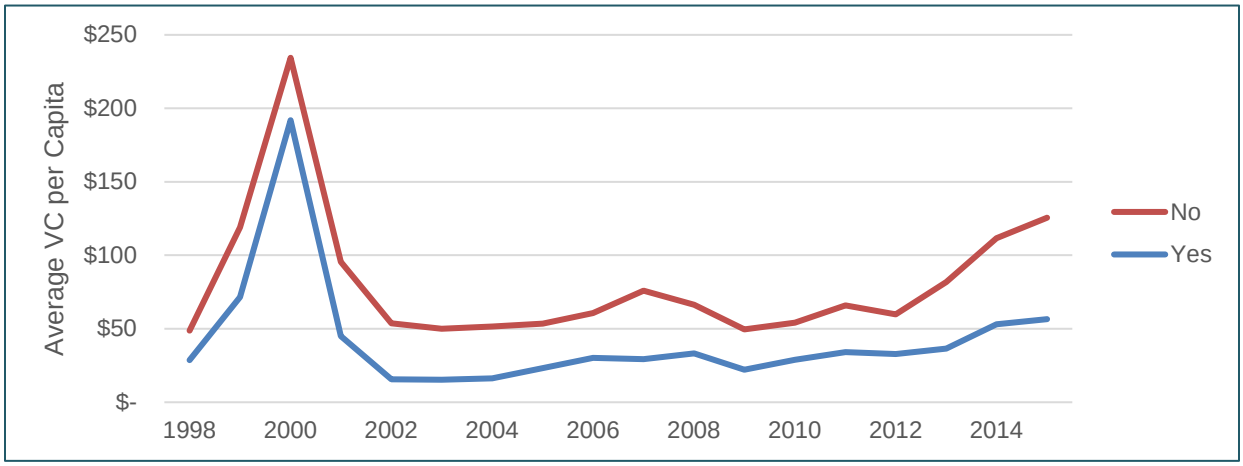
Effectiveness of the Credit - Model Results

In order to assess whether or not the VCI credit led to an overall increase in the amount of venture capital spent in Indiana, we conducted a regression analysis of the relationship in all 50 states between venture capital tax credits and the level of venture capital spent per capita in a state over time. The data on venture capital investments come from the PricewaterhouseCoopers and National Venture Capital Association Moneytree Report. These data were combined with GDP and population data from the Bureau of Economic Analysis from 1998 through 2015.

The number of states implementing some type of venture capital tax credit has grown consistently over time. In 1998, there were only three states with a credit: Kentucky, Ohio, and Maine. As of 2015, the final year of data available, there were 25 states with a venture capital investment tax credit including 10 of the 13 Midwest states. Within the Midwest, only Michigan, Missouri, and South Dakota do not have credits. On average, the states that have adopted credits have had them for 10 years, and the size of the credit ranges from 10% to 50% of the investment.

The average amount of per capita venture capital spent in any one state is $67.50, but there is a large gap when comparing states with a credit to states without a credit. On average, in states with a credit, investors spent a little over $50 per person in 2015, while in states without a credit they spent around $125 per person. As seen in Figure 26, however, this gap has remained fairly consistent over time and likely does not mean that having a venture capital tax credit leads to lower venture capital spent in a state. Instead, it may indicate that states that choose to adopt a venture capital tax credit already had lower than average venture capital expenditures than other states. In other words, states self-select into the policy, and this self-selection makes a comparison of averages between states biased since the states are not similar before the policy is adopted.

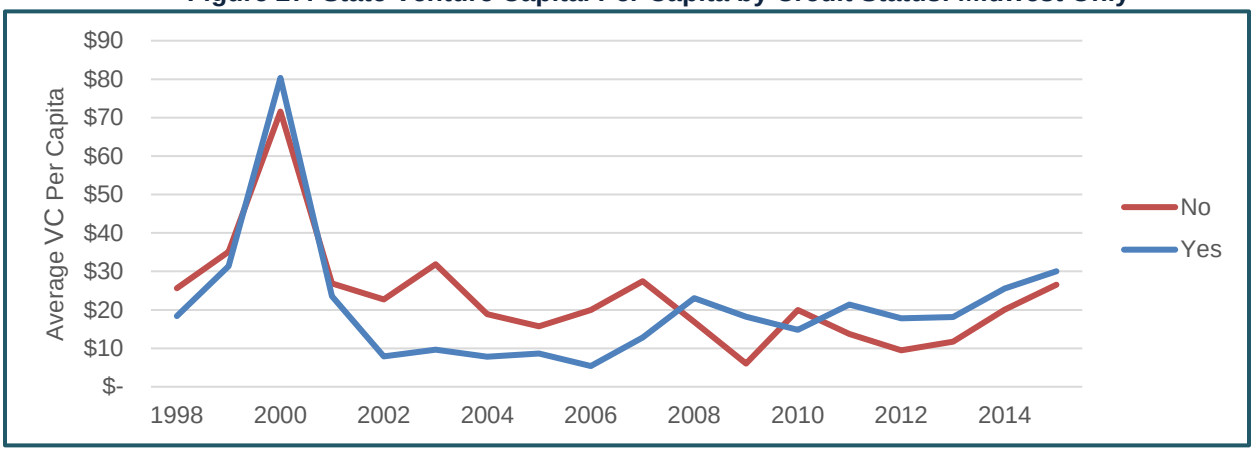
Figure 26: State Venture Capital Per Capita by Credit Status



Source: Raw data provided by the PriceWaterhouseCoopers, National Venture Capital Association, and Bureau of Economic Analysis, data analysis by the Office of Fiscal and Management Analysis.

In order to account for this potential bias, we can limit the comparison to only Midwestern states. When comparing the average level of per capita venture capital spent in Midwestern states with and without credits, investors spent about $30 per person in states with a credit in 2015. In states without a credit, investors spent about $28. Since 2008, investors in Midwest states with a credit almost always spent more than those in states without a credit (see Figure 27). However, more states began adopting a venture capital investment tax credit beginning in 2008. Indiana, Iowa, Kansas, Kentucky, Ohio, Minnesota, North Dakota, and Wisconsin all had credits in 2008 while Michigan, Illinois, Missouri, Nebraska, and South Dakota did not.

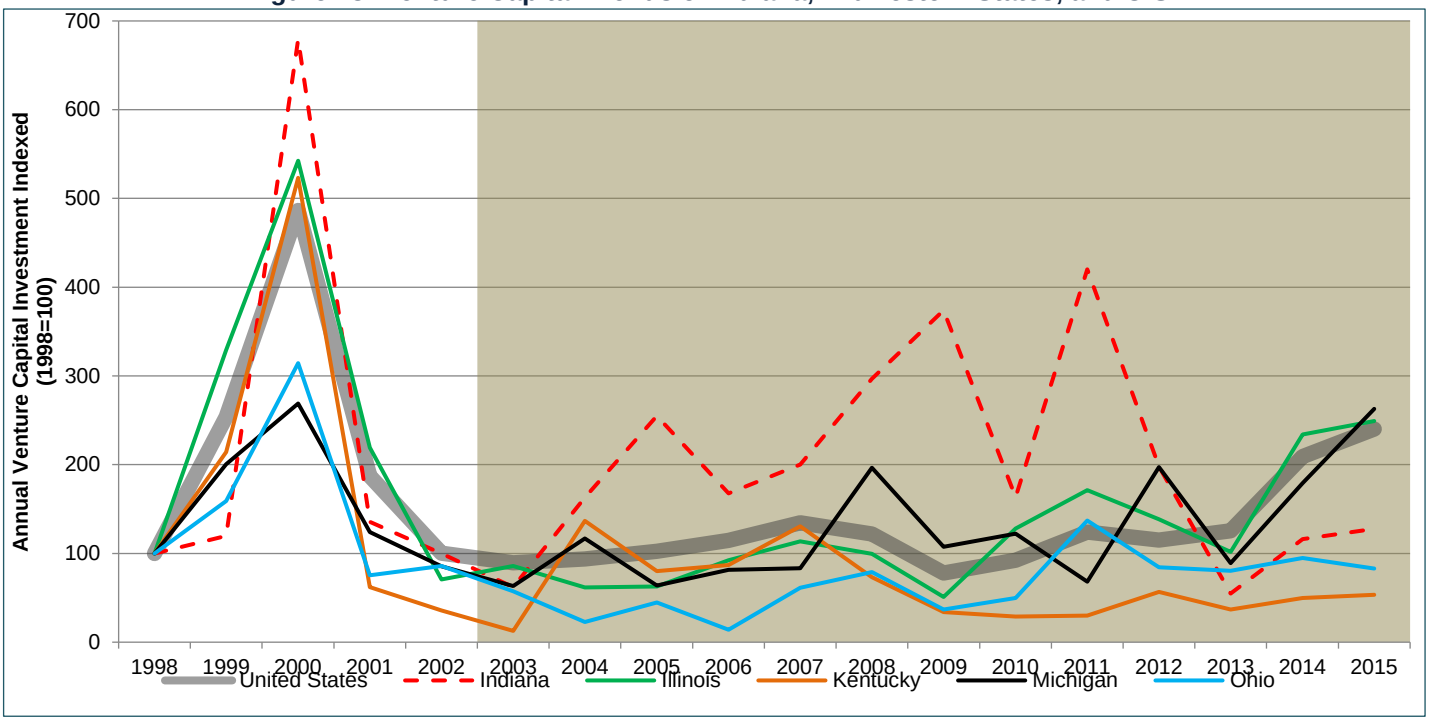
Figure 27: State Venture Capital Per Capita by Credit Status: Midwest Only



Source: Raw data provided by the PriceWaterhouseCoopers, National Venture Capital Association, and Bureau of Economic Analysis, data analysis by the Office of Fiscal and Management Analysis.

The simple comparison of averages over time indicates that having a venture capital investment tax credit slightly increases the level of venture capital spent per capita in the Midwest. But, in order to determine whether or not this result is statistically and economically significant, we ran a fixed effects regression model which controls for time, state, and industry share trends[2]. The regression results indicate that within the Midwest, implementing a venture capital tax credit increases per capita venture capital by about $9 on average. The average per capita venture capital in the Midwest is $23, so the effect of the credit is about a 40% increase in per capita venture capital. The effect of the credit also seems to increase the longer a state maintains the credit. For each additional year of the credit, per capita venture capital increases by an additional dollar.

Figure 28: Venture Capital Trends of Indiana, Midwestern States, and U.S.



Source: Raw data provided by the PriceWaterhouseCoopers, National Venture Capital Association, and Bureau of Economic Analysis, data analysis by the Office of Fiscal and Management Analysis.

The results are statistically significant for the Midwest only analysis. It is important to note that in the same models for the entire sample of states, there are no statistically significant impacts of the venture capital tax credit. Figure 28 displays the trends in annual venture capital investment in Indiana and its neighboring Midwestern states and the United States average. In general, the level of venture capital investment is fairly volatile over time within a state and, it may be highly sensitive to individual projects if they dominate the total amount invested. Indiana implemented the credit in 2003 at the same time as Iowa and North Dakota. Kentucky and Ohio had already had a credit for several years, and the other seven Midwestern states had not adopted it yet. These groups remained the same until 2005 when Wisconsin and Kansas adopted the credit. By 2009 both

[2] Fixed Effects Model Credit Dummy: $PerCapitaVentureCapital = \alpha + \beta_1\ CreditDummy + \beta_2\ NumStatesWithCredit + \beta_3\ ComputerManufShare + \beta_4\ DrugManufShare + \beta_5\ ComputerDesignShare + \beta_6\ SciTechServShare + t + s + \varepsilon$
Fixed Effects Model Years of Credit: $PerCapitaVentureCapital = \alpha + \beta_1\ YearsEffective + \beta_2\ NumStatesWithCredit + \beta_3\ ComputerManufShare + \beta_4\ DrugManufShare + \beta_5\ ComputerDesignShare + \beta_6\ SciTechServShare + t + s + \varepsilon$.
The models estimate the effect of implementing a venture capital tax credit on per capita venture capital in a state ($\beta_1\ CreditDummy$), and the effect of each additional year of the credit ($\beta_1\ YearsEffective$.) They both regress per capita venture capital on a constant, α, the variable of interest (either the dummy variable for whether or not a state has a credit or a variable representing the number of years a state has had a credit), the number of total states that have implemented a credit in that year (*NumStatesWithCredit*), and the share of state GSP represented by each of the four industries that commonly attract venture capital: Computer Design, Drug Manufacturing, Science and Technology Services, and Computer Manufacturing. The models also include time fixed effects (t), state fixed effects (s), and robust standard errors clustered at the state level (ε).

Minnesota and Michigan joined the credit group. In 2011, all of the Midwestern states except two had credits. In 2012, Michigan repealed the credit, thereby leaving 10 states with a credit and three without.

Given the results of the analysis, it appears that a Midwest state like Indiana can increase per capita venture capital by adopting a venture capital investment tax credit. However, the effect is only observable when compared to other Midwestern states. The total share of venture capital invested in Midwestern states as a share of the U.S. total has remained in the range of 4% to7% since 1999. The Midwestern states that adopt a credit may be outpacing the other Midwestern states that do not adopt a credit, but as a whole they do not seem to be capturing a larger share of the overall national venture capital.

Research and Development Incentives

Indiana has three incentives dedicated to encouraging firms to increase their R&D activities within the state. There is an income tax credit that allows businesses to reduce their tax liability for qualified research expense and a sales tax exemption for tangible goods purchased solely for research purposes. In addition, the patent-derived income exemption excludes an amount of income associated with certain patents from taxable income.

Research Expense Credit (IC 6-3.1-4)

The research expense credit provides an incentive for businesses to increase research activities in Indiana. The tax credit was enacted in 1984. The credit amount is based on a formula applied to the firm's qualified research expenses (QRE). QRE is research undertaken for the purpose of discovering information that is technological in nature and the application of which is intended to be useful in the development of a new or improved business component, as well as all of the activities which constitute elements of a process of experimentation for a new or improved function, performance, reliability, or quality. QRE can be categorized as: (1) wages of employees engaging in qualified research, (2) supplies used for qualified research, or (3) a portion of contract research expenses paid to outside entities to perform qualified research. The term is defined in Section 41(b) of the Internal Revenue Code.

The current methods of award computation were established in 2009 and allows the taxpayer to choose between the two calculation methods. The credit is equal to a percentage of the increased research expenses incurred during the taxable year. The credit may be computed in one of two ways:

- *Method 1:* Compute the difference between the QRE for the taxable year and the base amount. If the difference is less than $1 M, multiply the difference by 15%. If it is greater than $1 M, multiply the amount exceeding $1 M by 10% and add $150,000.
- *Method 2:* Compute the amount of QRE for the taxable year that exceeds 50% of the taxpayer's annual average research expenses for the three preceding years. The credit equals 10% of that amount. If the business did not have any QRE in any one of the past three years, the credit equals 5% of the expenses from the current year

Computing the Base Amount

The base amount used in Method 1 is defined by Section 41(c) of the Internal Revenue Code. It is equal to a fixed-base percentage multiplied by the average gross receipts for the four previous years. The fixed-base percentage is equal to the taxpayer's total research expenses for 1984 through 1988 divided by the gross receipts for 1984 through 1988. There is an alternative computation for start-up companies. The base amount is modified by considering only Indiana qualified research expenses and gross receipts attributable to Indiana. The maximum percentage is 16%.

The Department of State Revenue (DOR) administers the credit and ultimately determines which research expenses are considered Indiana QRE. The DOR may consider the following: (1) the place where the services are performed, (2) the residence or business location of the person performing the services, (3) the place where qualified research supplies are consumed, and (4) other factors the DOR determines are relevant.

The credit is nonrefundable with no annual limit. Unused credits may be carried forward for up to 10 years. However, credits may not be carried back.

Background: Goals and Attributes

Tax credits to increase R&D activities among businesses were spurred federally by the Economic Recovery Tax Act (ERTA) of 1981 and, later, the Tax Reform Act (TRA) of 1986. The goal of these credits is to increase the amount of firm-funded R&D in the U.S. A firm's ability to receive these credits is governed largely by the extent to which it spends more on QRE in a given year relative to some base year and, more importantly, its ability to use the credit at all.

Government subsidies that lower taxes or liabilities are often offered to firms with the intention of attracting subsequent firms. As firms begin to relocate to an area based on lower taxes, other firms may follow, thereby

leading to the agglomeration of an industry (Coulson, Liu, & Villupuram, 2013). Additionally, as He and Romanos (2016) find, vertical and horizontal linkages between suppliers and the market tend to influence the movement of a firm to an area with industrially similar firms. That is, sector-specific firms tend to move to areas where they can harness the resources and knowledge already available. As a result, lower tax rates may not necessarily attract firms in search of operational support (Gerritse, 2014), but may instead provide a breeding ground for leading firms. Additionally, as Papke (1993) states, firm location tends to be more dependent on proximity to markets, labor costs, infrastructure, and utility costs and less dependent on tax cost differentials, except for a few firms on the margin.

Generally, government subsidies to businesses in the case of R&D, should be designed in a way that raises the private rate of return to R&D activities (Hall B. H., 1993). While it is relatively easy to quantify this private return, based on estimates of price elasticity as explained below, the social return and, therefore, the *optimal* subsidy to generate the desired returns, are difficult to discern. The social return, in particular, is characterized by how much *better off* an economy is due to increased R&D activity. To assess this welfare effect, it is important to first recognize the potential for market failures to result from under investment in such innovation activities. An unintended consequence of this manifests in firms investing less in innovation than is "socially desirable" (Atkinson, 2007; Czarnitzki, Hanel, & Rosa, 2001). As such, direct grants are often considered more efficient than tax credits in correcting such shortfalls. But as Czarnitzi et al. note, grants are often subject to some level of discretion by a project-selecting body and, therefore, the potential for arbitrary decision making is high.

Like direct subsidies, tax credits also have flaws when used to encourage research. Since tax credit policy is often applied at a uniform rate across all businesses eligible for the incentive (e.g., the ERTA of 1981 proposed an effective rate of credit of 25%, which the TRA of 1986 later dropped to 16.6%), the optimal subsidy for some firms may not be achieved. This is further complicated by the extent to which businesses face high adjustment costs, which refer to the cost of facilities necessary for researchers to perform their work and the potential loss of revenues due to changes in the workforce of researchers.

The latter appears to pose the bigger threat to optimal subsidization, what with high costs of hiring and firing researchers who may transfer knowledge to competitors when they leave (Grabowski, 1968; Himmelberg & Petersen, 1994). Additionally, while the tax credit rate may be uniform, the award amounts will vary based on firm R&D investment, resourcefulness, and size. Firms that expect to engage in R&D activities are more likely to claim a tax credit, thus creating a selection bias. As a result of the selection bias, the credit may move the general goal of increasing firm-funded R&D away from the overall eligible population of firms and toward a select few firms. These firms are often larger, manufacturing and high-technology firms rather than small or medium-sized firms from a diverse industry base.

Credit Effectiveness/ Return on Investment

Tax credits are often evaluated using price elasticity of demand, or the responsiveness of a quantity demanded of a good to a change in its price, or in the case of Indiana, the extent to which businesses will increase their research activities in response to the tax savings provided by the research expense credit. Generally, studies show this elasticity ranges from -0.35 (Mansfield, 1986) to -1.0 (Baily & Lawrence, 1987, 1992; Hall B. H., 1993; Hall & Van Reenen, 2000; Bloom, Griffith, & Van Reenen, 2002) to -1.5 (Hall B. H., 1993), with the long-run average hovering around -1.0 and the short-run average much lower around -0.1 (Bloom, Griffith, & Van Reenen, 2002). This elasticity range suggests that demand for R&D responds slowly to changes in its price. As an example, taking the long-run average means that a 10% reduction in the cost of R&D stimulates a 10% rise in the level of expenses related to research, which is a relatively strong response since it implies a dollar-for-dollar impact of the credit on expenses. Still, others have found even larger responses of between $2 (Hall B. H., 1993) and $3 (Klassen, Pittman, Reed, & Fortin, 2004) of additional R&D investment for every dollar of taxes foregone by the government for the credit.

But what does this really mean in relation to R&D spending? According to a General Accounting Office study (1989), the federal research & experimentation tax credit induced 1% of all total private industrial R&D spending.

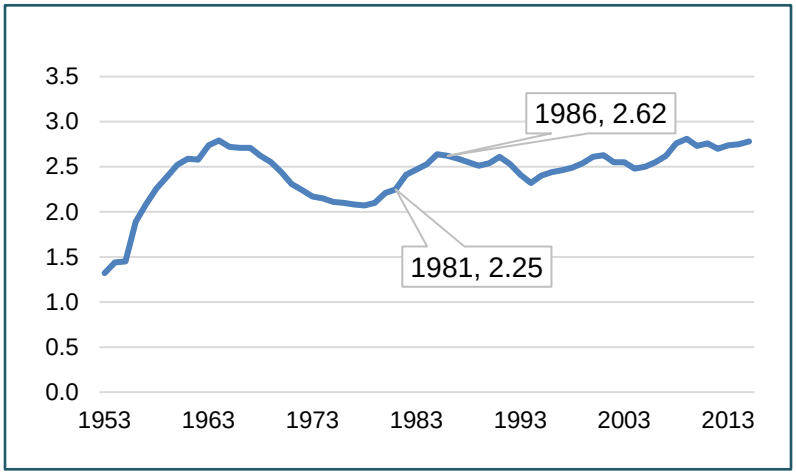
From a cost-benefit perspective, the study finds the federal tax credit stimulated between $1 B and $2.5 B of additional spending on research at a cost in foregone revenue of $7 B over a five-year period. Similarly, Tillinger (1991) finds the credit induced only 2% of all R&D spending.

Besides the federal research and experimentation credit, 40 states currently provide some type of business tax incentive for R&D expenditures. Many of these states provide tax credits ranging from a low of 1.25% to a high of 40% of the federally defined QRE. However, some states do not use the federal definition of research expenses to determine the tax credit.

Perhaps of equal interest to measuring the R&D spending that might be induced by the federal credit is considering the extent to which new R&D spending resulting from a state's R&D credit is actually R&D spending displaced from another state. So, the state R&D credits may not result in additional R&D spending in the aggregate on a national level, but simply shifts R&D spending from one state to another.

As Wilson (2009) states, it is possible that R&D is mobile across states, such that the cost of R&D in one state may influence R&D expenditures in another state. Taking the average of R&D costs in nearby states and weighting it by the inverse distance between the centers of those states, Wilson finds solid evidence of displacement. He finds a nearly one-to-one ratio of R&D coming into a state from another state, suggesting that increased R&D in one state tends to occur at the expense of decreased R&D outside of the state. More specifically, Paff (2005) concludes the R&D tax credit in California was successful because of firms that relocated there from another state.

Figure 29: U.S. R&D Intensity



Source: National Science Foundation, National Center for Science and Engineering Statistics, data analysis by the Office of Fiscal and Management Analysis.

One way to compare R&D activity across states is by calculating R&D intensity (see Figure 29). This is a measure of R&D expenditures in a state as a percentage of the state's gross domestic product. Data from the National Science Foundation shows that Indiana ranked 22nd among all states and the District of Columbia in total R&D intensity and 12th in total business related R&D expenditures in 2014. Total R&D expenditures in Indiana were nearly $7.3 B in 2014, which was 1.6% of total U.S. R&D expenditures, and $5 B in total business R&D expenditures (1.8%) of the total for all states. Table 18 contains the R&D expenditures by state.

Table 18: R&D Expenditures and Gross Domestic Product (GDP), by State: 2014

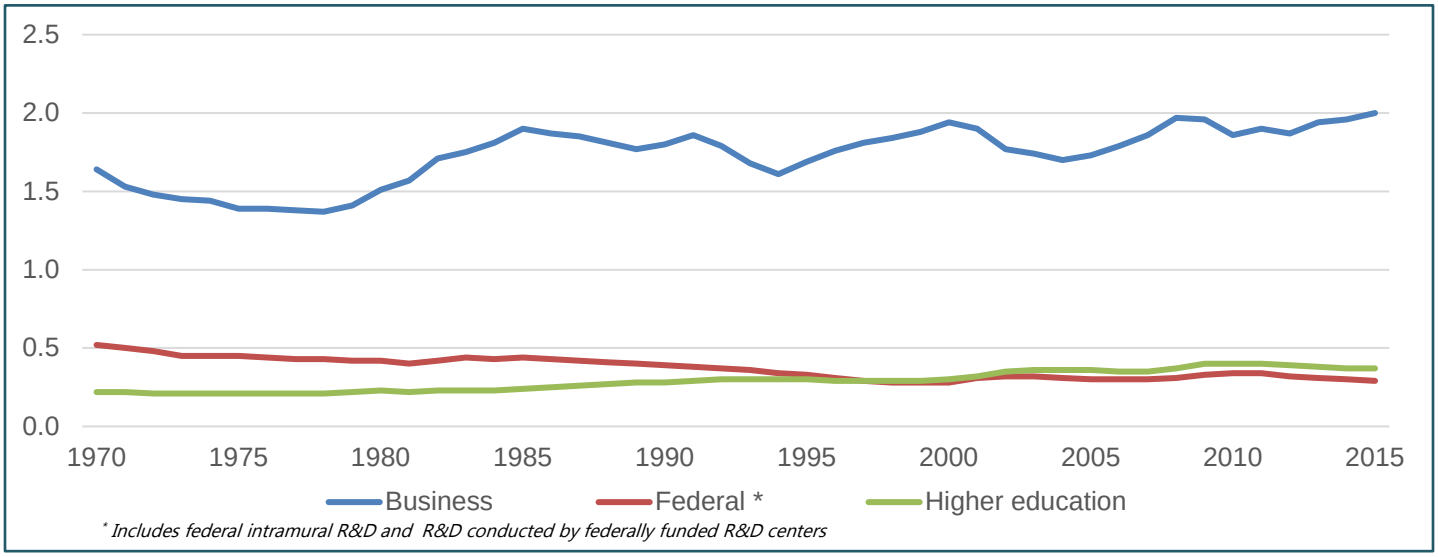
State Ranked on Business R&D Intensity	All R&D Expenditures ($ Millions)	Business* R&D Expenditures ($ Millions)	% of Total States Business R&D	Business R&D / GDP %	Rank in R&D Business Intensity	Total R&D Intensity	Rank in Total R&D Intensity
Massachusetts	$27,945	$17,101	6.22%	3.59%	1	5.86%	2
California	114,845	85,750	31.21	3.49	2	4.67	4
Washington	18,987	15,195	5.53	3.42	3	4.28	5
Michigan	19,764	15,421	5.61	3.31	4	4.24	6
Oregon	7,279	6,160	2.24	2.86	5	3.38	9
Delaware	2,732	1,839	0.67	2.70	6	4.01	7
Connecticut	10,219	6,819	2.48	2.64	7	3.95	8
New Jersey	15,370	11,027	4.01	1.94	8	2.71	14
Minnesota	8,244	6,403	2.33	1.92	9	2.47	16
Idaho	2,130	1,223	0.45	1.87	10	3.26	11
Utah	3,669	2,275	0.83	1.55	11	2.49	15
Indiana	**7,343**	**5,015**	**1.83**	**1.49**	**12**	**2.18**	**22**
Arizona	6,936	4,307	1.57	1.48	13	2.39	17
Illinois	15,964	11,196	4.08	1.44	14	2.06	25
Pennsylvania	14,898	9,635	3.51	1.40	15	2.16	23
Missouri	7,957	4,037	1.47	1.38	16	2.71	13
North Carolina	11,343	6,125	2.23	1.23	17	2.27	19
Colorado	6,775	3,829	1.39	1.22	18	2.15	24
New Hampshire	2,424	869	0.32	1.20	19	3.34	10
Wisconsin	5,789	3,677	1.34	1.20	19	1.89	27
Ohio	12,005	6,137	2.23	1.01	21	1.97	26
Maryland	20,211	3,445	1.25	0.95	22	5.55	3
Kansas	2,510	1,325	0.48	0.90	23	1.70	29
Iowa	3,003	1,513	0.55	0.87	24	1.72	28
Texas	22,467	13,674	4.98	0.86	25	1.42	31
Vermont	422	259	0.09	0.85	26	1.39	33
Rhode Island	1,298	479	0.17	0.84	27	2.28	18
Georgia	6,881	3,843	1.40	0.78	28	1.39	32
New York	20,820	10,794	3.93	0.75	29	1.44	30
Alabama	4,616	1,299	0.47	0.64	30	2.26	20
Virginia	10,489	2,877	1.05	0.60	31	2.19	21
Maine	596	308	0.11	0.54	32	1.05	35
Nebraska	1,094	543	0.20	0.48	33	0.96	40
South Carolina	2,034	936	0.34	0.47	34	1.02	37
North Dakota	523	247	0.09	0.45	35	0.95	41
Florida	9,009	3,877	1.41	0.44	36	1.02	38
Tennessee	4,245	1,365	0.50	0.43	37	1.35	34
Montana	464	188	0.07	0.41	38	1.01	39
Nevada	817	576	0.21	0.41	38	0.58	47
Kentucky	1,717	768	0.28	0.39	40	0.88	42

State Ranked on Business R&D Intensity	All R&D Expenditures ($ Millions)	Business* R&D Expenditures ($ Millions)	% of Total States Business R&D	Business R&D / GDP %	Rank in R&D Business Intensity	Total R&D Intensity	Rank in Total R&D Intensity
West Virginia	604	252	0.09	0.34	41	0.82	43
Oklahoma	1,113	543	0.20	0.30	42	0.62	45
New Mexico	5,816	270	0.10	0.29	43	6.31	1
South Dakota	271	121	0.04	0.26	44	0.58	46
Arkansas	636	277	0.10	0.22	45	0.52	49
Mississippi	1,125	198	0.07	0.18	46	1.05	36
Hawaii	639	138	0.05	0.17	47	0.80	44
D.C	3,935	183	0.07	0.15	48	3.21	12
Louisiana	1,120	299	0.11	0.12	49	0.46	50
Wyoming	123	44	0.02	0.11	50	0.32	51
Alaska	289	37	0.01	0.07	51	0.55	48
U.S. Total	**$477,708**	**$282,570**		**1.63%**	**N/A**	**2.75%**	**N/A**

**Business own expenditures/ non-federal.*
Sources: National Science Foundation, National Center for Science and Engineering Statistics, National Patterns of R&D Resources (annual series). State GDP data are from the U.S. Bureau of Economic Analysis.

Indiana's R&D ranking nationally, and the states' investment share of state GDP has not changed much since 2008 and 2009 when Indiana's current methodology for awarding credits was established. Indiana's R&D intensity levels and ranking have followed national trends, while maintaining a slightly above average investment ratio for business expenditures. Indiana's share of total R&D expenditures is approximately 68% from businesses, whereas for all states that share is 59%. This indicates that Indiana has a smaller share of federal investments making up total R&D expenditures in the state. Nationally and for Indiana, the long-term trend indicates a move towards a greater share of R&D investment from businesses and higher education as the share from the federal sources declines (Figure 30). Overall, R&D expenditures are increasing, but the growth is driven by private sector funding.

Figure 30: U.S. Historical R&D Expenditures as Share of GDP (%)



Source: Raw data provided by the National Science Foundation, National Center for Science and Engineering Statistics, data analysis by the Office of Fiscal and Management Analysis.

Credits Claimed

Indiana's credit is primarily claimed by corporate income taxpayers. From 2009 to 2014, corporate taxpayers claimed 83% of the total credits even though they represent 11% of the total claimants. An analysis of the corporate income tax credit claimants found that 90% of the credits between 2009 and 2014 were claimed from 10% of the taxpayers. Our findings are similar to other research that found a small number of firms are responsible for 91% of all research expenses. This implies that either the research activity in the state is conducted by a limited number of firms, or only certain tax-sophisticated firms are using the credit. Also, the credit claims do not appear to be representative of the amount of qualified research conducted in Indiana. The chart here illustrates a spike in spending near the time of increased claimants in Indiana.

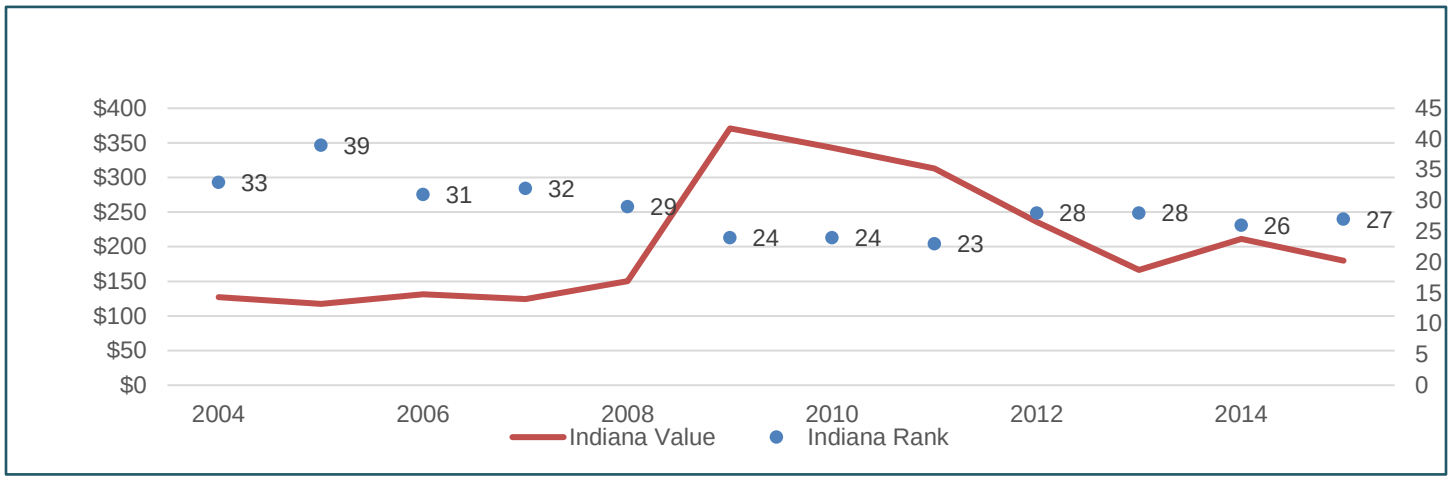
Table 19: Research Expense Credit Claims History, 2008-2014

Tax Year	Claims			Credits		
	Individual	Corporation	Total	Individual	Corporation	Total
2008	940	91	1,031	$7,129,928	$11,709,753	$18,839,681
2009	818	95	913	5,492,302	16,168,398	21,660,700
2010	1,419	173	1,592	11,931,888	35,110,190	47,042,078
2011	1,604	185	1,789	14,543,034	50,779,323	65,322,357
2012	1,685	200	1,885	14,991,231	133,008,105	147,999,336
2013	1,894	232	2,126	15,761,101	102,426,598	118,187,699
2014	2,035	248	2,283	18,652,308	47,776,520	66,428,828

Source: Raw data provided by the Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis.

The recent decline follows the national trend as overall obligations in the U.S. for science and engineering has been declining since 2010, while spending from businesses (minus federal sources) has been increasing. The credit claims in a taxable year are more likely the result of tax planning.

Figure 31: Federal Obligations for Science and Engineering R&D: by Businesses ($ in millions)



Source: Raw data provided by the National Science Foundation, National Center for Science and Engineering Statistics, data analysis by the Office of Fiscal and Management Analysis.

Price Elasticity of Demand

As noted above, studies show that the price elasticity of demand for research expenses ranges from -0.35 to -1.5, with the long-run average near -1.0. This means that a 10% reduction in the cost of R&D would stimulate a 3.5% to 15% increase in research expenditures.

The following table shows the total level of R&D spending by Indiana businesses in 2009 through 2014 (the most recent year of available data) from the National Science Foundation's annual Business R&D and Innovation Survey. Research expense credit claims were 0.49% of total expenditures in 2009. Credits claimed as a share of total R&D expenditures increased most years and were 1.32% of the total in 2014.

Based on this information, we estimate that the research expense credit could have induced between $23.3 M and $99.6 M in research expenditures (0.46% to 1.99% of total expenditures) in 2014 based on $66.4 M in credits claimed by taxpayers. To arrive at this range, we assume the elasticity is -0.35 at a minimum and as high as -1.5. If we assume the price elasticity is -1.0, the credit could generate a dollar-for-dollar impact on R&D spending. So in 2014, the credit could have induced $66.4 M in additional R&D spending. In certain scenarios, the revenue loss could be greater than the additional R&D spending.

Table 20: Estimated Impact on Total Business R&D Costs and Estimated R&D Spending Induced by the Research Expense Credit

Tax Year	Statewide Business R&D Spending (Millions)	Reduction in Cost of R&D from the Credit	Induced Spending (Millions)		Induced Spending (Percent)	
			Low	High	Low	High
2009	$4,449	(0.49%)	$7.6	$32.5	0.17%	0.73%
2010	4,219	(1.12)	16.5	70.6	0.39	1.67
2011	5,484	(1.19)	22.9	98.0	0.42	1.79
2012	5,223	(2.83)	51.8	222.0	0.99	4.25
2013	5,482	(2.16)	41.4	177.3	0.75	3.23
2014	5,015	(1.32)	23.3	99.6	0.46	1.99

Source: Raw data provided by the National Science Foundation, National Center for Science and Engineering Statistics, data analysis by the Office of Fiscal and Management Analysis.

Research and Development Sales Tax Exemption (IC 6-2.5-5-40)

Certain R&D property is exempt from sales and use tax. R&D property is defined as tangible personal property that has not previously been used in Indiana for any purpose and is acquired by the purchaser for the purpose of R&D activities. Exempt property includes R&D equipment, office supplies, consumables, hand-powered tools, and repair parts that are directly used in R&D activities.

The sales tax exemption was enacted in 2005. It applied to 50% of sales tax paid on R&D equipment in FY 2006 and FY 2007. Beginning in FY 2008, the exemption applied to 100% of sales tax paid only on R&D equipment, which includes laboratory equipment, computers, computer software, telecommunications equipment, and testing equipment. The Department of State Revenue (DOR) required that the equipment have a useful life of more than one year. The law was amended in 2013 to expand the exemption to include R&D property. It was amended again in 2015 to clarify what constitutes R&D activities.

Research and Development Activities Defined

R&D activities include design, refinement, and testing of prototypes of new or improved commercial products before sales have begun for the purpose of determining facts, theories, or principles, or for the purpose of increasing scientific knowledge that may lead to new or enhanced products. The statute excludes certain enumerated property.

The exemption applies regardless of whether the person that acquires the property is a manufacturer or seller of the products that are the subject of R&D.

The taxpayer is required to complete an exemption certificate with the DOR if the property is purchased from an Indiana vendor or an out-of-state vendor that is registered to collect Indiana sales tax. If the purchaser pays sales or use tax on exempt R&D property, the purchaser may file a claim for refund with the DOR.

Business Research and Development Activity in Indiana and the U.S.

The National Science Foundation (NSF) annually publishes data from its Business Research and Development and Innovation Survey. This survey provides information regarding R&D expenditures of businesses. The most recent survey data indicate that total R&D expenditures paid for and performed by companies in Indiana was about $5.48 B in 2013. Of this total, the vast majority (94.5%) of spending was done by manufacturers. In addition, medium and large companies spent the most on research activities (91.2%).

Table 21: Indiana R&D Paid for and Performed by the Company, by Industry: 2013

Industry	R&D Expenditures ($ millions)	Percent of Statewide R&D
All Industries	$5,482	100.0%
Mining, extraction, and support activities	2	0.0
Utilities	*	0.0
Manufacturing	5,181	94.5
Wholesale trade	7	0.1
Electronic shopping and electronic auctions	1	0.0
Transportation and warehousing	1	0.0
Information	138	2.5
Finance and insurance	11	0.2
Real estate and rental and leasing	*	0.0
Professional, scientific and technical services	115	2.1
Health care services	1	0.0
Other nonmanufacturing	24	0.4

**Less than $500,000.*

Source: National Science Foundation, National Center for Science and Engineering Statistics. 2016. Business R&D and Innovation: 2013.

NSF survey also collects information on how R&D expenditures are allocated. Across all industries in the U.S. in 2013, businesses spent the largest portion (67.6%) of their R&D budgets on personnel costs, including salaries, wages, fringe benefits, stock-based compensation, and temporary staffing. Only about 8.9% of expenditures were for equipment, materials, and supplies, so the exemption applies to only a small percentage of R&D expenditures.

Table 22: U.S. Domestic R&D Paid for and Performed by the Company, by Type of Cost: 2013

Type of Cost	R&D Expenditures ($ millions)	Percent of Total R&D Expenditures
Salaries, wages, and fringe benefits	$153,633	58.0%
Stock-based compensation	13,553	5.1
Temporary staffing	11,904	4.5
Expensed equipment	4,059	1.5
Materials and supplies	19,511	7.4
Lease and rental payments	4,099	1.5
Depreciation	10,413	3.9
Other purchased services (except R&D)	5,491	2.1
Other	42,250	15.9
Total	**$264,913**	**100.0%**

Source: National Science Foundation, National Center for Science and Engineering Statistics. 2016. Business R&D and Innovation: 2013.

Estimating the Fiscal Impact of the Sales Tax Exemption

The DOR does not collect data regarding the number or amount of claims for the sales tax exemption for R&D property, so we use data from the NSF Business R&D and Innovation Survey to estimate how much is claimed. Annual survey data are available through CY 2013. The NSF reports R&D spending by NAICS code for each state. It also reports spending by type of cost for each NAICS code at the national level.

Using U.S. data, we calculate the percentage of total R&D expenditures for materials, supplies, and expensed equipment for each industry. Based on these percentages, we estimate expenditures for materials, supplies, and equipment for Indiana businesses. We assume that 100% of these items used in R&D would have qualified for the sales tax exemption and that all exempt purchases were actually claimed via an exemption certificate or refund.

Table 23: Indiana R&D Expenditures and Estimated Sales Tax Exemptions Claimed ($ in millions)

Calendar Year	Statewide Business R&D Spending	Estimated Expenditures on Equipment, Materials, and Supplies	Estimated Sales Tax Exemptions Claimed
2008	$4,375	$390.9	$27.2
2009	4,449	373.5	26.0
2010	4,219	358.2	24.9
2011	5,484	540.3	37.6
2012	5,223	571.6	40.0
2013	5,482	588.9	41.2

Source: Raw data provided by the National Science Foundation, National Center for Science and Engineering Statistics, data analysis by the Office of Fiscal and Management Analysis

We can evaluate this sales tax exemption using the price elasticity of demand of R&D expenses. Research suggests that the price elasticity of R&D expenditures may range from -0.35 to -1.5, with the long-run average close to -1.0. If we assume the elasticity is -1.0, that implies that a 1% reduction in the cost of R&D stimulates a 1% increase in R&D spending. Based on the estimated sales tax exemptions claimed and total statewide R&D expenditures, the exemption likely reduced the total cost of R&D by less than 1% each year in CY 2008 through CY 2013. The following table shows the estimated percent reduction in R&D costs and induced spending. To arrive at the estimated range shown in the table, we assume the elasticity is -0.35 at a minimum and could be as high as -1.5. Based on these assumptions, the spending induced by the exemption could have ranged from $14.4 M to $61.8 M, or 0.3% to 1.1% of total spending, in 2013.

Table 24: Estimated Impact on Total Business R&D Costs and Estimated R&D Spending Induced by the Sales Tax Exemption

Calendar Year	Reduction in Cost of R&D from Exemption	Induced Spending (Millions)		Induced Spending (Percent of Total)	
		Low	High	Low	High
2008	(0.62%)	$9.5	$40.8	0.22%	0.93%
2009	(0.58)	9.1	39.0	0.20	0.88
2010	(0.59)	8.7	37.4	0.21	0.89
2011	(0.69)	13.2	56.4	0.24	1.03
2012	(0.77)	14.0	60.0	0.27	1.15
2013	(0.75)	14.4	61.8	0.26	1.13

Source: Office of Fiscal and Management Analysis.

If we assume that the price elasticity of demand for R&D is -1.0, the exemption could generate a dollar-for-dollar impact on R&D expenditures. So in 2013, the exemption could have induced $41.2 M in business R&D expenditures, or about 0.8% of actual expenditures.

Patent-Derived Income Exemption (IC 6-3-2-21.7)

This exemption was established to encourage research and innovation by offering an income tax deduction for certain income derived from utility or plant patents issued after December 31, 2007. Utility patents are issued for the functional aspects of an invention. About 90% of all patents issued are utility patents. Plant patents are granted for discovery or invention of certain plants (e.g. hybrids, or mutants.) Plant patents represent about 1% of the total patents issued annually. The remaining 9% are patents granted for aesthetic features and referred to as design patents. Design patents are not eligible for the exemption.

The patent income eligible for exemption can be from:

(1) Licensing fees or other income received for the use of a patent.
(2) Royalties received for the infringement of a patent.
(3) Receipts from the sale of a patent.
(4) Certain income from the taxpayer's own use of the qualified patent to produce the claimed invention.

A taxpayer may claim the exemption for 10 years with respect to a particular patent. During the first five taxable years, the exemption is equal to 50% of the income derived from a patent, with the exemption percentage declining by 10 percentage points per year during the sixth through tenth year of the exemption. Table 25 contains the exemption schedule. The total exemption amount that a taxpayer may claim in a taxable year is $5 M.

Table 25: Patent-Derived Income Exemption Schedule

Timeline	Allowed Exemption as a % of Patent-Derived Income
1st Year	50%
2nd Year	50%
3rd Year	50%
4th Year	50%
5th Year	50%
6th Year	40%
7th Year	30%
8th Year	20%
9th Year	10%
10th Year	10%
11th Year	0%

Source: Indiana Department of State Revenue

The taxpayer is eligible to claim the exemption only if the taxpayer is domiciled in Indiana and is either an individual or corporation with not more than 500 employees or a nonprofit organization. Indiana was the first state in the U.S. to provide a patent income exemption.

The patent income exemption would be considered effective if it results in:

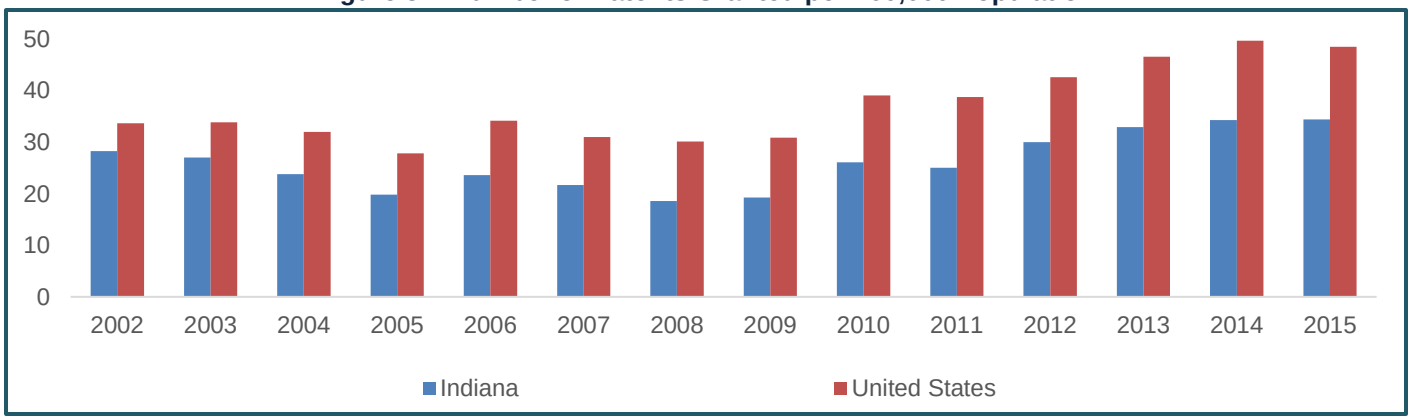
(1) The relocation of research activity conducted by businesses and individuals to Indiana from outside the state.
(2) An increase in-state research activity of businesses and individuals that are currently conducting research.

Trends and Factors

About 60% to 80% of innovations are consumer need-based, and thus they are market stimulated. This is known as demand-pull innovation. Innovations also occur as a result of R&D developing new technology to be pushed into the market. The magnitude of the cost of pursuing research depends on the integration of the potential output with the central product or goal of the business. Since most of the R&D is integrated with the central business activity, a small difference in the cost may be immaterial. Also, because of the substantially large cost of relocating a research center, a small incentive may not be sufficient to merit the decision to relocate. A small portion of innovation occurs at the user level. These individuals may be more cost-sensitive and reactive to the tax exemption.

Indiana ranked 14th in 1995, 22nd in 2005, and 20th in 2015 among all U.S. states in patents granted. Although Indiana's share of U.S. patent awards fell from 1.8% in 2002 to 1.3% in 2008, it has remained stable at that level since 2008. Indiana trails the national level of patents granted per capita, but the growth in patents granted in Indiana has followed the national trend.

Figure 32: Number of Patents Granted per 100,000 Population



Source: Raw data provided by the U.S. Patent Office, data analysis by the Office of Fiscal and Management Analysis.

Literature Review

The small but growing literature on the effect of corporate taxes on R&D investment and patent awards have shown mixed results. The existing literature studies the impact of differences in international taxation, which provide larger cost savings. Some studies suggest that lower corporate taxes, either in the form of a lower statutory rate or a preferential intellectual property regime, are associated with more patent applications. Skeie et al. (2017) found that the location of research activities appears to be sensitive to corporate taxes.

Other studies have found that the location of R&D investment and patent ownership is geographically separated in significant cases. They concluded that this geographical split is partly motivated by tax considerations. Alstadsæter et al. (2015) found that in the case of patent-related tax incentives without nexus requirements, the size of the tax advantage is negatively correlated with the local R&D. This suggests that the effects of a patent incentive are mainly on tax planning and may not influence the location of the research.

The taxpayer is required to be domiciled in Indiana in order to claim the exemption. Even though this may not be the most stringent nexus requirement, it does prohibit the taxpayer from taking the exemption without relocating their R&D to Indiana. Since a state tax incentive is a small portion of the total cost of performing R&D, it may not be enough to persuade a relocation. If a taxpayer were able to claim the maximum exemption of $5 M, it would only reduce their tax liability by $0.16 M. Indiana tax exemption claims are also designed to prevent tax planning by out of state businesses that do not conduct research in Indiana.

Tax Exemption Claims

Evidence from the income tax database suggests that the exemption is underutilized. The number of taxpayers claiming the exemption has been 31 or below for each year since the inception of the tax exemption. It has been claimed 161 times by 82 unique claimants. Table 26 shows the exemption claims for tax years 2008 through 2014 compared to the number of patents granted in Indiana. Table 27 shows the claims and the amount of forgone revenue associated with the exemption

This is a small share of total patents granted to Indiana individuals and corporations. This could be for various reasons. The large gap may demonstrate an information gap about state tax laws related to intellectual property and technologies. Low claims could also result from the absence of any tax liability for the patent award recipient.

Table 26: Patents Granted Compared to Exemption Claims

Year	Patents Granted in Indiana	Number of Taxpayers Claiming Exemption
2008	1,196	18
2009	1,246	16
2010	1,697	27
2011	1,633	27
2012	1,963	23
2013	2,167	19
2014	2,265	31

Source: Raw data provided by the U.S. Patent Office and the Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis

The total tax impact of the exemption between 2008 and 2014 has been about $286,000. This would mean that the total average annual cost savings is $41,000. On average, 23 taxpayers claim it annually. The average tax savings for each taxpayer is about $1,780 annually. The savings most taxpayers receive from the exemption is small when compared to the cost of innovation. However, some individual taxpayers received more than $10,000 in tax benefits, reducing their tax liability substantially. It is conceivable that the tax exemption was part of their research budget and decision making process.

Table 27: Patent-Derived Income Exemption Claims History, 2008-2014

Tax Year	Individual Income Tax			Corporate Income Tax			Total		
	Claims	Exemption Amount	Tax Impact	Claims	Exemption Amount	Tax Impact	Claims	Exemption Amount	Tax Impact
2008	6	$32,079	$1,091	12	$139,870	$362	18	$171,949	$1,452
2009	13	310,041	10,541	N/R	3,701,449	41,143	13	4,011,490	51,685
2010	22	386,347	13,136	N/R	4,805,496	57,600	22	5,191,843	70,736
2011	21	596,398	20,278	6	4,168,752	13,978	27	4,765,150	34,256
2012	15	1,170,711	39,804	8	5,053,147	9,415	23	6,223,858	49,219
2013	17	517,969	17,611	N/R	3,314,490	7,422	17	3,832,459	25,033
2014	28	1,190,790	40,487	N/R	1,172,633	13,197	28	2,363,423	53,684

N/R = Five or fewer filers, count not reportable.
Source: Raw data provided by the Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis.

Conclusion

Based on the low utilization of the exemption, we conclude that it may not have any significant impact on incentivizing additional R&D activity in Indiana. Our review of studies also support our conclusion that the size of the tax benefit may not be incentivizing the relocation of research activity. Given the small size of the state tax benefit, it is possible that it influences the amount of research by existing businesses, but we estimate that it may not incentivize relocation of new research to Indiana. Thus, the tax exemption is only effective to the extent that it encourages additional activity by businesses who are otherwise conducting research in Indiana. The exemption may also increase the research activity of individual innovators. However, there is no evidence in the tax database that the exemption is causing any relocation of independent researchers.

Geographically-Based Economic Development Programs

The tax incentives reviewed contain a geographic element, but those incentives are awarded to one firm for one project. Geographically-based programs differ because they provide benefits to firms located in specified areas through either a direct incentive or infrastructure improvements. Each program will be discussed separately, except the certified technology park and certified technology personal property tax deduction are combined. The property tax deduction is tied to the certified technology park program. While the mechanics of these programs differ from the other tax incentives, the intended outcomes are similar: increased jobs, wages, investment, and development or redevelopment of the area.

Infrastructure Development Zone Exemption (6-1.1-12.5)

Enacted in 2013, the infrastructure development zone property tax exemption applies to all eligible infrastructure within a geographic area designated by the county executive or county fiscal body as an infrastructure development zone. In 2017, the statute was amended to permit municipal legislative bodies to designate a zone.

The following types of infrastructure are eligible for the property tax exemption:

1. Storage, compressed natural gas, liquefied natural gas, transmission, and distribution facilities to be used in the delivery of natural gas, or supplemental or substitute forms of gas sources by a natural gas utility.
2. Facilities and technologies used in the deployment and transmission of broadband service, however defined or classified by the Federal Communications Commission, or advanced services (as defined in 47 CFR 51.5) by a provider of broadband service or advanced services.
3. Facilities used in the treatment, storage, or distribution of water by a water utility.
4. Facilities used in the collection or treatment of wastewater by a wastewater utility.

Before a geographic area can be designated as an infrastructure development zone, the adopting body must do each of the following:

1. Publish notice of a public hearing on the proposed ordinance to designate an infrastructure development zone.
2. Conduct the public hearing.
3. Find that adequate eligible infrastructure is not available in the zone and that a property tax exemption will provide opportunities to increase the availability of infrastructure and economic development in the zone.
4. Adopt an ordinance designating the zone.

LSA conducted a survey of county auditors to gather information on the infrastructure development zone exemption. All the counties that responded to the survey indicated that no infrastructure development zone exemptions have been awarded. Furthermore, many county auditors were not aware of the exemption.

Maritime Opportunity District Deduction (6-1.1-40-10)

The maritime opportunity district deduction entitles an owner of new manufacturing equipment located in a maritime opportunity district to a personal property tax deduction. Before a business acquires qualifying equipment for which the business wishes to claim a maritime opportunity district deduction, it must send the Ports of Indiana Commission (POI) two items for approval:

1. A statement of benefits; and
2. A request to designate the area as a maritime opportunity district, if one is not already designated in the area where the qualifying equipment will be located.

The statement of benefits must include the following information:

1. A description of the equipment that the business wants to acquire;
2. An estimate of the number of individuals that will be employed or retained as a result of the equipment purchase and the salaries of these individuals; and
3. A cost estimate for the new manufacturing equipment.

In order to approve the statement of benefits, the POI must determine the purported benefits that can reasonably be expected to occur as a result of the installation of the new manufacturing equipment.

The POI must make each of the following determinations before approving a request to designate an area as a maritime opportunity district.

1. The area is located adjacent to a state-owned port on state-owned land.
2. There will be redevelopment or rehabilitation of property in the geographic area that will require substantial investment relative to the size of the business making the investment.
3. The business making the investment will be manufacturing goods.
4. More than 50% of the goods manufactured are to be shipped through a port operated by the state and are destined for international markets.
5. The business is making a long-term commitment to the territory.
6. The investment by the business will result in an increase in the port's revenue.

In order to make the determinations described above, the POI must prepare maps or a description of the boundaries of the maritime opportunity district, pass a resolution declaring the area a maritime opportunity district, publish notice of a public hearing regarding the district, and make a final determination on whether the qualifications for a district have been met.

Once the statement of benefits is approved and the POI designates a maritime opportunity district, the owner is eligible for a personal property tax deduction. The deduction is available for 10 years and is a percentage of the assessed value of the equipment as illustrated in Table 28.

In the first year, the deduction is capped so that it may not reduce the taxpayer's assessed value below what it was in the preceding year. If the cap is hit, the deduction amount in years 2-10 will be determined by multiplying the percentages in the table above by the deduction amount in the first year.

Table 28: Maritime Opportunity District Deduction Schedule

Year	Deduction Amount as a Percentage of Assessed Value
1-6	100%
7	95%
8	80%
9	65%
10	50%

In 2016, Indiana contributed 4.5% to the national manufacturing GDP (U.S. Bureau of Economic Analysis, n.d.). According to the U.S. Census Bureau, Indiana exported 2.9% of the nation's manufactured commodities (U.S. Census Bureau, 2016). Even with Indiana's robust manufacturing sector, a maritime opportunity district has never been established.

Special Rate for Income Derived Inside a Military Base (IC 6-3-2-1.5)

Indiana established a reduced corporate adjusted gross income (AGI) tax rate to encourage businesses to locate all or part of their operations to: (1) a military base that is scheduled for closing or closed; (2) a military base reuse area; (3) an economic development area established in connection with a closed military base; or (4) a military base recovery site. The reduced rate of 5% applies only to income derived from sources within the military base area. The business is eligible to apply the rate during the taxable year in which the corporation locates or expands operations in the area and the next four succeeding taxable years. The amount of qualifying income must be reported separately when the taxpayer files their annual tax return.

A taxpayer is not entitled to the special tax rate to the extent the taxpayer substantially reduces or ceases its operations at another location in Indiana in order to relocate its operations within the qualified area, unless: (1) the taxpayer had existing operations in the qualified area; and (2) the operations relocated to the qualified area are an expansion of the taxpayer's operations in the qualified area. There are some additional criteria the business must meet to be eligible for the lower tax rate.

Businesses located in military bases across the state qualify for the special rate. Currently, there are three installations in Indiana that are both enterprise zones and military base reuse areas: Grissom Air Force Base in Miami County, Fort Benjamin Harrison in Marion County, and the Indiana Army Ammunition Plant in Clark County. The special rate applies to a business filing as a corporation--C-Corporations and S-Corporations. S-Corporations are exempt from taxation at the entity level except on passive income and built-in gains. Although it is possible that certain S-Corporations conducting business in the designated areas had income taxed at the entity level, but it would be a rare occurrence.

Table 29: Number of Taxpayers and Tax Liability Reduction

C-Corporation		
Year	Count	Estimated Tax Impact
2009	16	$0
2010	69	$0
2011	75	< $25K
2012	45	< $25K
2013	24	< $25K

Source: Raw data provided by the Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis.

Based on an analysis of the income tax database, it is estimated that not more than 75 C-Corporations have declared themselves eligible for the lower rate in the last five years. Only a small portion of these taxpayers had a tax liability during those five years. Based on the available data, it is not possible to determine the share of business income that was generated in the qualified military bases by the eligible businesses. However, based on their effective tax rate, it was determined that no business benefited from the lower rate in two out of five years. The total tax benefit to all eligible taxpayers in the remaining three years was below $25,000. An examination of the tax database shows that some S-Corporations have also filed Schedule M, which is used to claim the special rate. Of these corporations, only those with passive income or built-in gains would potentially benefit from the special rate. Any tax benefit to S-Corporations is unknown but not likely to be significant.

It is assumed that the purpose of the special rate is to incentivize economic activity in qualified military base areas. It is clear from the table above that only a small number of C-corporations were eligible for the tax benefit. It is also evident that the tax benefit received by these taxpayers was a very small share of their tax liability. Although it is possible the special rate was instrumental in incentivizing a handful of businesses, it is likely from the level of discount provided by the rate it did not have far-reaching impact.

Conclusions from recent studies on the impact of state corporate income tax rates on employment and business formation have been mixed. Some studies on the relationship between a tax rate cut and entrepreneurial activity have failed to find a statistically positive relationship between the two (Bruce & Deskins, 2012; Gabe & Bell, 2004). Other researchers have found a positive effect of a tax cut on employment (Harden & Hoyt, 2003; Shuai & Chmura, 2013). Yet, others propose that tax rates do not affect, or have no clear effect, on employment and growth (Alm & Rogers, 2011; Ljungqvist & Smolyansky, 2017).

Additionally, P.L.125-1998 established a nonrefundable tax credit (military base recovery tax credit) for rehabilitation of vacant buildings located in a military base recovery site. P.L.81-2004 also established a different nonrefundable AGI tax credit (military base investment cost credit) for investment in a business that locates all or part of its operations to one of the previously described military base areas. The credits were repealed in 2013. These credits were not claimed in the last five years of their existence. It is likely that these credits were never claimed during their lifetime. The low utilization of these credits suggests a low level of additional economic activity conducted by businesses in military base areas that had income tax liabilities.

Lastly, the corporate income tax rate is being phased down from 8.5% in FY 2012 to 4.9% in FY 2022 and thereafter. The tax benefits attached to the special military rate will end by FY 2022. In addition, this incentive could result in certain taxpayers in military base areas paying taxes at a higher corporate income tax rate than other Indiana taxpayers starting in FY 2022.

Certified Technology Parks (IC 36-7-32)

The certified technology park (CTP) program was established to facilitate the location of high-tech businesses to Indiana along with increasing jobs in those industries. A local unit operating a CTP is authorized to make various public improvements in the region, such as infrastructure improvements and the construction of various facilities, including business incubator facilities. To fund the public improvements, territory in a CTP may be designated as a tax increment finance area (TIF). In addition, CTPs are allowed to capture sales tax, state income tax, and local income tax revenue.

Since the inception of the program, 26 CTPs have been designated. The first CTP was established in Anderson and the latest was designated in Fishers. Table 30 contains a list of Indiana's CTPs.

Table 30: Certified Technology Park Locations, Designation Years

Location	Year of Designation	Location	Year of Designation
Anderson	2003	Kokomo	2004
Bloomington	2005	Muncie	2004
Columbus (Info Tech)*	2004	North Vernon*	2012
Columbus (Downtown)*	2010	Purdue Aerospace District	2015
Crown Point/Merrillville	2006	Richmond	2004
Evansville	2004	Scottsburg	2004
Fishers	2016	Seymour	2012
Fort Wayne	2003	Shelbyville	2003
Hammond	2003	South Bend	2009
Indianapolis (IU)	2003	Terre Haute	2004
Indianapolis (Intech/Ameriplex)	2005	Warsaw	2012
Indianapolis (CityWay)	2011	West Gate at Crane Naval Warfare Center	2006
Jeffersonville*	2005	West Lafayette	2003

**Decertified*

Source: Raw data provided by the Indiana Economic Development Corporation, data analysis by the Office of Fiscal and Management Analysis.

The designation of a CTP is initiated by a county or municipality. The territory of the proposed CTP must be under the jurisdiction of the local unit's redevelopment commission. Once a CTP is proposed by a local unit, it must apply to the Indiana Economic Development Corporation (IEDC). The IEDC and the local unit enter into an agreement governing the terms and conditions of the CTP. The agreement must contain several important pieces of information. It must contain a description of the proposed territory. It specifies the financial commitments of the parties involved, and the terms of the support the partnering research institution will provide. It should also include the public facilities that will be developed in the region and the costs of those facilities.

In addition, the IEDC must receive a firm commitment from at least one business engaged in a high-technology activity that will create jobs and meet one of the following criteria:

- A demonstration of significant support from an institution of higher education, private research-based institute, or a military R&D or testing facility.
- A demonstration that the CTP region will take advantage of the unique characteristics and specialties offered by the public and private resources available within the area.
- The existence or proposed development of a business incubator to provide support to the CTP.
- A comprehensive business plan that addresses business formation, availability of resources, and assumptions on the costs and revenues related to the development of the CTP.
- Assurance that the proposed CTP will be developed to principally contain either a business incubator or high-technology activity.

If the IEDC approves the application, they must submit the recommendation to the State Budget Committee for review and recommendation to the State Budget Agency. Those entities must approve the designation before any revenue will be allocated to the CTP. After the CTP is approved, the local unit is instructed to contact the DOR to establish a CTP account. This triggers the revenue capture. The CTP will not receive any incremental revenue unless the local unit contacts the DOR.

CTPs must be recertified by the IEDC. Initially, recertification occurred every four years from the time the region was established. P.L. 259-2017 decreased the time between recertifications to three years for a recertification occurring after January 1, 2018. The local unit must provide the following information to be recertified:

- Total employment and payroll levels for all businesses operating within the CTP.
- The nature and extent of any technology transfer activity occurring within the CTP.
- The nature and extent of any nontechnology businesses operating within the CTP.
- The use and outcomes of any state money made available to the CTP.
- An analysis of the CTP's overall contribution to the technology-based economy in Indiana.

P.L. 259-2017 also required the IEDC to develop metrics to evaluate the CTPs effective January 1, 2018. The IEDC may terminate or rescind the designation if the local unit does not comply with the terms of the agreement or meet the defined metrics. The IEDC provides some marketing and support to the CTPs. However, the impetus is on the local units to execute their plans and achieve the desired outcomes. In similar programs in other states, the state administrative agency plays a larger role in the park's development.

Other States' Programs

Business/research parks have been in existence since the late 1950's when North Carolina established the Research Triangle Park. Almost every state has some type of certified research and business park system. Several certified park programs have been in existence for many years in states like Michigan. Other states, like Wisconsin, have recently begun certified park programs. Some parks are mostly research-based and are located at major public universities. It is not uncommon for a state's business/research park program to be administered by a public university.

Several states utilize a state economic development agency, quasi-governmental authority, or a private corporation to regulate, manage, and market their program. They often employ incentives to encourage firm relocation and formation, research, and investment. Several programs such as those in Wisconsin and Michigan are primarily pursuing out-of-state businesses (whether technology related or not) to relocate in their sites. Arizona and Iowa primarily have established pure incubator type research parks within their major public universities. Maryland has a hybrid program of promoting available sites for established businesses and incubator parks at major universities such as Johns Hopkins University. A characteristic of other states' programs is a focused marketing and advertising campaign conducted by their economic development agency to support the attraction of start-up businesses within their certified parks. Many states use their economic development agency to aggressively promote these parks to potential tenants.

Indiana Certified Technology Parks

There are two ways to describe Indiana's CTP program. It can be described as a centralized state program designed to encourage the creation of high-tech businesses and jobs in designated regions. From this perspective, one could assume the parks are homogenous in scope, projects, and funding. This assumption could easily be justified because the CTPs are established under one statute, and they all receive state assistance through the same mechanism. They also all undergo the same recertification process. However, the CTP program should be described as 26 distinct local projects where the state has chosen to invest up to $5 M or, for WestGate, $15 M. Statute provides a broad criteria for a region to qualify for the program, but it does not dictate the details. Local units are given the discretion to pursue their own objectives, provided it is within the framework of the law.

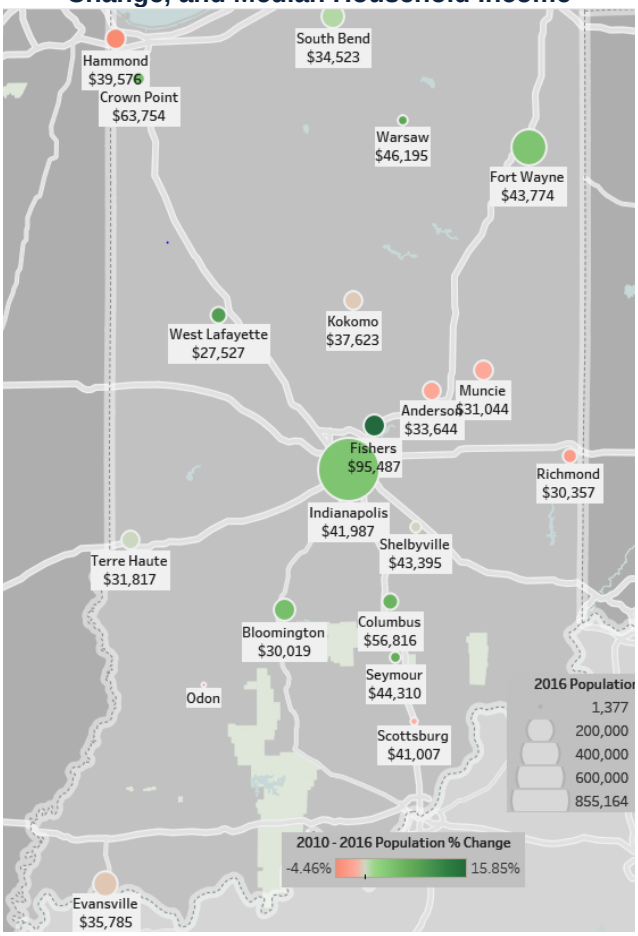
As a result, each CTP is unique. Below are a few examples.

- The Flagship Enterprise Center in Anderson contains a business incubator and two accelerator buildings with the goal of diversifying the local economy. Anderson is the nation's second leading Small Business Association microlender, and they assist with development of areas outside the CTP like Anderson's community revitalization and enhancement district.
- Columbus used their CTP revenue for a large capital project that facilitated the expansion of infrastructure for a specific high-tech business.
- Scottsburg's Mid-America Science Park works with local employers to develop career training programs to build and retain a skilled workforce for the region's high-tech businesses.
- The WestGate CTP is building out the region's infrastructure to attract businesses that will work closely with the Crane naval research facility.
- Purdue Research Parks attempt to create regions with technology-based organizations and supportive businesses. That may include retail, restaurant, and other professional and service companies. The West Lafayette Tech Park specifically has 51 buildings with approximately 360 acres still available for future development.

Our investigation found the CTPs are all working with their regions' strengths and weaknesses to create more opportunities for residents. This leads to diversity among the CTPs even among those with the same manager or partners. The Purdue Research Foundation manages five different CTPs across the state. They all contain incubator facilities and institutional support, but the character of each region is distinct and largely driven by the CTP's primary tenants. The demographic makeup of the regions where the CTPs are located differs as widely as the local administration and the goals of the CTPs. Some of these factors may influence local decision making.

Figure 33 shows the population of the cities with CTPs. The cities that encompass these CTPs range in population from over 855,000 in Indianapolis which is home to four designated CTPs, to a population estimated at less than 2,000 in the town of Odon where the WestGate CTP is located. CTPs are located in both rural and urban areas, some with high unemployment and others with some of the lowest unemployment levels in the state.

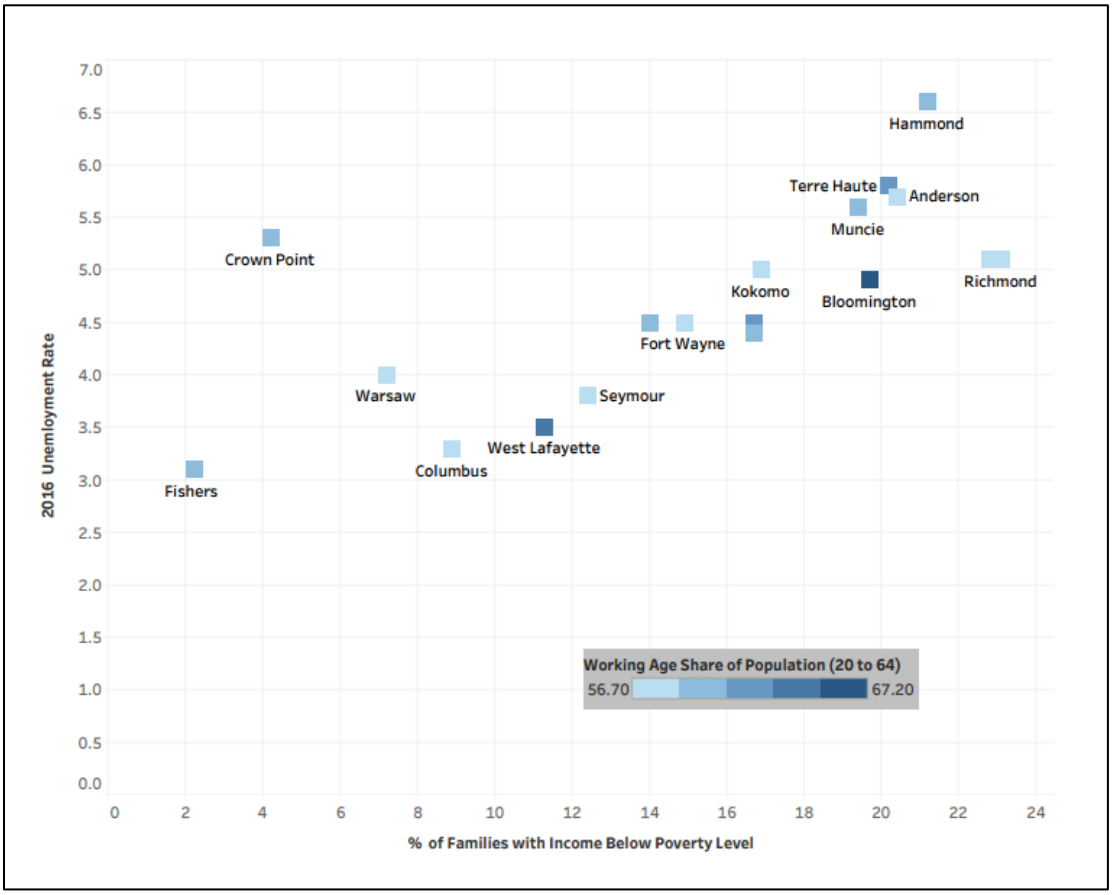
Figure 33: CTP City Population Size, Population Change, and Median Household Income



Source: Raw data provided by the U.S. Census Bureau, data analysis by the Office of Fiscal and Management Analysis.

The median household income in these areas also ranges from a high of $95,487 in Fishers, to a low of $27,527 in West Lafayette which is home to two CTPs and many college students. Some of the CTP areas also struggle with additional barriers to economic development, such as a higher than average concentration of households below the poverty level or an aging labor force. The city of Richmond is estimated to have 23.1% of families with income below the poverty level, whereas that rate is just 2.2% in Fishers and 4.2% in Crown Point. Yet, the concentration of persons age 65 and up is over 18% in Crown Point and 10% in Hammond and Indianapolis. Figure 34 shows poverty and unemployment statistics for the CTP regions.

Figure 34: CTP City Unemployment Rate and percent of Families in Poverty



Source: Raw data provided by the U.S. Census Bureau, data analysis by the Office of Fiscal and Management Analysis.

Establishment Statistics

The program is intended to attract businesses engaged in high-technology activities. The statute defines high-technology activities as:

- Advanced computing.
- Advanced materials.
- Biotechnology.
- Electronic device technology.
- Engineering or laboratory testing related to product development.
- Technology relating to the assessment or prevention of health or environmental threats.
- Medical device technology.
- Product R&D.
- Advanced vehicles technology.

The statutory definition of high technology is a combination of industries and businesses activities. To investigate the program's effectiveness, LSA had to translate the statutory activities into industrial sectors. The definition of "high tech" varies across geographic regions as state and local economic developers target establishments for growth and development. One taxonomy was developed by a multistate consortium of researchers, the Workforce Information Council, and the Bureau of Labor Statistics. A report illustrating the results of this research was released in 2014 documenting how the taxonomy was developed to analyze high-tech industry and occupational clusters for a state-by-state analysis of employment trends in these industries. This research included a healthcare component with the expanding definition of science, technology, engineering, and mathematics (STEM) industries and occupations. The following analysis uses this definition for high-technology industries with the addition of a few industries LSA deemed pertinent to Indiana's economy given the statutory definition listed above, including medical equipment device manufacturing. (A complete list of the taxonomy is in Appendix A.)

This definition of a high-tech industry represents a small segment of Indiana's economy with just over 7% of employment within 8% of Indiana firms. When including STEM healthcare industries, this concentration rises to nearly 20% of employment. The expanded classification has a greater share of employment than Indiana's manufacturing sector. Within the CTP areas, both the high-tech and healthcare segments comprise a greater and growing share of employment.

During 2005, this sector compared 13% of employment within the CTPs, and that has grown to 18% in 2015. When including the healthcare sector, the combined share has grown from 39% of CTP employment to nearly 44%. Overall, healthcare has grown by 11% from 2005 to 2015 in the CTP, and high-tech employment has grown by 48% from 8,913 employed to 13,243. This is in contrast to overall employment levels in the CTPs, which are below 2000 levels. The choice to include healthcare in this analysis is due to the many research partners, university hospitals, and physician groups located in these areas. Figure 35 shows the annual percent change in employment among all the CTPs, and Figure 36 shows the actual number of employees.

Figure 35: CTP Annual % Change in Employment

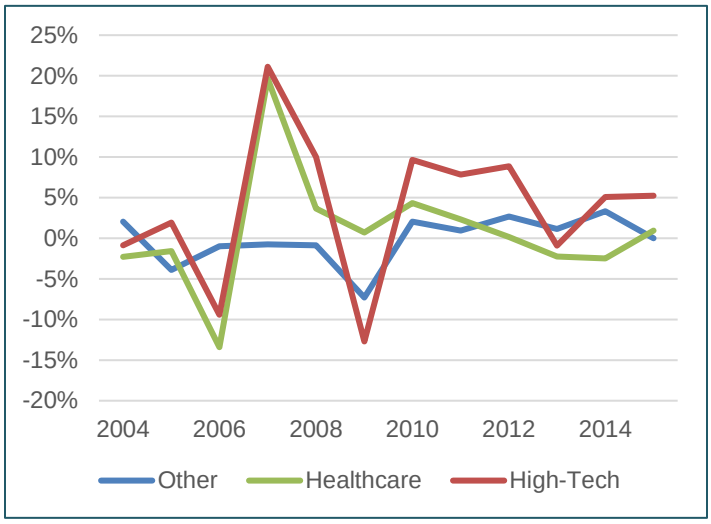
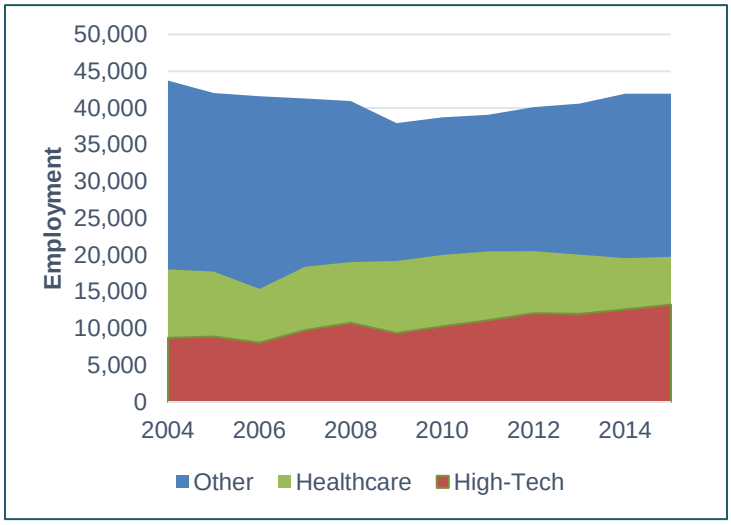
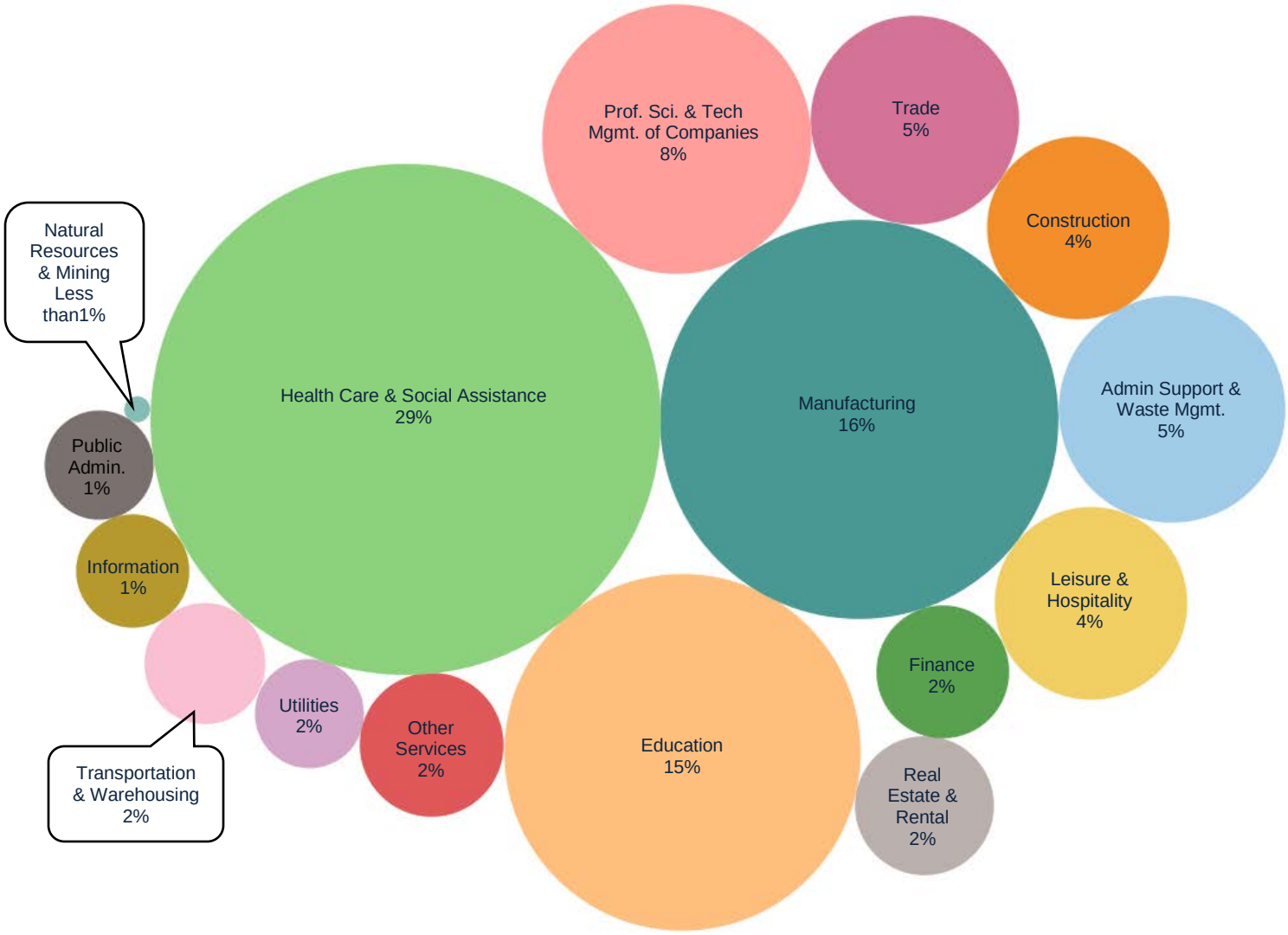


Figure 36: CTP Employment by Category



Source: Raw data provided by the Indiana Economic Development Corporation and the Bureau of Labor Statistics, data analysis by the Office of Fiscal and Management Analysis.

Figure 37: CTP Employment Concentration by Industry, 2016



Source: Raw data provided by the Indiana Economic Development Corporation and the Bureau of Labor Statistics, data analysis by the Office of Fiscal and Management Analysis.

Despite the overall trend towards growth in high-tech and healthcare, the industry composition varies greatly within each of the CTPs. Figure 37 shows the distribution of employment by industrial sector. The Indianapolis CityWay CTP has the strongest concentration of leisure and hospitality firms at 94%. Columbus downtown tech park is 96% manufacturing. Ignition Park leads in construction with 53% of employment in this industry. Richmond's CTP has the most diverse industry distribution. The concentration for all CTPs is shown in this illustration. As these CTPs cover vastly different geographic areas in terms of mileage and available storefronts, these variances are unsurprising.

Effectiveness

Because they are so different regionally, it is difficult to employ a single set of metrics to apply to each CTP. For example, employment and wages are common measures used to evaluate economic development programs. Those measures may be applicable when analyzing a CTP that features an industrial park with the spec buildings already present. Those regions were built around the objective of attracting established firms. However, that measure may not be appropriate for CTPs where a business incubator is the focal point.

Incubators help businesses succeed to reach the next level. As a consequence, a productive incubator will have some level of churn.

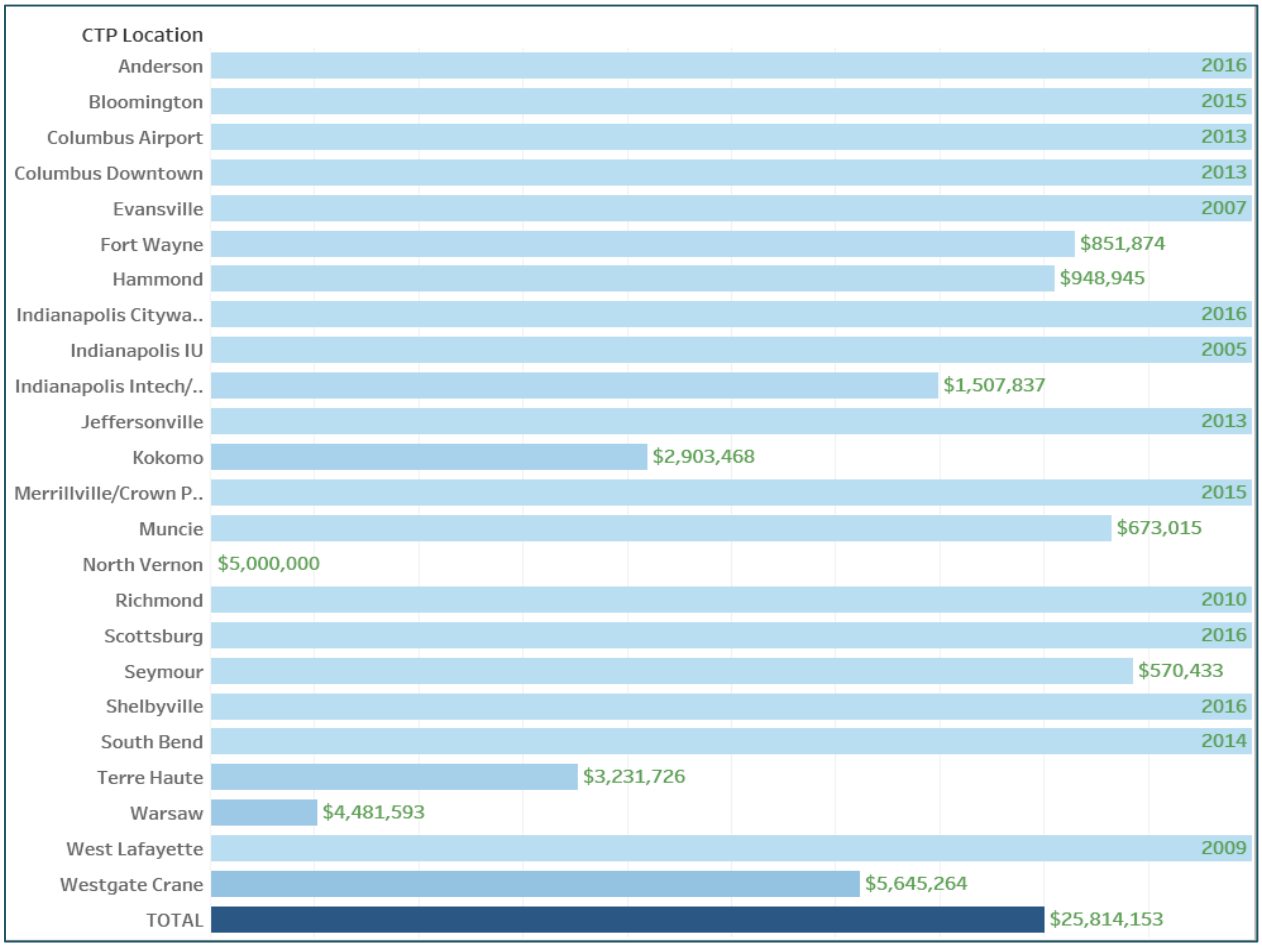
Employment and wage growth may show inconsistent trends as mature firms leave the facility and young firms move in. Tenant churn might be a reasonable metric for an incubator, but it is not for an industrial park. However, no activity is always a cause for concern.

Revenue Capture

CTPs are authorized to capture incremental sales tax, state income tax, and local income tax revenue generated in the CTP. The state makes monthly revenue transfers to the CTP fund established by the local development commission that has jurisdiction over the park. While there is no annual incremental revenue capture limit for the program, there is a lifetime capture limit applicable to each CTP. A CTP may capture up to $5 M in incremental tax revenue during its lifetime. However, there is an exception for the WestGate at Crane Naval Warfare Center CTP. The WestGate CTP is allowed to capture a total of $15 M because it captures revenue from three counties. As of FY 2016, 14 CTPs had reached the lifetime capture limit, and the CTPs can still capture $25.8 M in tax revenue.

Figure 38 reports the remaining revenue eligible for capture by each CTP since the inception of the program. From FY 2003 to FY 2016, the CTPs captured $81.3 M in sales tax and state income tax revenue and $22.8 M in local income tax revenue. The year is listed for those areas that have already reached the maximum revenue capture. Table 31 shows the percentage of the revenue capture attributable for each tax.

Figure 38: Remaining Revenue Capture of Year of Maximization



Source: Raw data provided by the Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis.

Table 31: Revenue Capture by Tax Type

Location	Sales Tax	State Income Tax	Local Income Tax
Anderson	10.8%	60.7%	28.4%
Bloomington	35.3%	49.3%	15.4%
Columbus Airport	0.0%	73.1%	26.9%
Columbus Downtown	0.0%	73.1%	26.9%
Evansville	8.2%	71.0%	20.8%
Fort Wayne	0.0%	75.3%	24.7%
Hammond	1.1%	98.9%	0.0%
Indianapolis CityWay (NoS)	81.6%	12.3%	6.1%
Indianapolis Intech/Ameriplex	3.7%	68.9%	27.3%
Indianapolis IU	2.8%	63.5%	33.6%
Jeffersonville	2.8%	66.5%	30.7%
Kokomo	18.2%	55.2%	26.6%
Merrillville/Crown Point	4.5%	83.7%	11.8%
Muncie	34.1%	49.9%	16.1%
North Vernon	0.0%	0.0%	0.0%
Richmond	16.3%	58.1%	25.6%
Scottsburg	75.2%	18.5%	6.3%
Seymour	27.2%	49.2%	23.5%
Shelbyville	9.3%	66.3%	24.4%
South Bend	12.9%	57.3%	29.8%
Terre Haute	56.3%	32.0%	11.8%
Warsaw	0.0%	77.3%	22.7%
West Lafayette	0.3%	77.5%	22.2%
WestGate Crane	0.0%	70.5%	29.5%

Source: Raw data provided by the Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis.

The revenue provided by the state may be used to operate the public facilities in the region or pay the leases and obligations associated with the development of public facilities or associated improvements in the region. Statute also allows the redevelopment commission to issue bonds to finance the public facilities. Many of the CTPs have used the money to help fund incubator facilities. This helps the facilities keep rents low and provide business services to the tenants. Others have used the revenue as part of a larger capital improvement to benefit both the CTP and the surrounding region.

The incremental revenue captured by a CTP is another measure of the level of economic activity in the CTP. But there are other factors to consider. Small firms engaged primarily in R&D will not generate substantial amounts of personal income or sales taxes. These firms may be engaged in the development of new technology, but this activity will not be reflected in the CTP's revenue capture. Conversely, a number of factors could lead to substantial balances in a CTP increment fund without necessarily leading to high-technology activity. For example, the boundaries of the CTPs in Evansville and downtown Indianapolis include downtown areas that are not part of the business incubator. This territory includes certain retail and service operations. Taxes generated by these activities are eligible for recapture (leading to higher revenue captures), but they do not reflect an increase in technology development activity.

Although the CTP increment fund may be misleading, the absence of any reported balance in the CTP fund is concerning since even inflationary increases in tax collections should be reflected in the fund balance.

Property Tax

Like other geographic economic development programs, the CTPs have a special tax incentive at their disposal. The CTP personal property deduction is a personal property tax deduction enacted in 2010 to incentivize investment in CTPs. The deduction is available for personal property located in a CTP that is:

1. Not part of the assessed value for which a personal property tax allocation has been made for the payment of the principal of and interest on bonds or lease rentals.
2. Assessed for the first time after December 31, 2010.
3. Installed before March 2, 2015.
4. Is primarily used to conduct high-technology activity.

To receive the deduction, a county fiscal body must adopt an ordinance providing a property tax deduction equal to 100% of the assessed value of the qualified personal property located in the county. The ordinance must specify a deduction length between two and ten years.

There have not been any CTP personal property deductions awarded. Given that the deduction is only for personal property installed before March 2, 2015, it is unlikely that any deductions will be awarded in the future.

In addition to the deduction, the local units have the authority to capture the incremental property tax of the region through a TIF area. At least 73% of the parks are within a TIF.

Conclusion

Indiana's CTP program is a mechanism to invest in local projects intended to increase the number of high-tech businesses, jobs, and ultimately wages. Indiana has invested $104 M in 26 different local economic development plans. Because of their diversity, there is no single measure that could be applied to all the CTPs. However, the job growth within high-tech industries in the CTPs is growing at a faster rate than the state average. Each CTP should be judged on its initial proposal, and their business plan should be the basis to evaluate the program.

The rationale of increment financing is to capture the revenue increase associated with the targeted activity and reinvest it back into the CTP. Some CTPs include businesses not related to high-tech development. CTPs include a number of restaurants, retail, and other service industries. Incremental tax revenue is also captured from those firms even though their activity is unrelated to high technology and would likely not qualify for the program on its own. The method used to compute the state investment amount may not be linked to the activity the program purports to incentivize. However, unlike incentives that are awarded to individual firms, the CTP revenue goes to the local units for local investments. This, along with the spending limitations, reduces the amount of funds that could leak out of state.

Professional Sports and Convention Development Areas

A professional sports and convention development area (PSCDA) is a special zone where certain state and local tax revenues generated by activity at designated sports and convention facilities are captured and diverted to a special fund for capital improvement projects within the PSCDA. The PSCDA program was established as a mechanism for the State of Indiana to partner with local governments in order to develop sports and convention facilities. There are four active PSCDAs: Indianapolis/Marion County, Allen County, South Bend, and Evansville. Since the program began, the PSCDA's have captured a total of $292.3 M.

Facilities within the Indianapolis PSCDA

- Banker's Life Fieldhouse
- Colts Practice Center
- Indiana Convention Center
- Lucas Oil Stadium
- Victory Field
- Marriott Hotel – Downtown
- Marriott Place
- Hyatt Regency
- Westin Hotel

The establishment of a PSCDA is authorized by two separate statutes. The authorizing statute for the Marion County PSCDA is IC 36-7-31. The PSCDAs outside of Indianapolis and Marion County are authorized under IC 36-7-31.3. The PSCDAs were established by a resolution passed by the adopting local body defined in the appropriate statute. The resolution designating a PSCDA must be reviewed by the State Budget Committee and be approved by the State Budget Agency. A PSCDA is authorized to include noncontiguous parcels of land. No incremental tax revenue may be captured by a PSCDA unless approved by the State Budget Agency. While the concept of the PSCDAs are the same, the individual PSCDAs are unique

Indianapolis/Marion County

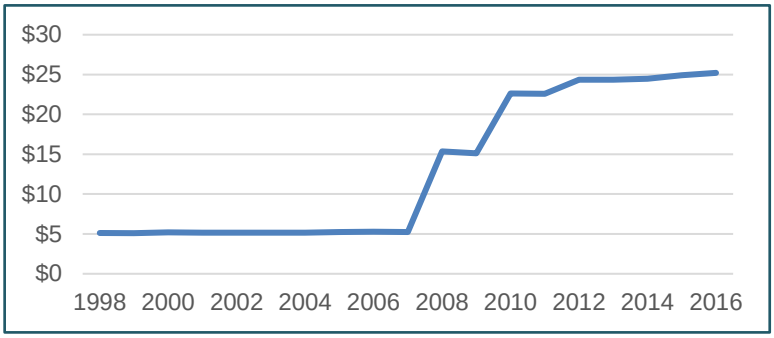
The initial Indianapolis/Marion County PSCDA was established in 1997. The authorization allows Indianapolis/Marion County to establish a PSCDA containing a facility or complex of facilities used to hold professional sporting events. Professional sports team training facilities may also be included in the PSCDA. Legislation was subsequently enacted that allowed for the expansion of the Indianapolis/Marion County PSCDA boundaries to include Lucas Oil Stadium after May 14, 2005, and multiple hotels in downtown Indianapolis after June 30, 2009. The funds are used to finance obligations issued by the CIB and the Indiana Stadium and Convention Building Authority. The bonds issued by the Stadium Authority are paid through a lease agreement between the CIB and the Stadium Authority. Indianapolis/Marion County has received 85% of the total revenue captured by PSCDAs in Indiana since the program was established.

Capital Leases Payable

According to the CIB's 2015 consolidated annual financial report, the total long-term capital lease obligations are $1,032 M. That includes $666.5 M for Lucas Oil Stadium and $329.2 M for the expansion of the Indiana Convention Center. The bonds for those projects were issued between 2005 and 2009. The remaining obligations are associated with the CIB's other capital assets. The 2015 portion of the capital obligations was $34.4 M.

The Indianapolis PSCDA is authorized to capture the tax revenue attributable to events held at the convention center, sports facilities, and hotels in the PSCDA. All of the food and beverage tax, sales tax, state income tax, and local income tax revenue is captured by those facilities. Food and beverage tax revenue may not be captured by hotels in the area. Figure 39 reports the revenue captured by the Indianapolis PSCDA since its inception. It has received $250.8 M from FY 1998 to FY 2016

Figure 39: Annual Revenue Captured by the Indianapolis PSCDA ($ in millions)

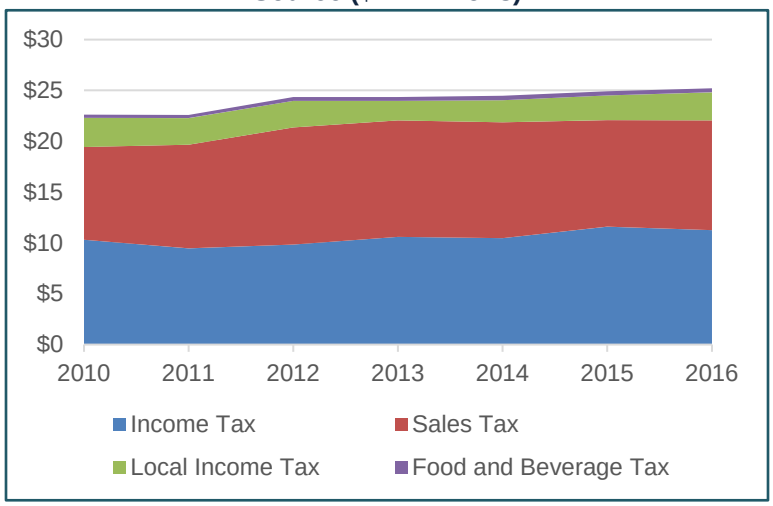


Source: Raw data provided by the Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis.

The Indianapolis PSCDA is subject to two state revenue capture limits. A state capture limit equal to $16 M annually applies to the portion of the PSCDA containing the sports facilities and the convention center. The first $5 M of this revenue stream pays obligations relating to the construction of Banker's Life Fieldhouse. The remaining $11 M is dedicated to obligations related to the construction of Lucas Oil Stadium and the expansion of the Indiana Convention Center. A separate $8 M capture limit is applied annually to the portion of the PSCDA containing the specified hotels. This revenue stream can only be used to pay operating expenses on capital improvements that are owned, leased, or operated by the CIB (Banker's Life Fieldhouse, the Indiana Convention Center, Lucas Oil Stadium, and Victory Field). The revenue capture by the Indianapolis PSCDA must cease by January 1, 2041.

Historically, the PSCDA has nearly reached both statutory revenue capture limits. The hotel portion of the PSCDA reaches the $8 M threshold each year in about 9 months. The average state tax revenue capture attributable to the sports facilities is about $14 M per year, leaving $2 M in potential state revenue that could be captured. The PSCDA also captures a portion of the local income tax and food and beverage tax revenue. Those taxes account for, on average, $2.8 M per year. Figure 40 reports the Indianapolis PSCDA revenue capture by tax type for FY 2010 through FY 2016.

Figure 40: Indianapolis PSCDA Revenue Capture by Source ($ in millions)

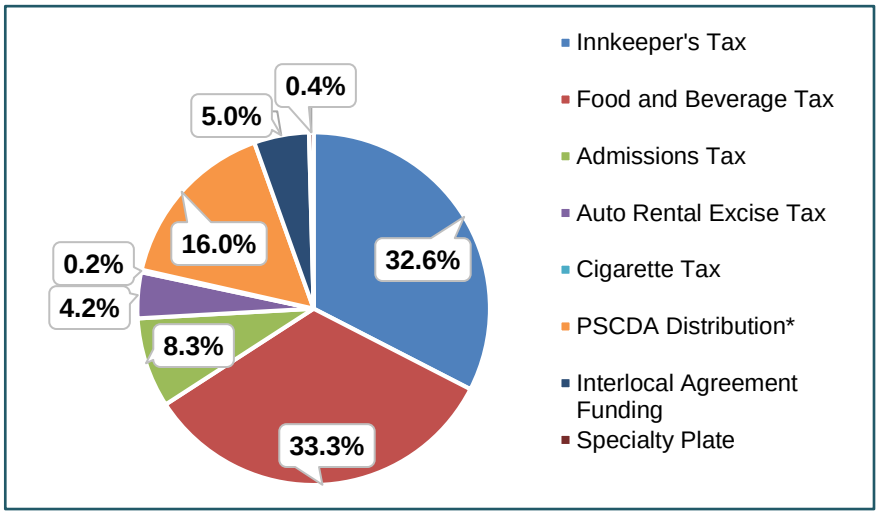


Source: Raw data provided by the Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis.

Additional CIB Revenue Sources

The PSCDA distribution is not the CIB's only revenue source. In 2015, the CIB collected $191.2 M in total revenue. The operating revenues totaled $31.4 M. Rental income, food service commissions, parking lot income, labor reimbursements from conventions, trade shows, and sporting events held at the Indiana Convention Center and Lucas Oil Stadium are the primary sources of operating revenues. Nonoperating revenues totaled $159.7 M, of which $158.8 M was from state and local taxes and other assistance.

Figure 41: Marion County CIB State and Local Tax Revenue Sources 2015



Source: Raw data provided by the Marion County CIB, data analysis by the Office of Fiscal and Management Analysis

The $158.8 M in state and local taxes come from a variety of sources. Figure 41 illustrates the percentage share of all these revenue sources for CY 2015. The largest source of tax revenue distributed to the CIB is the food and beverage tax. That includes both the 2% rate imposed in Marion County and 0.5% imposed and received from the surrounding counties that adopted the tax (Morgan County did not adopt the 0.5% rate). The 10% innkeeper's tax is the next largest revenue source. The PSCDA distribution accounts for only 16% of the total state and local tax revenue received by the CIB. After adjusting for the local taxes included in the PSCDA distribution, the state revenues from the sales tax and income tax comprise only 14% of all state and local taxes received by the Marion County CIB.

Outside of Marion County

Cities and counties outside Marion County were also authorized to establish a PSCDA, provided the city or county has a professional sports franchise playing the majority of its home games in a facility owned by the city, the county, a school corporation, a county building authority, a capital improvement board, or other specified public entities. The PSCDA must contain the sports facility where the professional team plays its games. In addition, a PSCDA may include convention facilities, an airport, a museum, a zoo, a facility used for nationally significant public attractions, a performing arts venue, a county courthouse that is a registered historic landmark, or a hotel. As with the Indianapolis PSCDA, any other city or county PSCDA is allowed to include noncontiguous parcels of land. Table 32 lists several attributes of the PSCDAs authorized under IC 36-7-31.3.

Current statute prohibits the establishment of an additional PSCDA.

Table 32: Characteristics of the PSCDAs Outside of Marion County

	Allen County	Evansville	South Bend
Year Established	**1998**	**1999**	**1998**
Facilities Included	• War Memorial Coliseum • Grand Wayne Center • Indiana University-Purdue University Fort Wayne Campus • Holiday Inn Hotel – Coliseum • Hilton Hotel – Grand Wayne Center	• Bosse Field	• Century Center • Four Winds Field • Morris Civic Center • Palais Royale Ballroom • Studebaker National Museum
Taxes Captured	• Sales tax • Individual income tax • Local income tax	• Sales tax • Individual income tax • Local income tax • Food and beverage tax	• Sales tax • Individual income tax • Local income tax • Food and beverage tax
Annual capture limit	$3,000,000	$587,145	$657,592
Total captured*	$32,257,700	$763,000	$8,337,200
Expiration Year	2039	2019	2018

**Total PSCDA revenue distribution the region received since it was established.*
Source: Raw data provided by the Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis.

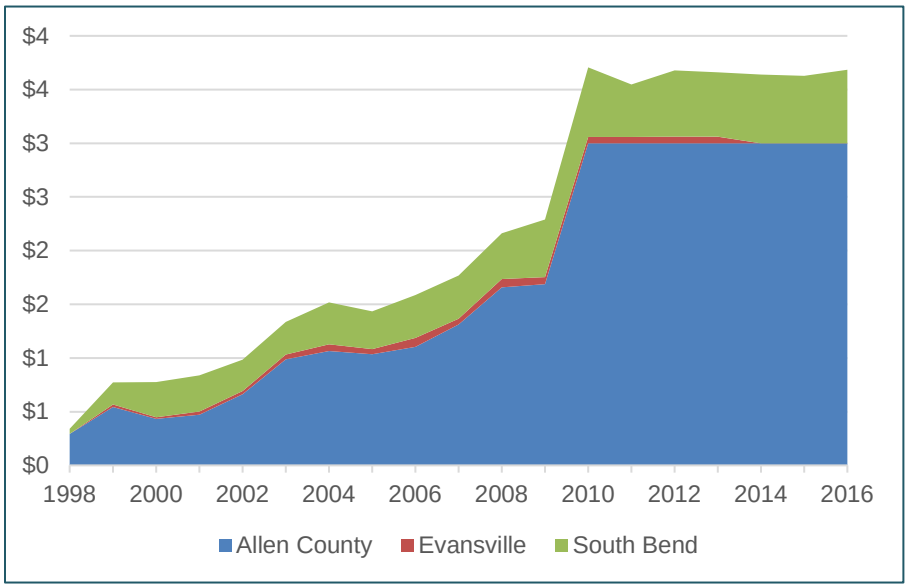
Like Marion County, these PSCDAs are authorized to capture revenue from sales tax, state income tax, local income tax, and food and beverage tax generated at the designated facilities. Each PSCDA is subject to revenue capture limits. The annual capture limit for the Allen County PSCDA is $3 M, with the limit applying to the capture of revenue from the sales tax, state income tax, and local income taxes. The Allen County PSCDA is allowed to capture revenue until the end of 2039 to finance an expansion of the Allen County War Memorial Coliseum.

There are revenue capture limits on sales tax and state income tax collected from the Evansville and South Bend PSCDAs. Those limits are based on the population contained in the jurisdiction in which they are located. The Evansville PSCDA capture limit is $5 multiplied by the city population, or $587,145 based on the 2010 Census. The South Bend capture limit is $6.50 multiplied by the city population, or $657,592 based on the 2010 Census. The revenue capture in both PSCDAs is allowed for 20 consecutive years. This would extend to 2019 for Evansville and 2018 for South Bend.

Figure 42 shows the revenue capture by PSCDA since each was established. The revenue captured by Allen County amounts to 78% of the total revenue captured by the PSCDAs outside Marion County. Allen County has consistently reached the $3 M capture limit since the PSCDA expanded to include the Indiana University-Purdue University Fort Wayne campus in 2010. South Bend has met its threshold a few times, but not consistently.

The composition of tax revenues varies among the PSCDAs. Allen County captures mostly state and local income tax. About 73% of the revenue they received was from those two taxes. South Bend and Evansville capture a greater share of their revenue through sales tax. Figures 43 through 45 show the share of revenues by source for fiscal years 2010 to 2016.

Figure 42: Annual Revenue Capture by the PSCDAs Outside of Marion County ($ in millions)



Source: Raw data provided by the Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis.

Figure 43: Revenue Capture by Source, Allen County PSCDA

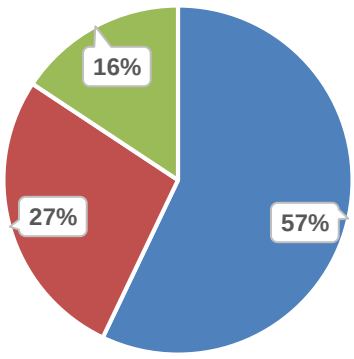


Figure 44: Revenue Capture by Source, Evansville PSCDA

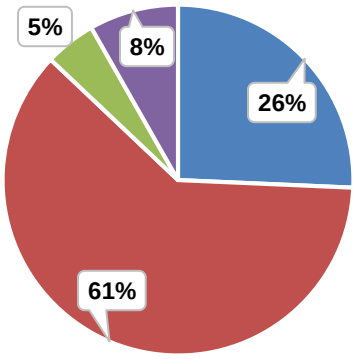
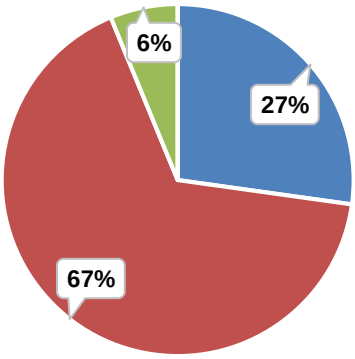


Figure 45: Revenue Capture by Source, South Bend PSCDA

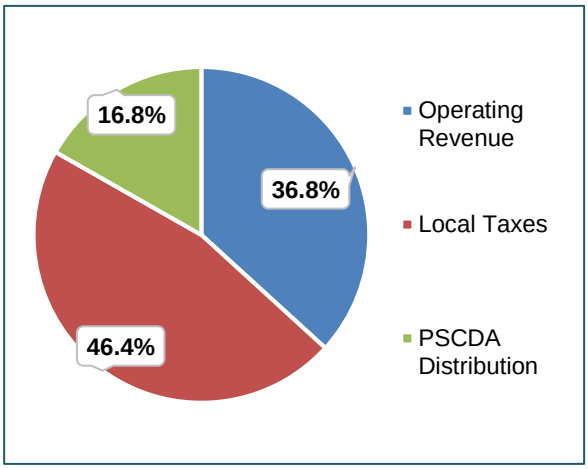


Source: Raw data provided by the Department of State Revenue, data analysis by the Office of Fiscal and Management Analysis.

The revenue captured by the PSCDA can be used for a number of purposes. It may be used for financing or refinancing authorized capital improvements. Generally, the revenue is used for a facility used by a professional sports franchise. However, the revenue may also be used for facilities that attract convention or tourism related events, an airport, a museum, a zoo, a facility used for public attractions of national significance, a performing arts venue, a county courthouse registered on the National Register of Historic Places, or a hotel. The captured revenue is deposited in the PSCDA fund established by the city or county.

The remaining analysis focuses on the Allen County PSCDA. The Allen County PSCDA represents 78% of the program revenue captured outside Marion County. Revenue deposits for the Allen County PSCDA are unique. The first $2.6 M is deposited into the Coliseum PSCDA fund and the remaining amount is transferred to the joint county-city capital improvement board. The Allen County War Memorial Coliseum had a total of $15 M in revenues during CY 2016 (see Figure 46). Revenues included $8.4 M from operations and development and $7.3 M came from their supplemental food and beverage tax distribution. Expenditures from food and beverage taxes totaled $8.2 M and $9 M from Coliseum operations and the PSCDA distribution.

Figure 46: Allen County War Memorial Coliseum Revenues by Source 2016



Source: Raw data provided by Allen County, data analysis by the Office of Fiscal and Management Analysis

Purpose of the Program

The PSCDA program was established as a mechanism for Indiana to partner with local governments to develop professional sports and convention facilities. At its core, the PSCDA program is a specialty tax increment financing zone. It diverts revenues from the covered taxes to the local units to pay for leases, obligations, and operation of certain authorized capital improvements. Of the revenue diverted, 87% is attributable to sales and state income tax. The remaining 13% is from local income tax and food and beverage tax. With the exception of the hotels and the Indiana University-Purdue University Fort Wayne Campus, the captured revenue is directly attributable to the activities in the facilities and is reinvested back into facilities.

Literature Review

There is a large body of academic research on whether investment in a stadium is an optimal use of public funds. Andrew Zimbalist (2013) made the following comment in Government Finance Review:

Independent scholarly studies have found that a city, county, or state should not anticipate a positive economic or fiscal impact from a new stadium or arena, or from a new team. That is, a new sports facility by itself should not be expected to raise employment or per capita income levels in a community.

Other research supports Zimbalist's statement. Baade (1996) studied the impact of professional sports teams in 48 cities, and he found that, on average, professional sports teams did not increase city per capita income. His research also suggests that professional sports displaced leisure spending within the city. Siegfried and Zimbalist (2000) did not find a positive correlation between sports facility construction and economic development. Coates and Humphreys (2000) studied the effects of professional sports in 37 cities. Their results suggest professional sports had no measurable impact on the growth rate of per capita income. Furthermore, their research suggests that professional sports may reduce per capita income. Coates (2007) reviewed scholarly research published on the economic impact of professional sports teams and the majority of the research suggests that stadiums did not affect employment, income, and tax revenue.

It should be noted that not all research suggests a negative relationship between stadiums and economic development. Baade (1996) observed a positive relationship between sports teams and per capita income in Indianapolis which he believed was more attributable to the other infrastructure investments Indianapolis made in conjunction with the stadium. Research by Swindell and Rosentraub (1998) suggests sports investment is modestly successful in creating hotel and service sector jobs. However, it did not appear to attract high-wage jobs. Agha (2013) found that minor league baseball teams increased per capita income in the year a stadium was built and the subsequent four years.

The proponents of sports facility spending state that the investments will bring jobs, income, and development to the region. Facilities are often large, expensive buildings that take years to construct. The capital investment creates construction jobs. Critics often note that the construction jobs only exist while the facility is being built, and those jobs would have been created for any large capital project. Once the facility opens, the proponents claim the consumer spending at the facility will drive additional investment into the region. Hotels, shops, and other establishments will be created to meet the demand of the visitors attending events at the facility. It is the activity from the visitors after the construction that will boost the economy in the long term. The proximate development surrounding the stadium will drive the economic impact and not just the activity directly associated with the sports team (Crompton, 2004).

Critics respond by stating the proponents' claims would be true if the money spent by the people attending the event is all new spending to the region. People have a limited amount of disposable income they can spend on entertainment. The sports facility provides an option for the local residents. Spending by local residents at the sports facility may not be new spending but a realignment or displacement of money they would have spent elsewhere in the region. Instead of a dinner and a movie in their neighborhood, a family may attend a baseball game downtown. This is referred to as the substitution effect (Siegfried & Zimbalist, 2000).

The substitution effect has many implications when estimating the economic impact of a sports facility. Researchers have long held that all local spending should be excluded from economic impact estimates of sports facilities. This is because spending at a sports facility by local residents is not new but likely shifted from spending that would otherwise occur at other local businesses. If locals are not excluded, the estimates will likely be inflated. However, researchers have noted that not all local spending should be excluded from the analysis. Some local residents would have gone outside the region to attend a specific event if there was not one close to their home. For example, an Indianapolis resident would have driven to Chicago to see a NFL game. Instead they can see a game in Indianapolis. This is referred to as import substitution. Goods consumed from local production that would have otherwise been imported or would have forced the consumer to go outside the region. Unfortunately, the amount of spending diverted within the region and the amount of spending that would have left the area is difficult to measure. Because of the difficulty associated with separating redirected and new spending, it is advised to completely exclude all local spending (Wassmer, Ong, & Propheter, 2016).

In terms of contribution to Indiana's economy, the portion of GSP attributable to professional sports is less than 1%. It is not a major contributor to Indiana's economy compared to manufacturing, agriculture, and even gaming. The industry's contribution to GSP is limited largely because 61% of its value added is from employee compensation and proprietor income. Typically, we expect wages paid to employees to be spent in the local economy, triggering additional economic activity. However, professional athletes usually reside in different states, so the induced impact from athletes' salaries leaks outside the region.

Regardless of the body of scholarly research that finds publicly-funded stadiums are not the economic engines the proponents claim, governments continue to divert revenues for the construction and improvement of these facilities. Zimbalist (2013) has also noted that governments spend millions of dollars to support cultural activities that are not expected to have positive economic effects. He notes that sports teams can have a cultural and social impact on the community. Other researchers have attempted to measure the cultural impact of sports teams and how they affect the perception of residents (Crompton, 2004). Swindell and Rosentraub (1998) surveyed Indianapolis residents on how the sports teams, events, and other amenities made them feel about the area. They found a certain amount of civic pride was associated with the museums and professional sports teams. Rosentraub (1999) found that even though professional sports did not result in a large economic impact, it did provide a role for the downtown areas in Cleveland and Indianapolis. If a community thinks professional sports will improve their quality of place by providing an intangible social benefit, they may decide the investment is appropriate.

However, just because investments in a sports facility may not result in large economic growth, it does not necessarily mean the investment is a loss. If a facility can host a variety of events, the attributable economic activity may cover the cost of the investment. This is the focus of our analysis. Are the events at the PSCDAs generating enough proximate economic activity for Indiana to recoup its investment in those local facilities? We are not addressing whether the cities with dedicated local tax revenues are breaking even. The PSCDA is a state program with the revenue authorization approved by the State Budget Committee and State Budget Agency. The other taxes funding improvements were enacted by the local governing bodies and are not part of this program. In addition, the region for determining the economic impact of the PSCDA program is different for local taxes. The definition of the region is a critical part of an economic impact analysis, and we will discuss this in more depth later. The first step in measuring the impact of the PSCDAs is to learn about the events held at the facilities.

Attendance and Events

The activity at various PSCDAs ranges from about 50 events and attendance in the low ten thousands annually to hundreds of events and hundreds of thousands of attendees. Evansville's PSCDA contains Bosse Field as its sole facility. Bosse Field generally records the fewest events and attendance within the four PSCDAs annually. Marion County, due to its size and number of facilities, leads attendance and event statistics by a large margin annually, with Fort Wayne and South Bend coming in second and third.

The following charts and graphs contain attendance and event days for Lucas Oil Stadium and the Indiana Convention Center and the Allen County War Memorial Coliseum. These are two examples of the type of facilities operating within the PSCDAs.

Lucas Oil Stadium and Convention Center

Combined, Lucas Oil Stadium and the Indianapolis Convention Center held 346 events over 640 event days with attendance of 1.9 million persons during CY 2016. Figures 47 and 48 show the percentage of attendance and event days per event category.

Figure 47: Lucas Oil Stadium and Convention Center Event Days 2016 By Category

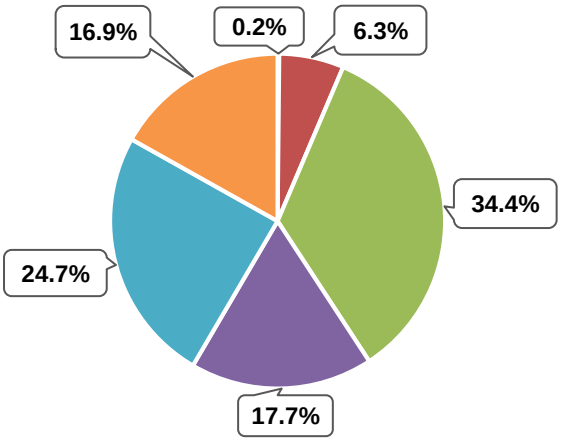
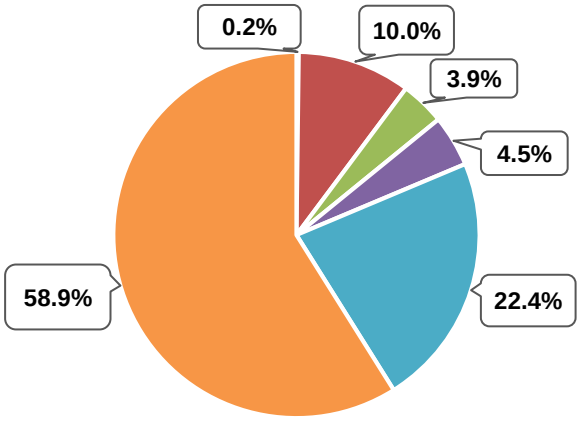


Figure 48: Lucas Oil and Convention Center Attendance 2016 By Category



Entertainment
Trade Shows
Local, Business and Social
State Convention Business
National Convention Business
Competition

Source: Raw data provided by the Marion County CIB, data analysis by the Office of Fiscal and Management Analysis

Allen County War Memorial Coliseum

The Allen County War Memorial Coliseum saw over 1 million visitors and racked up just over 1,300 event days during CY 2016. The facility hosts various sports events such as Fort Wayne Mad Ants basketball and Komets hockey, as well as many trade shows and local business and social events. Figures 49 and 50 provide the percentage of attendance and event days per event category.

Figure 49: Allen County War Memorial Coliseum Event Days 2016*

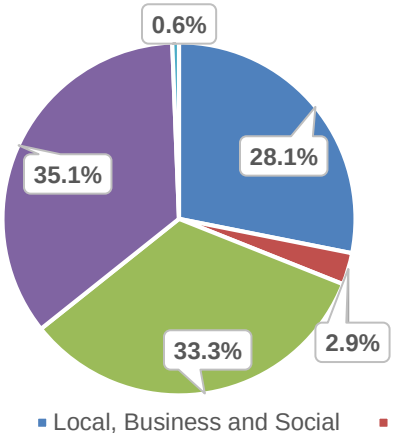
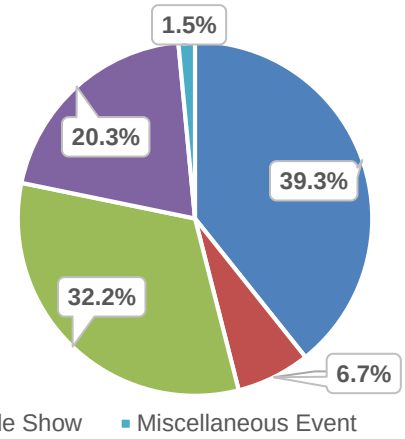


Figure 50: Allen County War Memorial Coliseum Attendance 2016



Local, Business and Social | Concert | Sports | Trade Show | Miscellaneous Event

**Does not include move-in/move-out days.*
Source: Raw data provided by the Allen County War Memorial Coliseum, data analysis by the Office of Fiscal and Management Analysis.

Economic Impact Analysis

The literature suggests that facilities like those that receive financing from the PSCDA program may not stimulate enough economic activity to generate large increases in jobs or income. However, facilities that attract any spending that would not have otherwise occurred in a region will produce at least some new economic activity. In turn, that economic activity has an impact on tax revenue generated by all levels of government. We focus on estimating state-level tax impact associated with new economic activity generated by the spending of out-of-state visitors attending events in Indiana PSCDAs. By estimating the tax impact, we can understand whether or not Indiana is receiving a return on its investment in the PSCDA program.

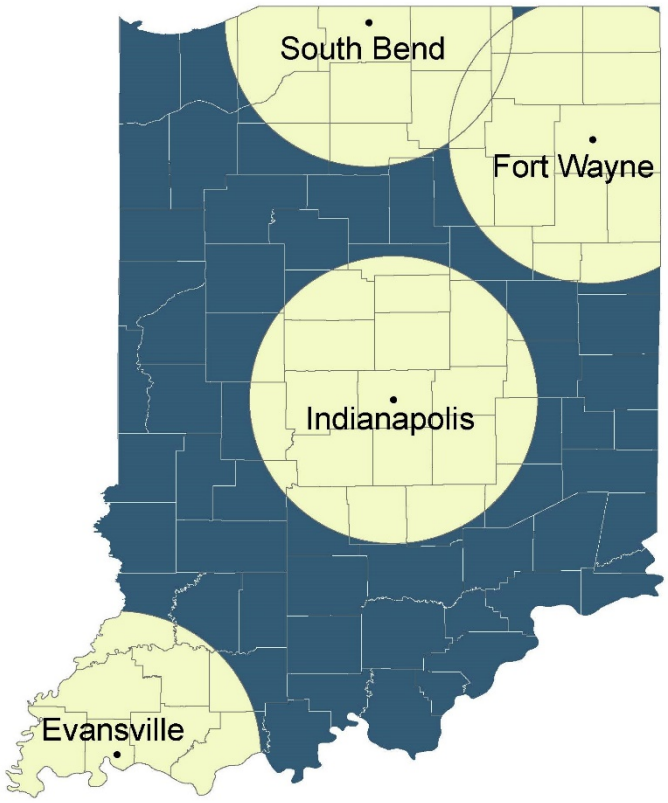
The total economic impact of PSCDAs consists of the direct economic activity associated with visitor spending. Income generated by firms in the PSCDA stimulates additional economic activity indirectly by purchasing goods and services from other sectors. Finally, those revenues induce economic activity as wages circulate through a region's economy as employees make purchases. The tax impact of the PSCDAs is a function of the total economic impact associated with visitor spending in the areas.

Model and Data

Input/output modeling is a common method for estimating total economic and tax impact. The IMPLAN input/output model is used in this analysis to produce the impact estimates. Model estimates are based on business transaction and interaction data from the U.S. Bureau of Economic Analysis and Bureau of Labor Statistics.

The inputs for this analysis come from multiple sources. Event spending was estimated using annual attendance records at facilities in the PSCDAs. Specifically, the price of tickets for each event was multiplied by the attendance. We estimated the proportion of spending from out-of-state visitors since we are only interested in spending that is new to Indiana. In addition, innkeeper's tax data were used to estimate the proportion of gross lodging income attributable to hotel room nights purchased by out-of-state PSCDA visitors. Finally, food and

Figure 51: Comparing Study Regions



Source: Office of Fiscal and Management Analysis.

beverage tax data were used to estimate the proportion of annual gross income received by restaurants that is attributable to out-of-state PSCDA visitors.

Our analysis differs from common tourism or event-related economic impact analyses. First, the region of the assumed economic impact is usually smaller. For instance, tourism studies typically define new spending to an area if the visitor is from outside the county or a 50 mile radius of an event. Figure 51 shows how a typical facility study would define a region with a 50 mile radius. Using the state as our region creates a higher threshold for what is new spending and what is spending that is simply realigned or displaced from entertainment substitutes (e.g., dinner and a movie). As a result, the economic impact estimates are smaller than most tourism studies, but a better fit for the purpose of this analysis.

It is important to note that the data inputs did not have location indicators. Therefore, the portion of spending attributed to out-of-state attendees at PSCDA events had to be estimated. Events that catered primarily to Indiana residents (e.g., football game between two Indiana high school teams, high school graduations, Indiana business conventions) were not included in the model. We believe the spending associated with those events is not new spending but a displacement of local spending. Professional sports and national conventions were the primary events included in this analysis. We assume that all direct spending inputs would not have occurred in Indiana but for the activities occurring in the PSCDAs. Based on our assumptions, approximately 25% of all event attendees came from outside the state. We estimate that 20% of total hotel income and 3% of food and beverage purchases are attributable to out-of-state PSCDA visitors. In addition, we were unable to obtain data for some common inputs (e.g., merchandise sales and transportation costs) that are often collected from proprietary sources. We consider our estimates to be conservative as a result of not having some of those common inputs.

Conclusion

The purpose of this analysis is to understand whether or not the economic impact associated with activities in the Indiana PSCDAs leads to a tax impact that recoups the investment made by the state. The annual contribution from the state to Indiana PSCDAs is approximately $25.2 M. The model estimates suggest that the state recoups at least its $25.2 M investment from out-of-state visitor spending. Based on our inputs, spending at restaurants and hotel room nights are the largest contributors to the total economic impact. The sales tax is the largest capture from the activities that occur in the PSCDAs. In order to provide a more refined estimate, we would require detailed spending and attendance data for every event occurring in a PSCDA facility.

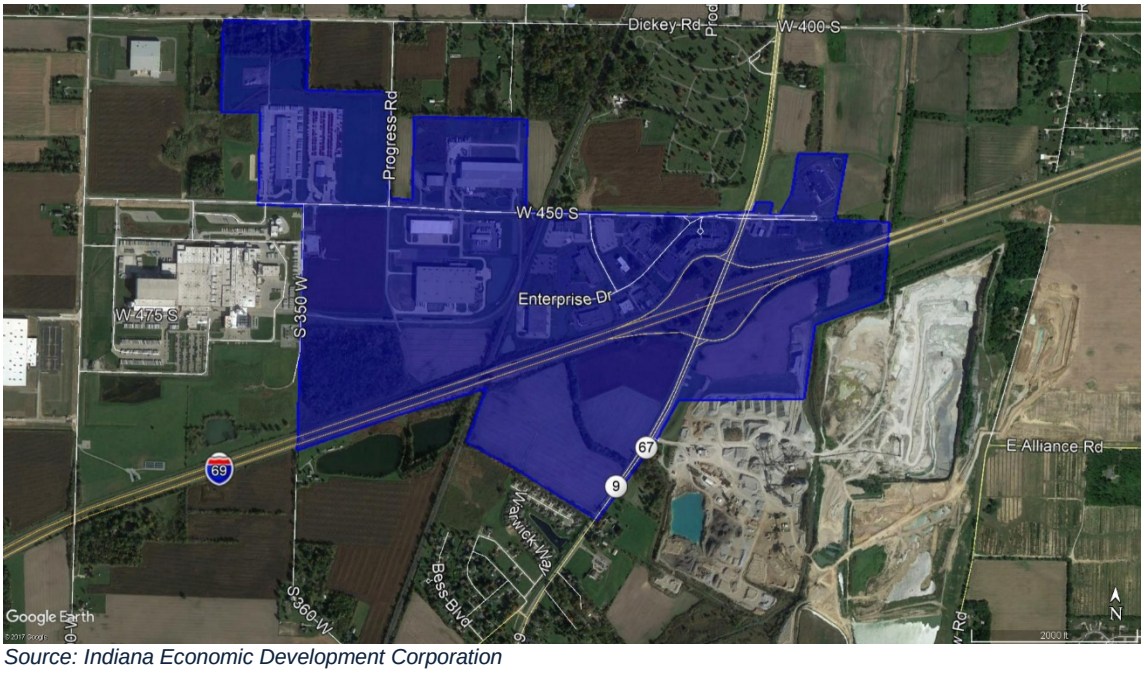
Appendix A. High-Tech Industry Taxonomy

Four-Digit Industry	Description
High-Tech Industries	
2111	Oil and Gas Extraction
2211	Electric Power Generation Transmission and Distribution
3241	Petroleum and Coal Products Manufacturing
3251	Basic Chemical Manufacturing
3252	Resin, Synthetic Rubber and Artificial Synthetic Fibers and Filaments Manufacturers
3254	Pharmaceutical and Medicine Manufacturing
3332	Industrial Machinery Manufacturing
3333	Commercial and Service Industry Machinery Manufacturing
3336	Engine, Turbine and Power Transmission Equipment Manufacturing
3341	Computer and Peripheral Equipment Manufacturing
3342	Communications Equipment Manufacturing
3343	Audio and Video Equipment Manufacturing
3344	Semiconductor and Other Electronic Component Manufacturing
3345	Navigational, Measuring, Electromedical and Control Manufacturing
3346	Manufacturing and Reproducing Magnetic and Optical Media
3353	Electrical Equipment Manufacturing
3364	Aerospace Product and Parts Manufacturing
3391	Medical Equipment and Supplies Manufacturing
4234	Professional and Commercial Equipment and Supplies Merchant Wholesalers
4236	Household Appliances and Electrical and Electronic Goods Merchant Wholesalers
4242	Drugs and Druggists Sundries Merchant Wholesalers
4861	Pipeline Transportation of Crude Oil
5112	Software Publishers
5171	Wired Telecommunications Carriers
5172	Wireless Telecommunications Carriers (except Satellite)
5174	Satellite Telecommunications
5179	Other Telecommunications
5182	Data Processing, Hosting, and Related Services
5191	Other Information Services
5211	Monetary Authorities Central Bank
5413	Architectural, Engineering, and Related Services
5415	Computer Systems Design and Related Services
5416	Management, Scientific, and Technical Consulting Services
5417	Scientific R&D Services
9241	Administration of Environmental Quality Programs
9271	Space Research and Technology
Healthcare Component	
4461	Health and Personal Care Stores
5419	Other Professional, Scientific, and Technical Services
6211	Offices of Physicians
6212	Offices of Dentists
6213	Offices of Other Health Practitioners
6215	Medical and Diagnostic Laboratories
6216	Home Health Care Services
6219	Other Ambulatory Health Care Services
6221	General Medical and Surgical Hospitals
6222	Psychiatric and Substance Abuse Hospitals
6223	Specialty (except Psychiatric and Substance Abuse) Hospitals
6231	Nursing Care Facilities (Skilled Nursing Facilities)

Source: Workforce Innovation Council

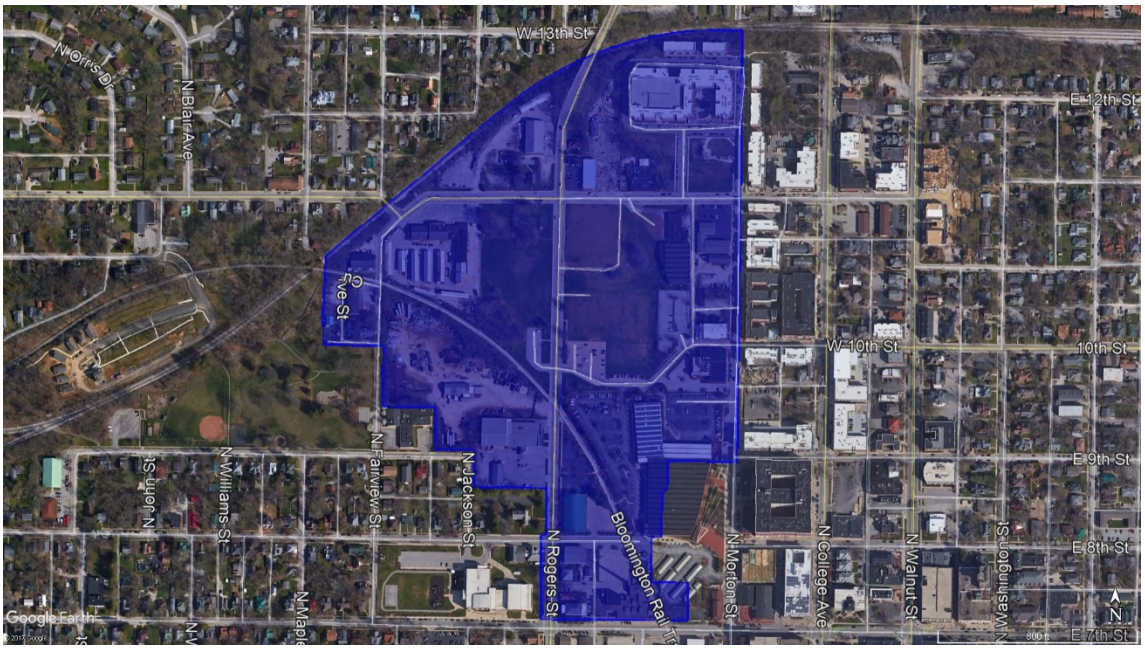
Appendix B. Certified Technology Park Maps

Anderson



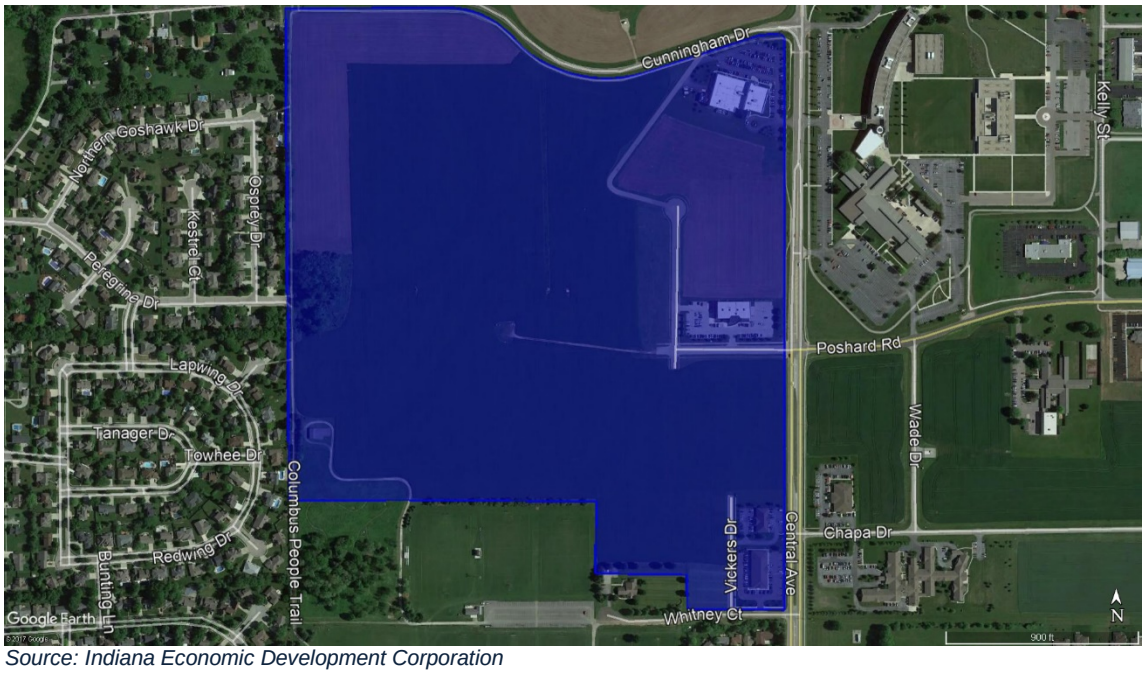
Source: Indiana Economic Development Corporation

Bloomington



Source: Indiana Economic Development Corporation

Columbus Airport

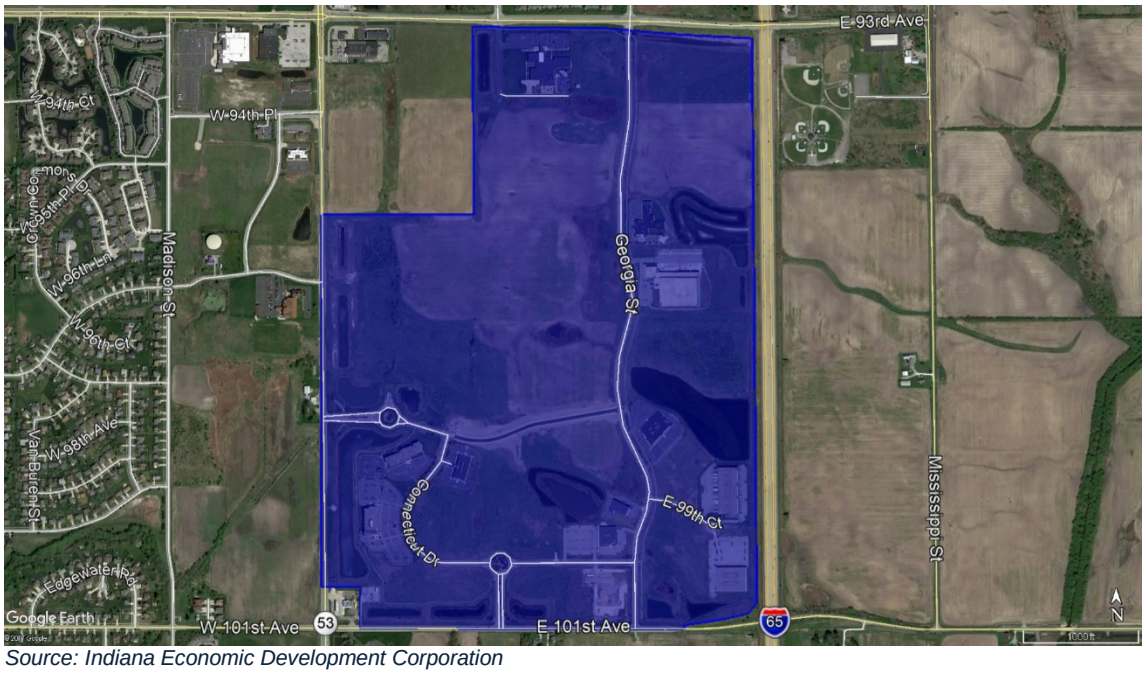


Source: Indiana Economic Development Corporation

Columbus Downtown

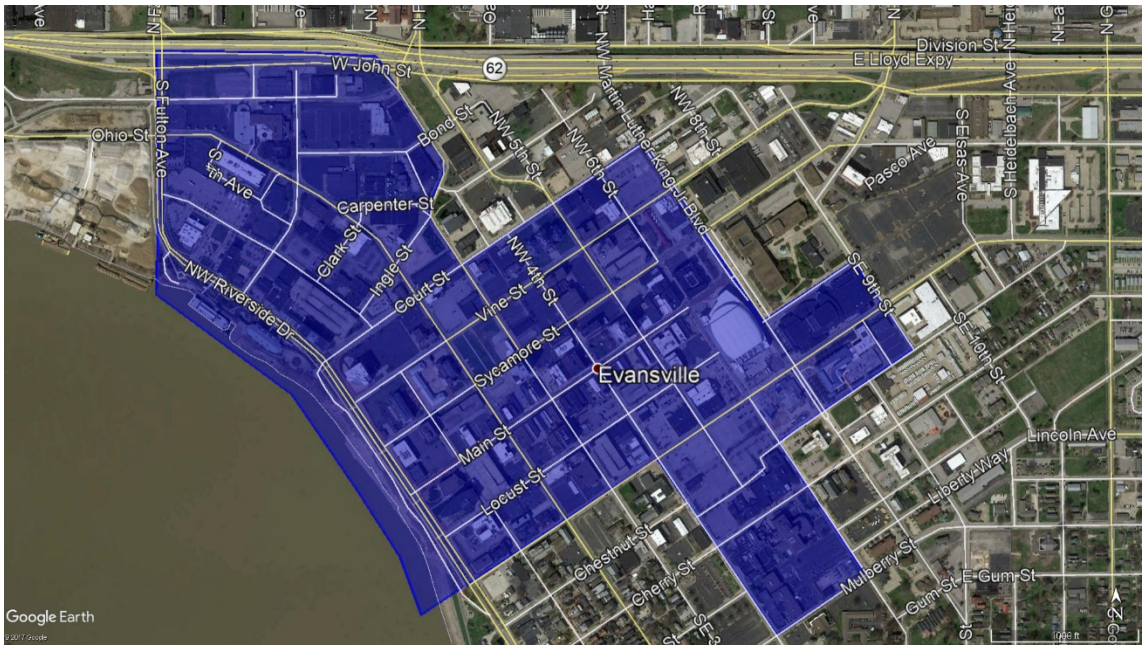
Source: Indiana Economic Development Corporation

Crown Point/Merrillville



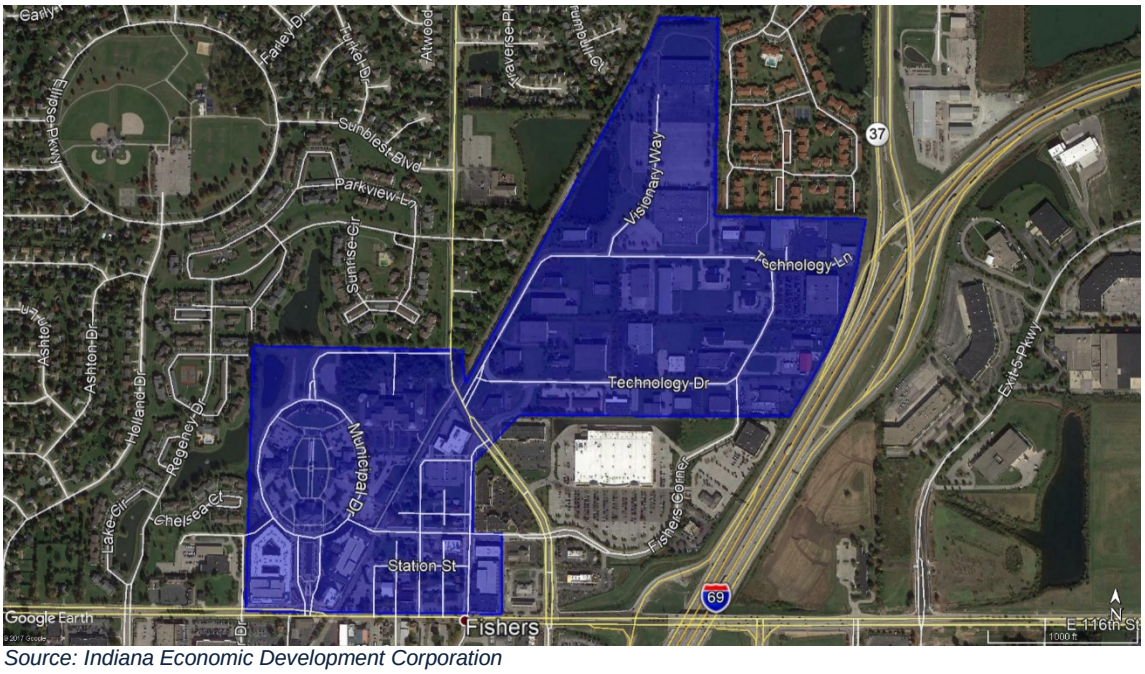
Source: Indiana Economic Development Corporation

Evansville



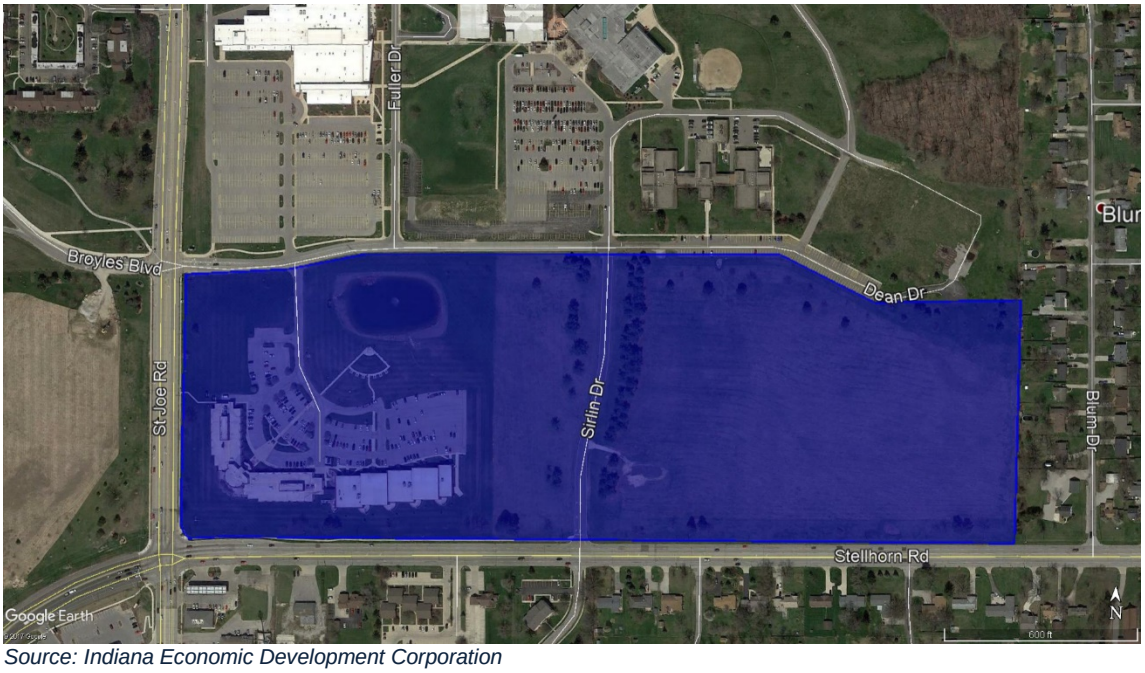
Source: Indiana Economic Development Corporation

Fishers



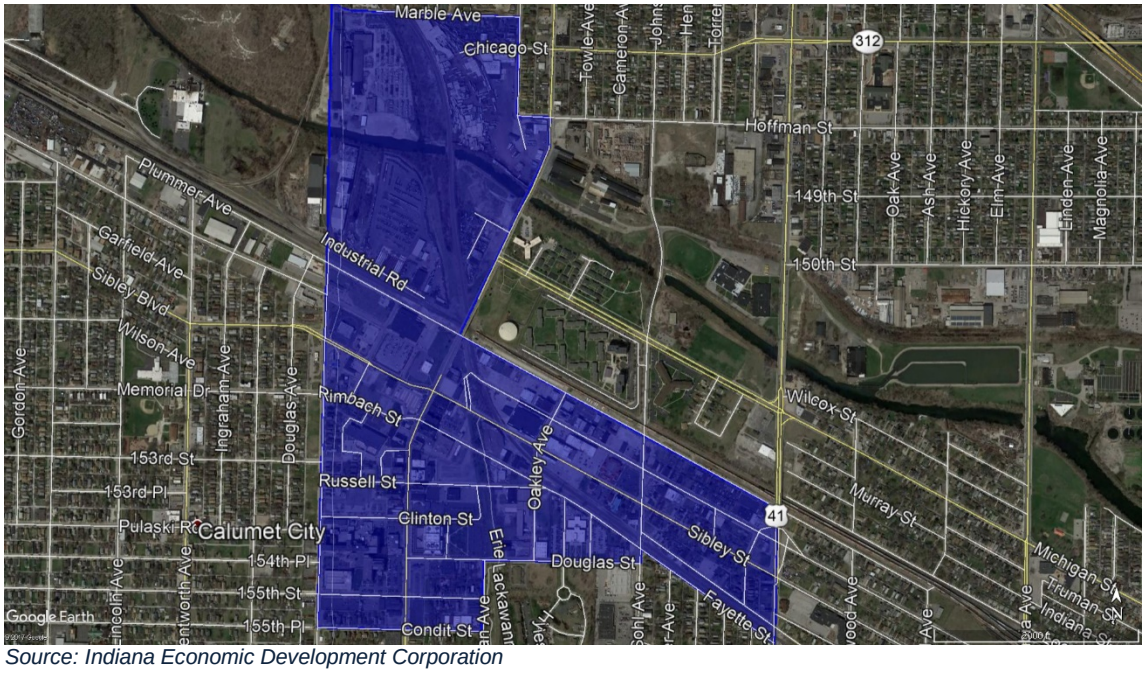
Source: Indiana Economic Development Corporation

Fort Wayne



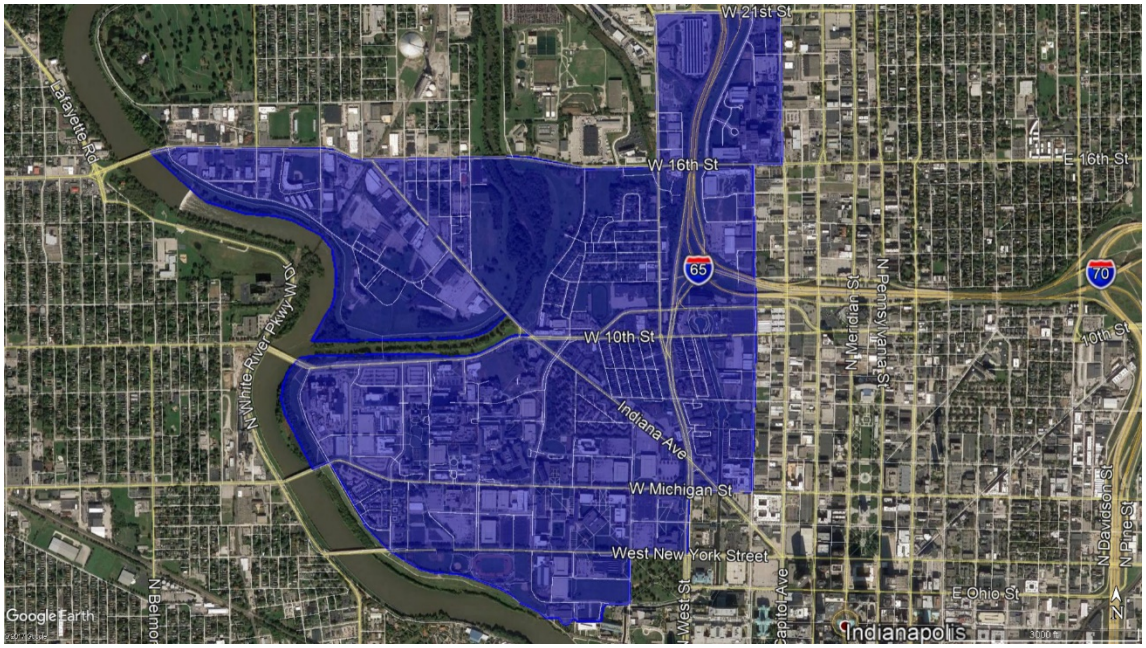
Source: Indiana Economic Development Corporation

Hammond



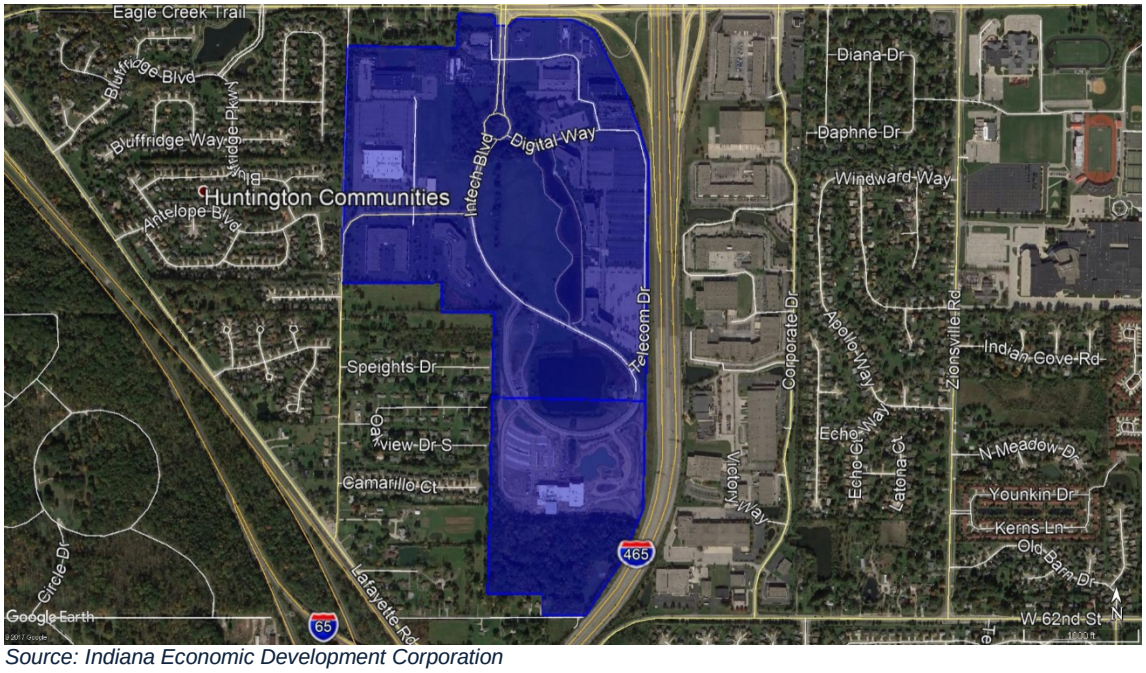
Source: Indiana Economic Development Corporation

Indianapolis Indiana University 16 Tech



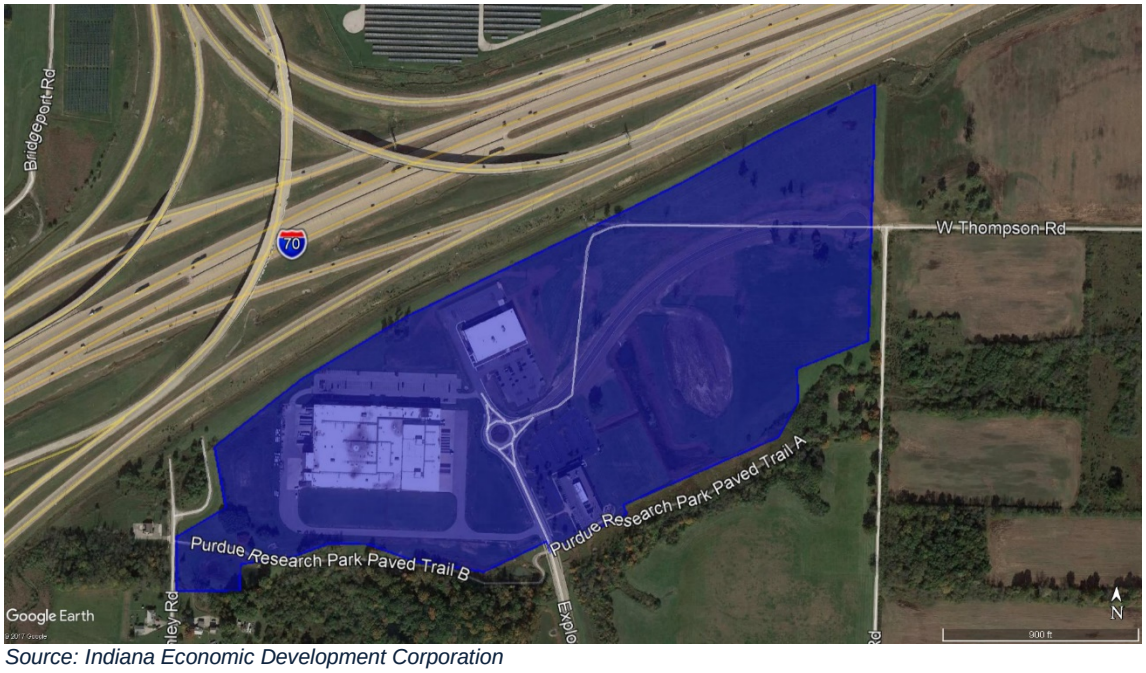
Source: Indiana Economic Development Corporation

Indianapolis Intech/Ameriplex (Intech)



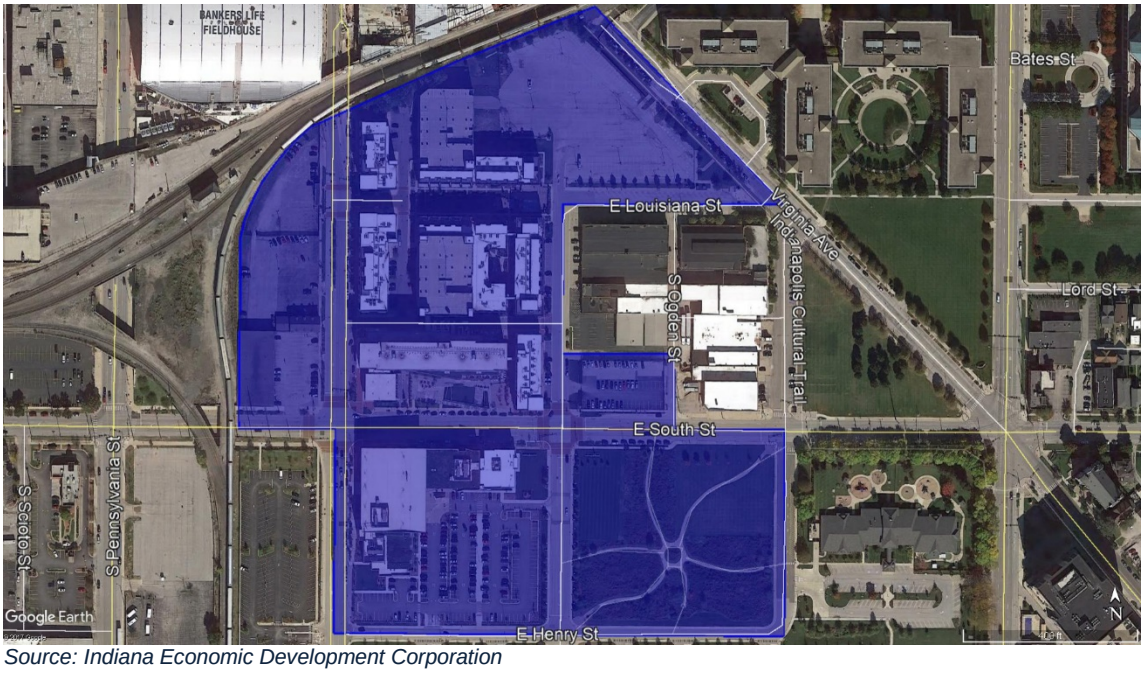
Source: Indiana Economic Development Corporation

Indianapolis Intech/Ameriplex (Ameriplex)



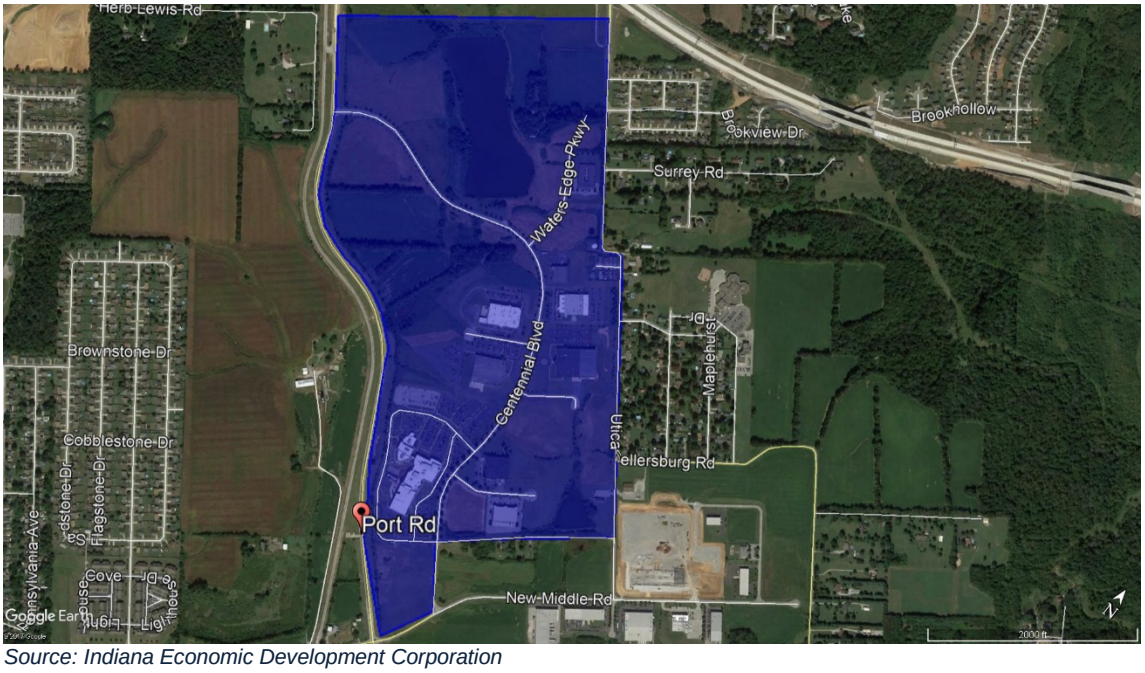
Source: Indiana Economic Development Corporation

Indianapolis CityWay (North of South)



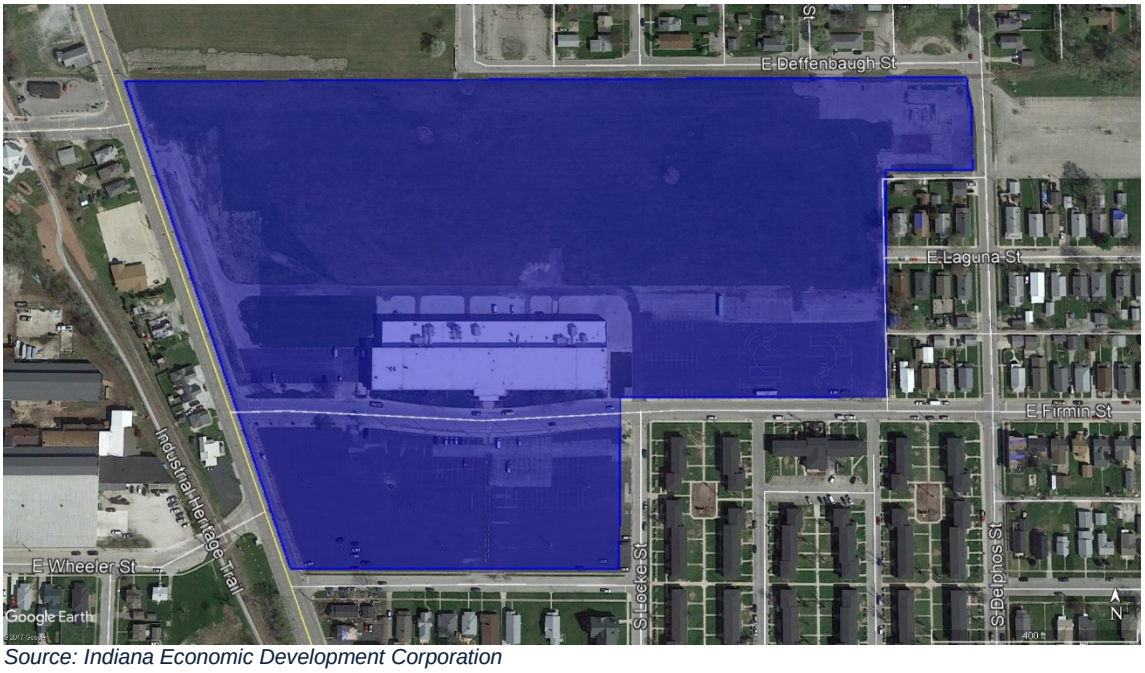
Source: Indiana Economic Development Corporation

Jeffersonville



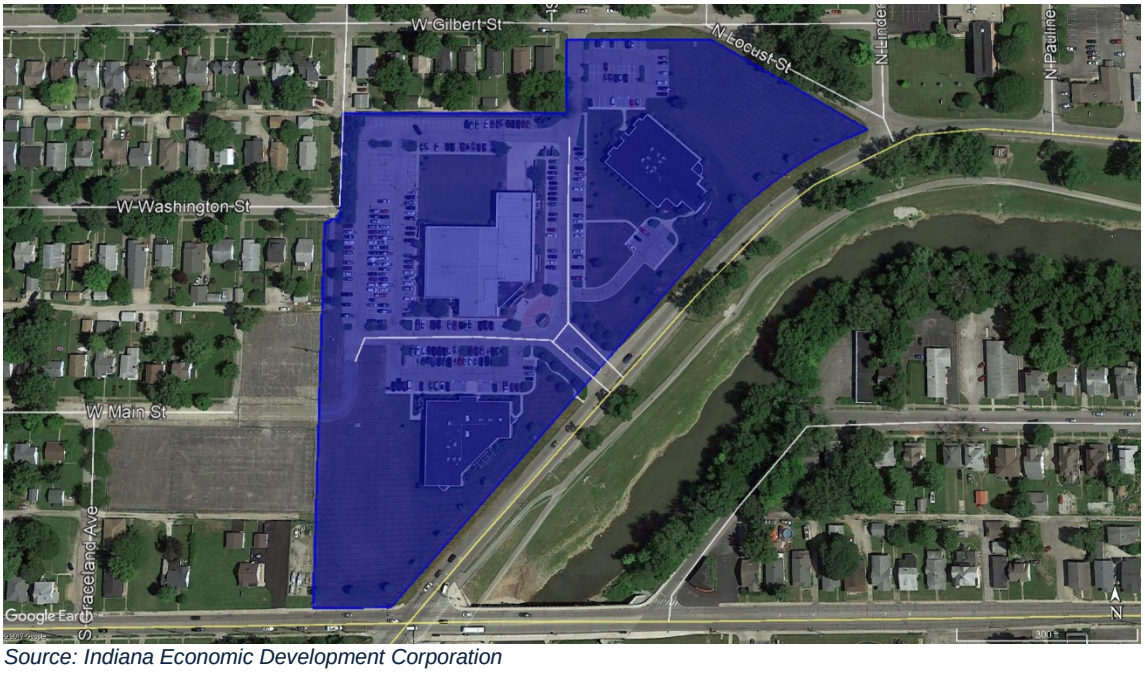
Source: Indiana Economic Development Corporation

Kokomo



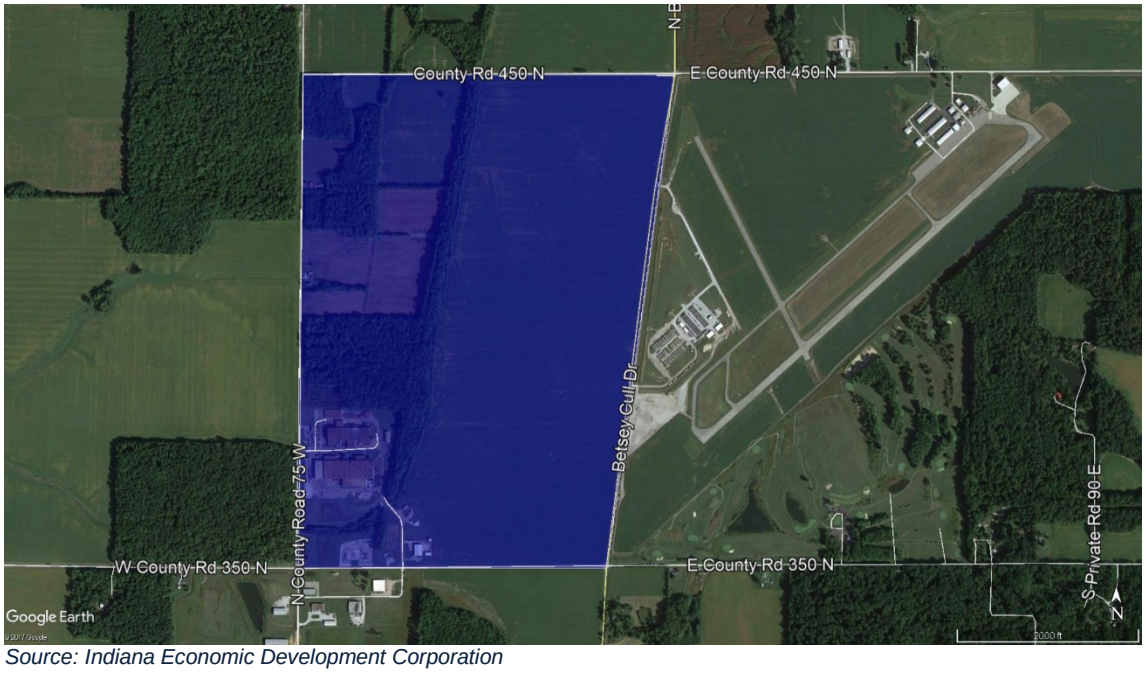
Source: Indiana Economic Development Corporation

Muncie



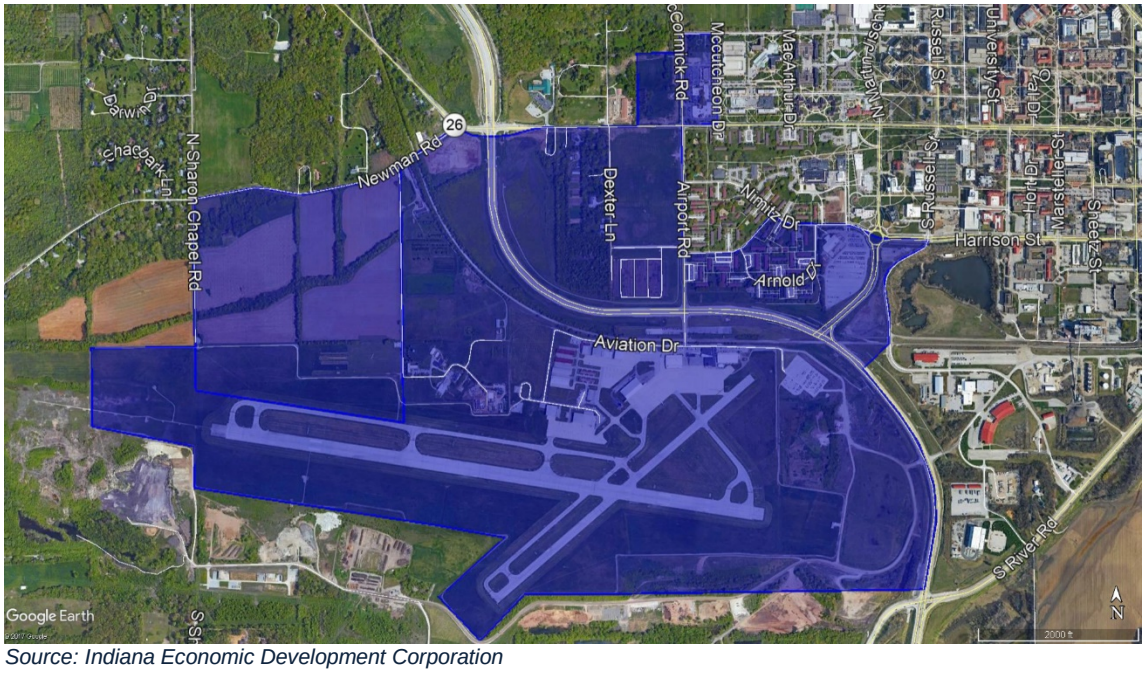
Source: Indiana Economic Development Corporation

North Vernon



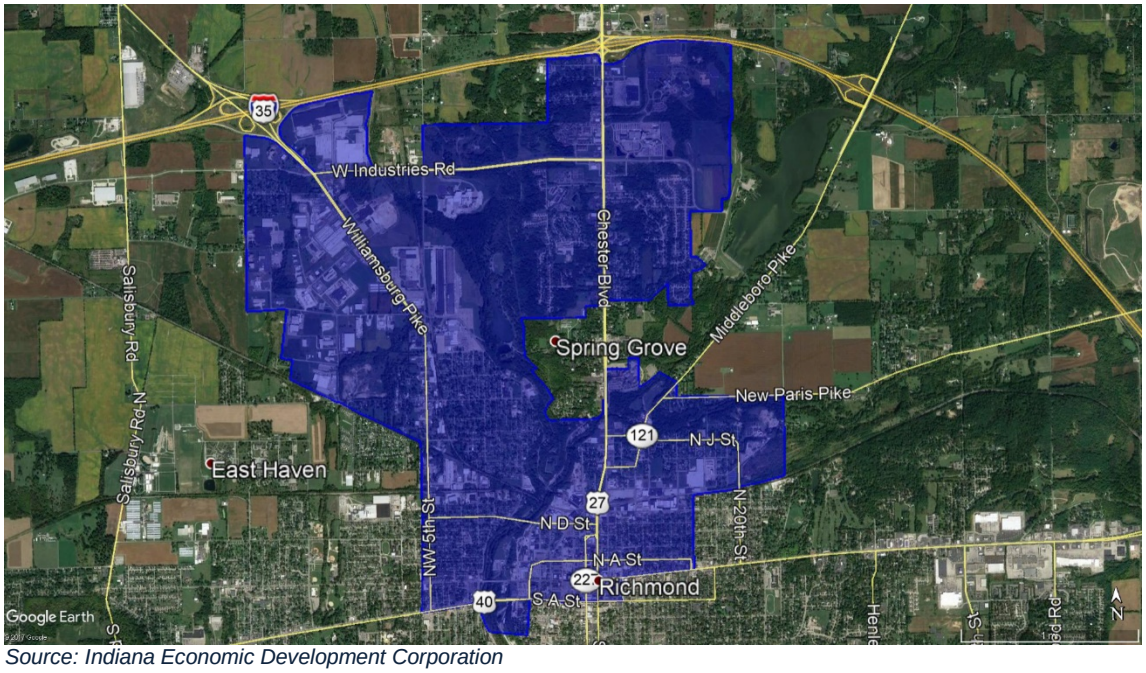
Source: Indiana Economic Development Corporation

Purdue Aerospace District



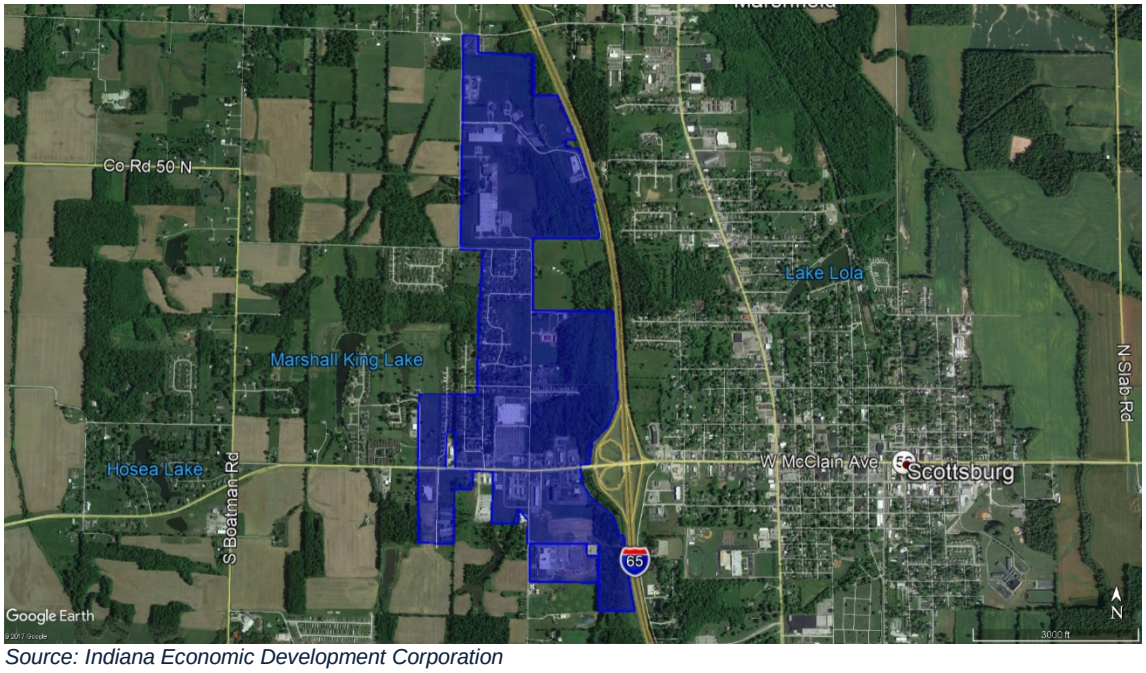
Source: Indiana Economic Development Corporation

Richmond



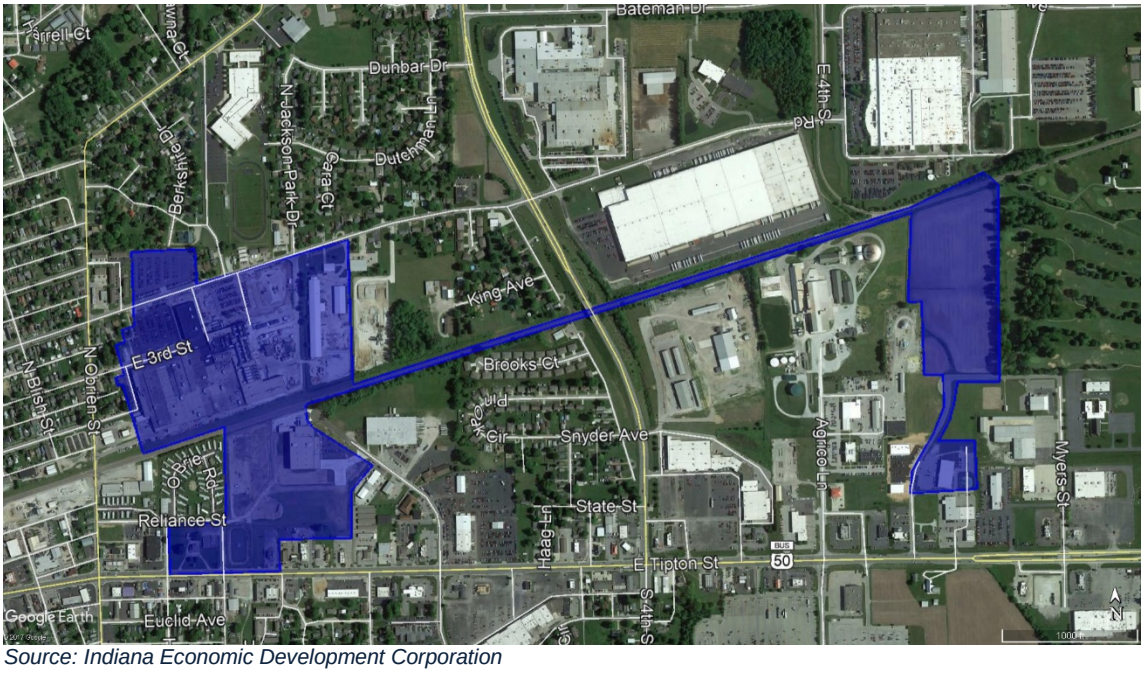
Source: Indiana Economic Development Corporation

Scottsburg



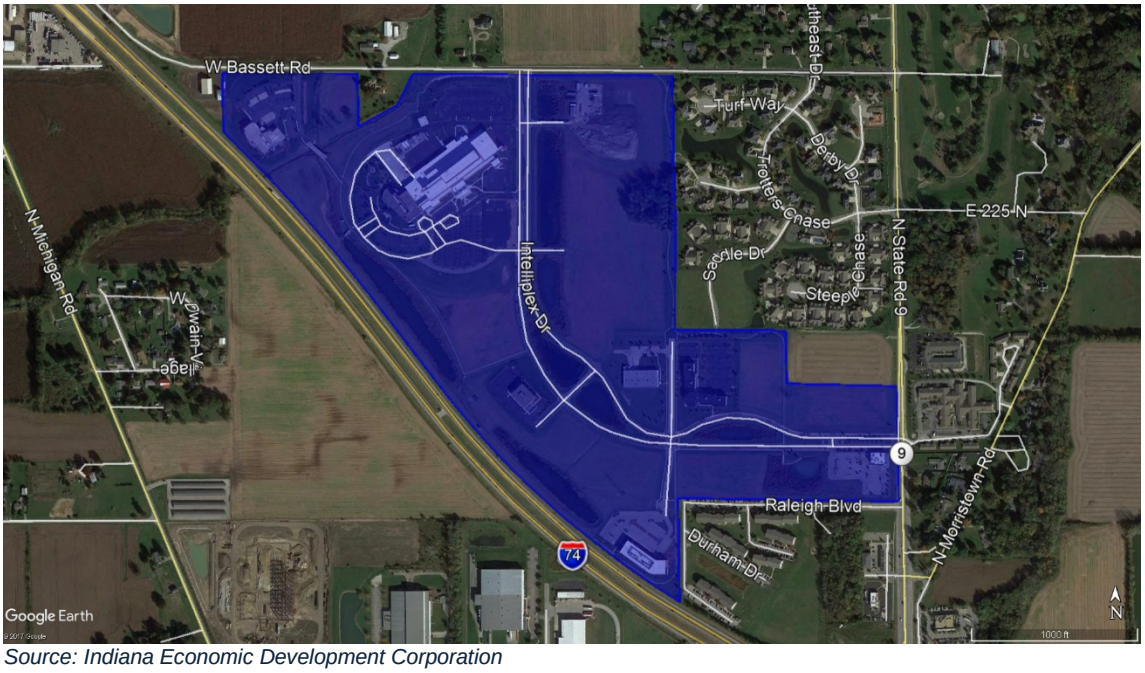
Source: Indiana Economic Development Corporation

Seymour



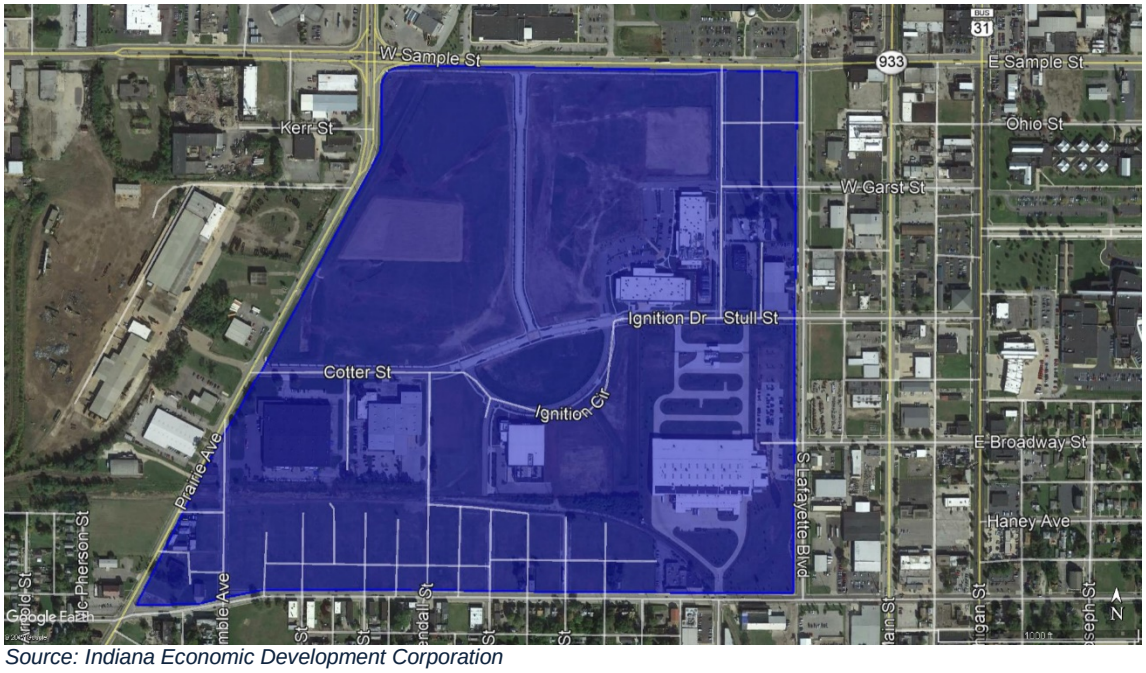
Source: Indiana Economic Development Corporation

Shelbyville



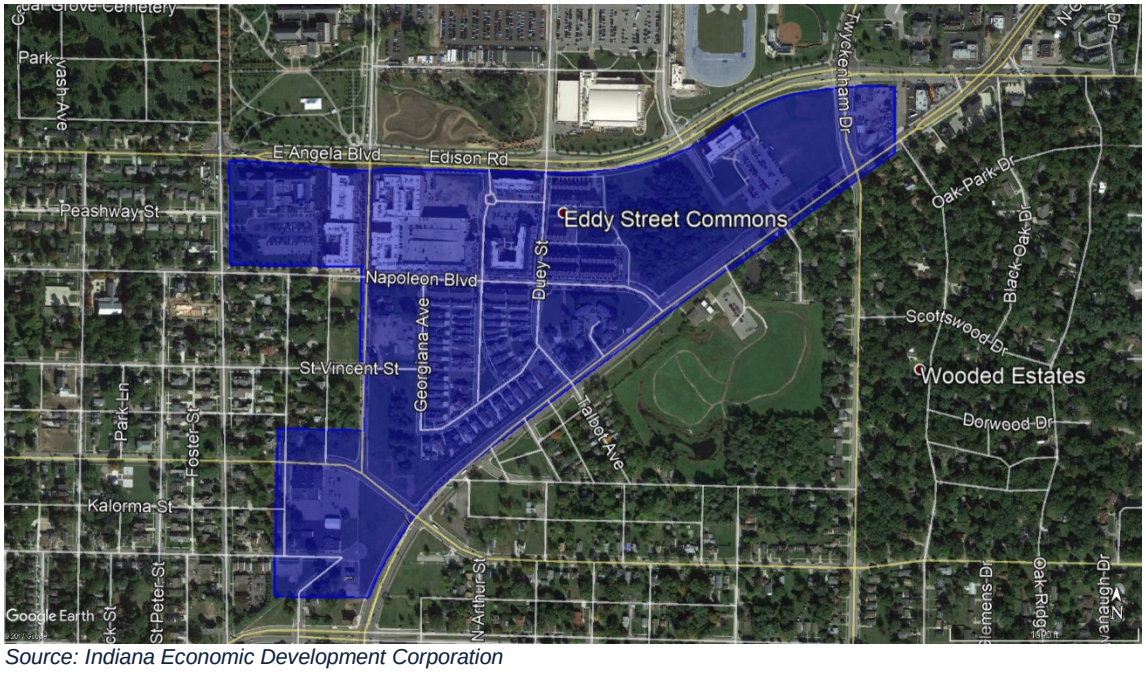
Source: Indiana Economic Development Corporation

South Bend – Ignition Park



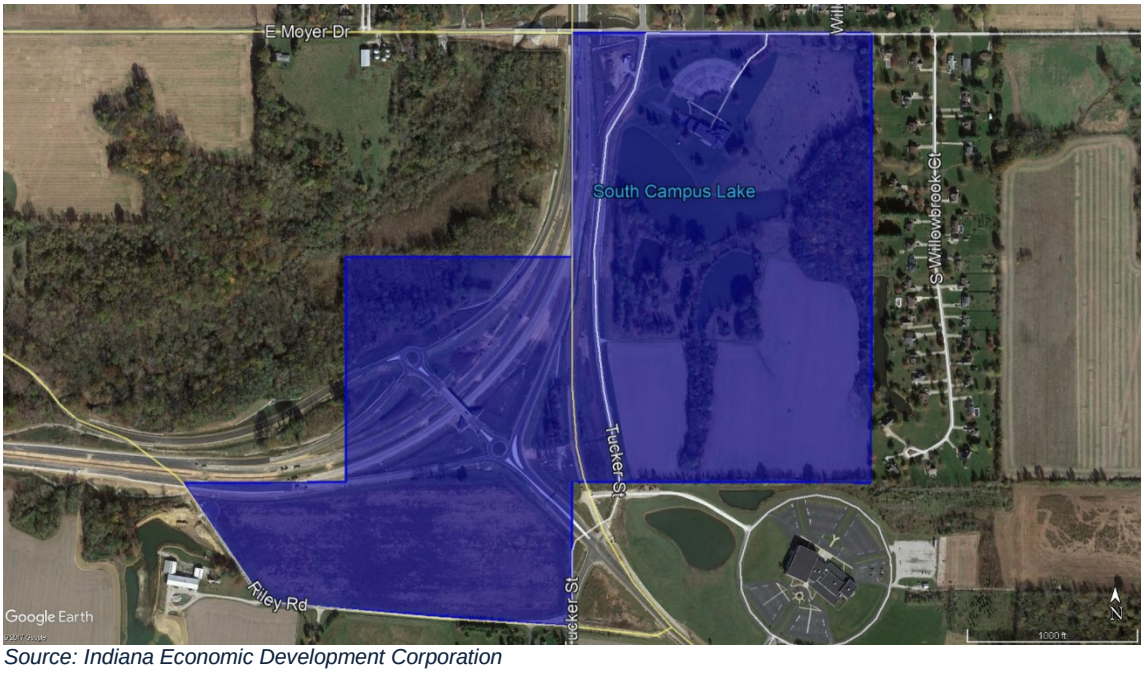
Source: Indiana Economic Development Corporation

South Bend – Innovation Park at Notre Dame



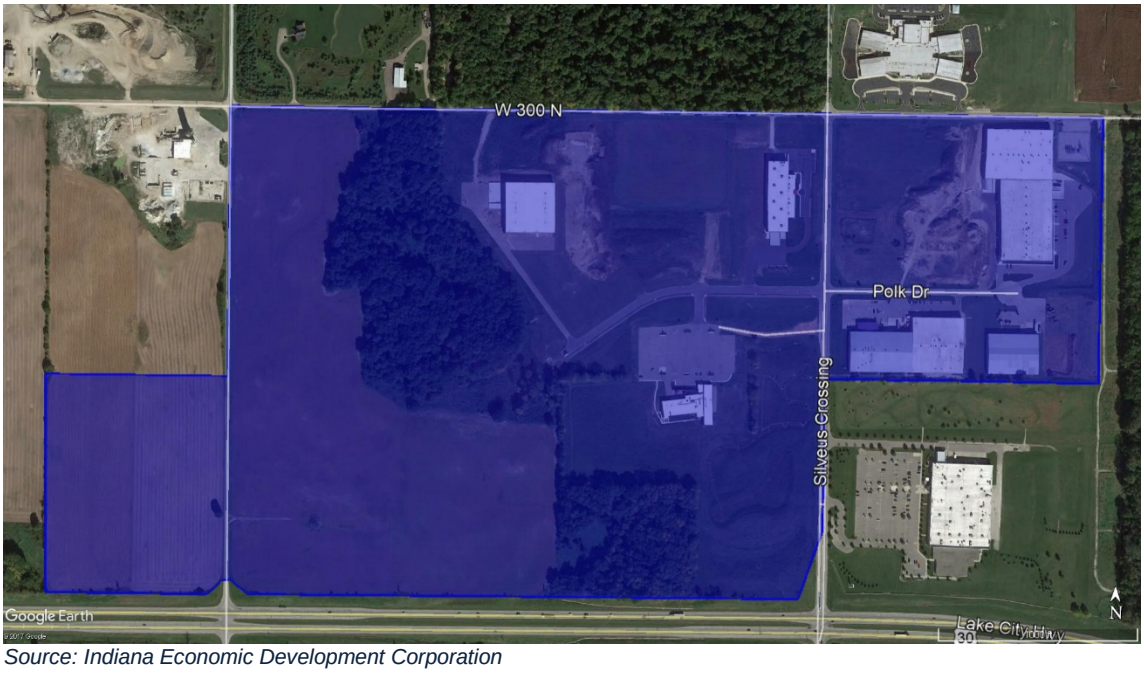
Source: Indiana Economic Development Corporation

Terre Haute



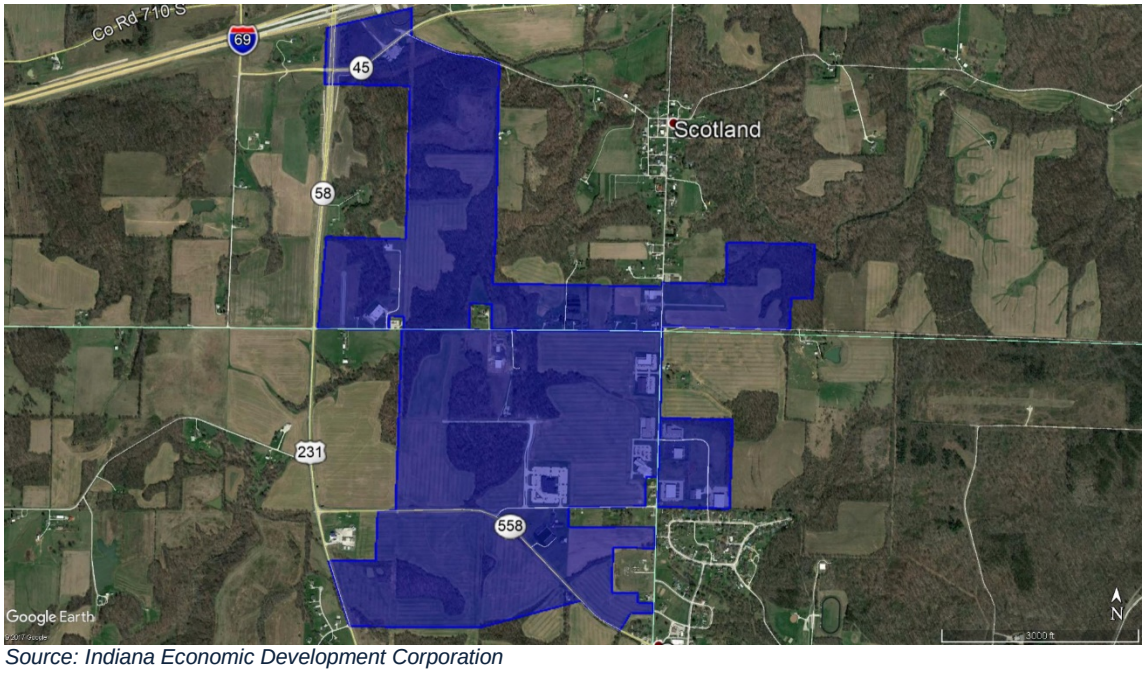
Source: Indiana Economic Development Corporation

Warsaw



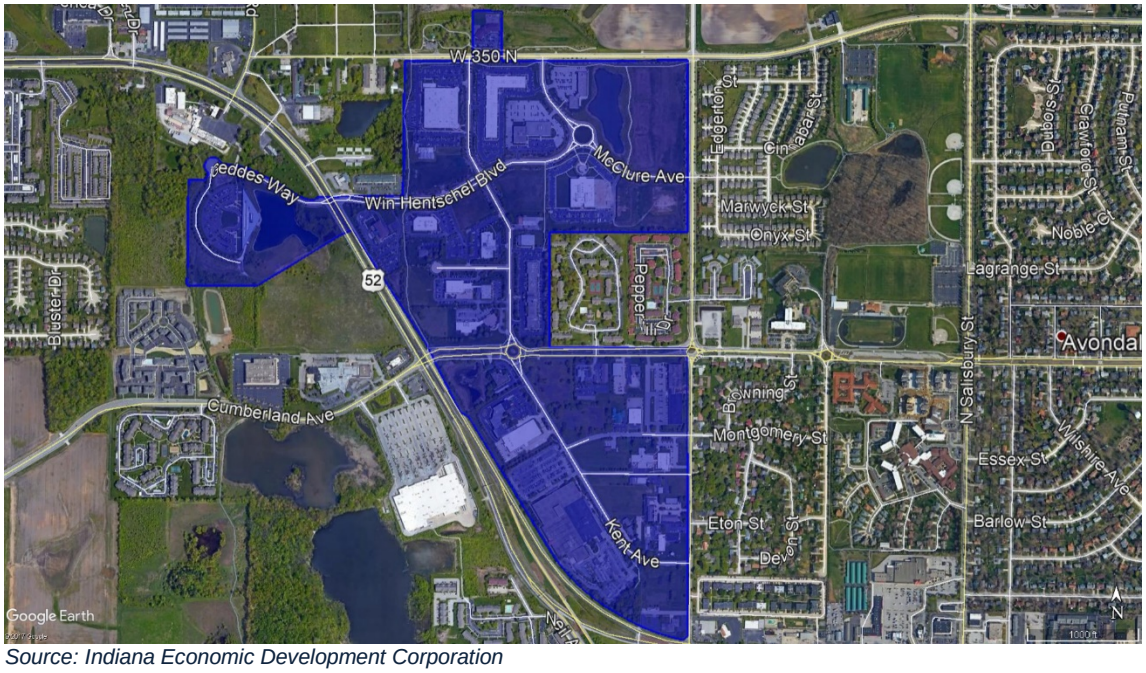
Source: Indiana Economic Development Corporation

WestGate at Crane Naval Warfare Center



Source: Indiana Economic Development Corporation

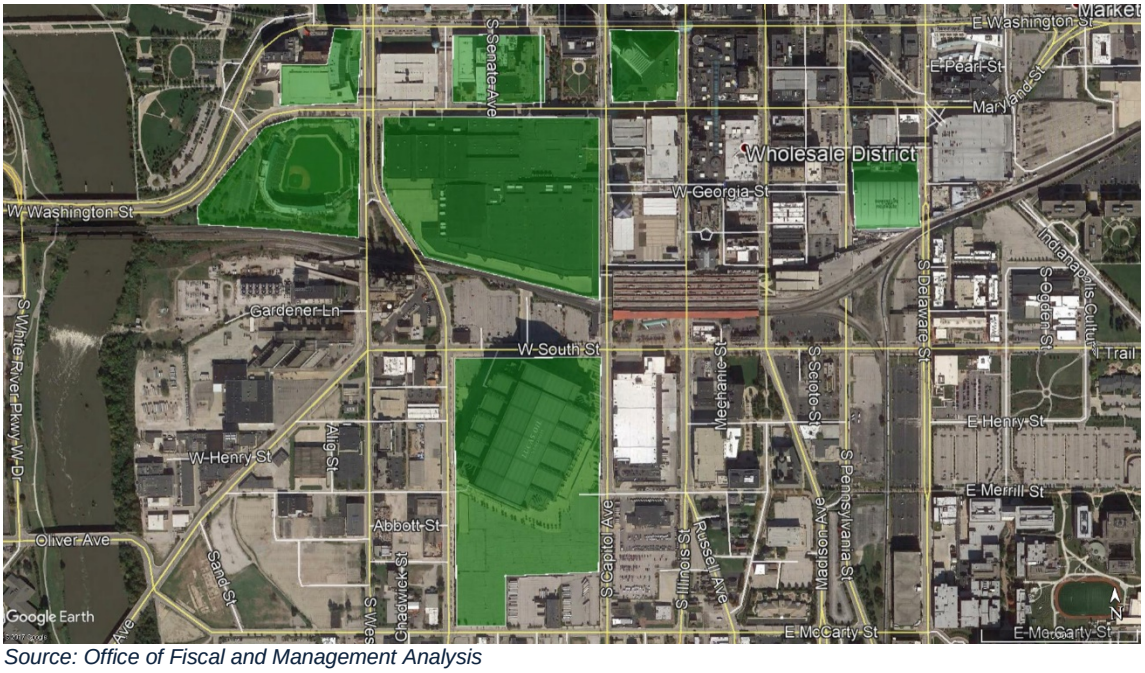
West Lafayette



Source: Indiana Economic Development Corporation

Appendix C. Professional Sports and Convention District Area Maps

Indianapolis/Marion County (Downtown)

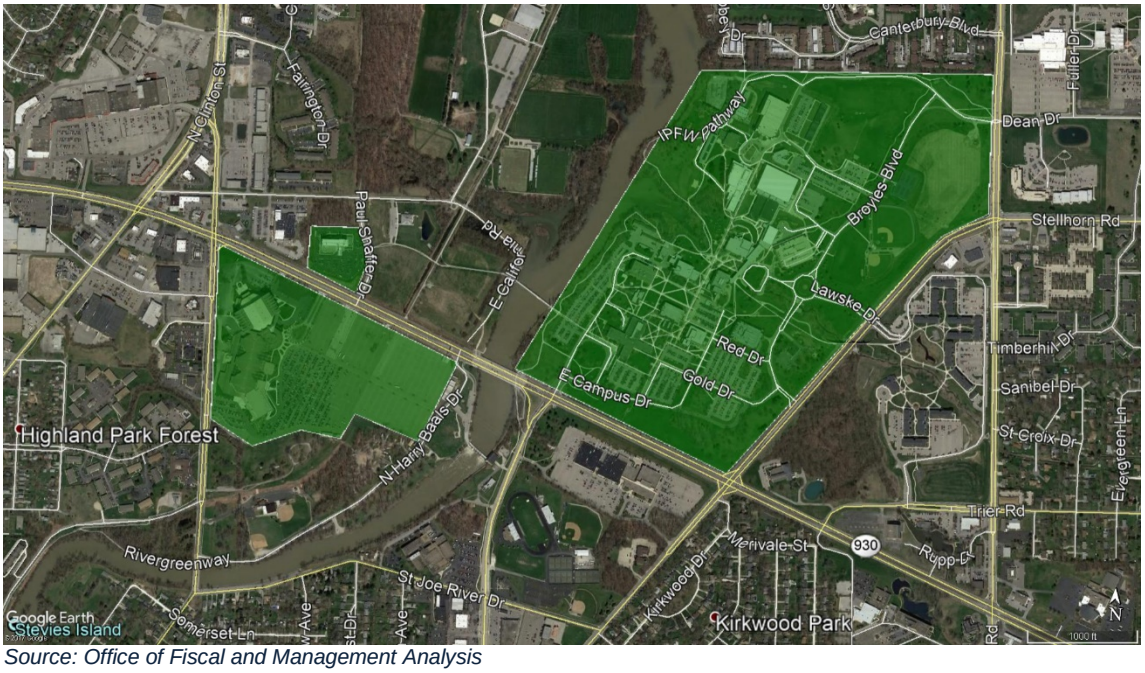


Source: Office of Fiscal and Management Analysis

Indianapolis/Marion County (Training Facility)

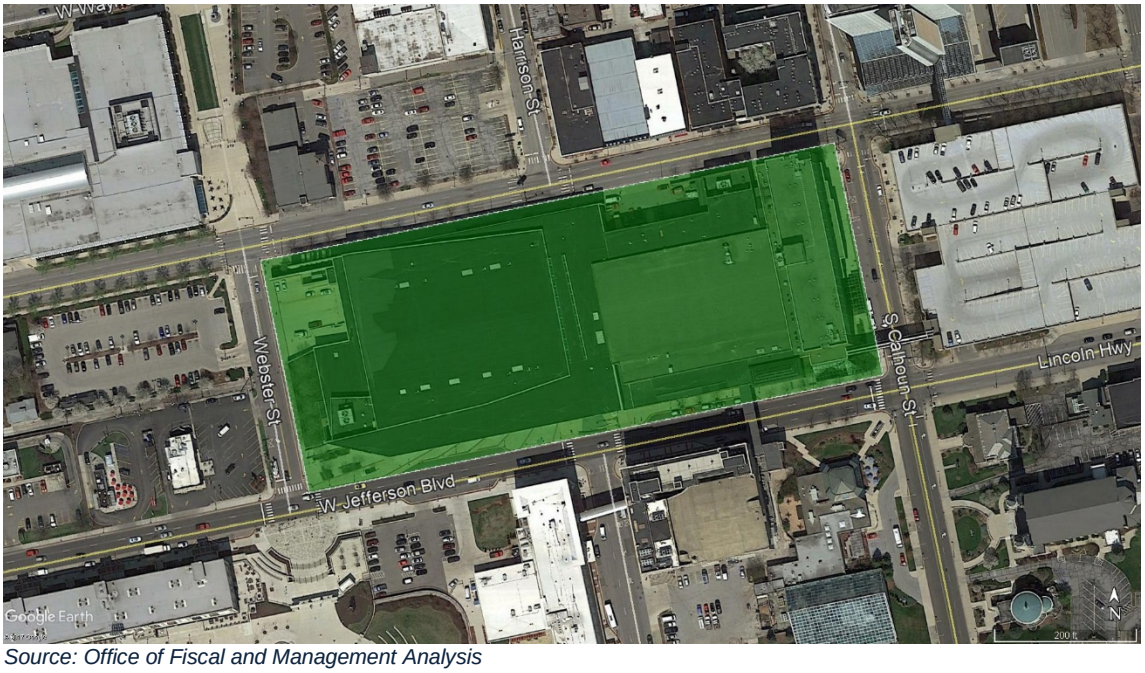
Source: Office of Fiscal and Management Analysis

Allen County (North)



Source: Office of Fiscal and Management Analysis

Allen County (Downtown)



Source: Office of Fiscal and Management Analysis

Evansville

Source: Office of Fiscal and Management Analysis

South Bend

Source: Office of Fiscal and Management Analysis

Appendix D. Tax Incentive Review Statute (IC 2-5-3.2-1)

Chapter 3.2. Review, Analysis, and Evaluation of Tax Incentives

2-5-3.2-1
Year Enacted 2014; Year Amended 2015

Sec. 1. (a) As used in this section, "tax incentive" means a benefit provided through a state or local tax that is intended to alter, reward, or subsidize a particular action or behavior by the tax incentive recipient, including a benefit intended to encourage economic development. The term includes the following:

(1) An exemption, deduction, credit, preferential rate, or other tax benefit that:

(A) reduces the amount of a tax that would otherwise be due to the state;

(B) results in a tax refund in excess of any tax due; or

(C) reduces the amount of property taxes that would otherwise be due to a political subdivision of the state.

(2) The dedication of revenue by a political subdivision to provide improvements or to retire bonds issued to pay for improvements in an economic or sports development area, a community revitalization area, an enterprise zone, a tax increment financing district, or any other similar area or district.

(b) The general assembly intends that each tax incentive effectuate the purposes for which it was enacted and that the cost of tax incentives should be included more readily in the biennial budgeting process. To provide the general assembly with the information it needs to make informed policy choices about the efficacy of each tax incentive, the legislative services agency shall conduct a regular review, analysis, and evaluation of all tax incentives according to a schedule developed by the legislative services agency.

(c) The legislative services agency shall conduct a systematic and comprehensive review, analysis, and evaluation of each tax incentive scheduled for review. The review, analysis, and evaluation must include information about each tax incentive that is necessary to achieve the goals described in subsection (b), which may include any of the following:

(1) The basic attributes and policy goals of the tax incentive, including the statutory and programmatic goals of the tax incentive, the economic parameters of the tax incentive, the original scope and purpose of the tax incentive, and how the scope or purpose has changed over time.

(2) The tax incentive's equity, simplicity, competitiveness, public purpose, adequacy, and extent of conformance with the original purposes of the legislation enacting the tax incentive.

(3) The types of activities on which the tax incentive is based and how effective the tax incentive has been in promoting these targeted activities and in assisting recipients of the tax incentive.

(4) The count of the following:

(A) Applicants for the tax incentive.

(B) Applicants that qualify for the tax incentive.

(C) Qualified applicants that, if applicable, are approved to receive the tax incentive.

(D) Taxpayers that actually claim the tax incentive.

(E) Taxpayers that actually receive the tax incentive.

(5) The dollar amount of the tax incentive benefits that has been actually claimed by all taxpayers over time, including the following:

(A) The dollar amount of the tax incentive, listed by the North American Industrial Classification System (NAICS) Code associated with the tax incentive recipients, if an NAICS Code is available.

(B) The dollar amount of income tax credits that can be carried forward for the next five (5) state fiscal years.

(6) An estimate of the economic impact of the tax incentive, including the following:

(A) A return on investment calculation for the tax incentive. For purposes of this clause, "return on investment calculation" means analyzing the cost to the state or political subdivision of providing the tax incentive, analyzing the benefits realized by the state or political subdivision from providing the tax incentive.

(B) A cost-benefit comparison of the state and local revenue foregone and property taxes shifted to other taxpayers as a result of allowing the tax incentive, compared to tax revenue generated by the taxpayer receiving the incentive, including direct taxes applied to the taxpayer and taxes applied to the taxpayer's employees.

(C) An estimate of the number of jobs that were the direct result of the tax incentive.

(D) For any tax incentive that is reviewed or approved by the Indiana economic development corporation, a statement by the chief executive officer of the Indiana economic development corporation as to whether the statutory and programmatic goals of the tax incentive are being met, with obstacles to these goals identified, if possible.

(7) The methodology and assumptions used in carrying out the reviews, analyses, and evaluations required under this subsection.

(8) The estimated cost to the state to administer the tax incentive.

(9) An estimate of the extent to which benefits of the tax incentive remained in Indiana or flowed outside Indiana.

(10) Whether the effectiveness of the tax incentive could be determined more definitively if the general assembly were to clarify or modify the tax incentive's goals and intended purpose.

(11) Whether measuring the economic impact is significantly limited due to data constraints and whether any changes in statute would facilitate data collection in a way that would allow for better review, analysis, or evaluation.

(12) An estimate of the indirect economic benefit or activity stimulated by the tax incentive.

(13) Any additional review, analysis, or evaluation that the legislative services agency considers advisable, including comparisons with tax incentives offered by other states if those comparisons would add value to the review, analysis, and evaluation.

The legislative services agency may request a state or local official or a state agency, a political subdivision, a body corporate and politic, or a county or municipal redevelopment commission to furnish information necessary to complete the tax incentive review, analysis, and evaluation required by this section. An official or entity presented with a request from the legislative services agency under this subsection shall cooperate with the legislative services agency in providing the requested information. An official or entity may require that the legislative services agency adhere to the provider's rules, if any, that concern the confidential nature of the information.

(d) The legislative services agency shall, before October 1 of each year, submit a report to the legislative council, in an electronic format under IC 5-14-6, and to the interim study committee on fiscal policy established by IC 2-5-1.3-4 containing the results of the legislative services agency's review, analysis, and evaluation. The report must include at least the following:

(1) A detailed description of the review, analysis, and evaluation for each tax incentive reviewed.

(2) Information to be used by the general assembly to determine whether a reviewed tax incentive should be continued, modified, or terminated, the basis for the recommendation, and the expected impact of the recommendation on the state's economy.

(3) Information to be used by the general assembly to better align a reviewed tax incentive with the original intent of the legislation that enacted the tax incentive.

The report required by this subsection must not disclose any proprietary or otherwise confidential taxpayer information.

(e) The interim study committee on fiscal policy shall do the following:

(1) Hold at least one (1) public hearing after September 30 and before November 1 of each year at which:

(A) the legislative services agency presents the review, analysis, and evaluation of tax incentives; and

(B) the interim study committee receives information concerning tax incentives.

(2) Submit to the legislative council, in an electronic format under IC 5-14-6, any recommendations made by the interim study committee that are related to the legislative services agency's review, analysis, and evaluation of tax incentives prepared under this section.

(f) The general assembly shall use the legislative services agency's report under this section and the interim study committee on fiscal policy's recommendations under this section to determine whether a particular tax incentive:

(1) is successful;

(2) is provided at a cost that can be accommodated by the state's biennial budget; and

(3) should be continued, amended, or repealed.

(g) The legislative services agency shall establish and maintain a system for making available to the public information about the amount and effectiveness of tax incentives.

(h) The legislative services agency shall develop and publish on the general assembly's Internet web site a multi-year schedule that lists all tax incentives and indicates the year when the report will be published for each tax incentive reviewed. The legislative services agency may revise the schedule as long as the legislative services agency provides for a systematic review, analysis, and evaluation of all tax incentives and that each tax incentive is reviewed at least once every five (5) years.

(i) This section expires December 31, 2023.

Appendix E. Tax Incentive and Incentive Program Descriptions

Corporate Income Tax/Individual Income Tax

Tax Provision	Description
21st Century Scholars Program Credit (Reviewed in 2015)	50% of contributions to the 21st Century Scholarship Support Fund. The maximum credit is $100 for individuals and $200 for joint filers. Repealed effective January 1, 2017.
Adoption Tax Credit	10% of the federal adoption tax credit claimed for the year. The maximum credit equals $1,000 per eligible child. The credit was effective beginning January 1, 2015.
Alternative Fuel Vehicle Manufacturing Investment Credit	15% of qualified investments made between 2007 and 2016 to manufacture and assemble alternative fuel vehicles. Credits are approved by the IEDC. New credits not awarded after December 31, 2016.
Coal Gasification Technology Investment Credit	10% of the first $500 M in qualified investment in an integrated coal gasification power plant (7% if the investment is in a fluidized-bed combustion unit) and 5% of the qualified investment exceeding $500 M (3% if the investment is in a fluidized-bed combustion unit). Credits are approved by the IEDC Board.
Community Revitalization Enhancement District Credit (Reviewed in 2016)	Percent of qualified investments made in these areas as approved by the IEDC Board.
Community Revitalization Enhancement District Credit (Local) (Reviewed in 2016)	Percent of qualified investments made in these areas as approved by the IEDC Board.
Earned Income Tax Credit (Reviewed in 2015)	A refundable tax credit for certain families that have a modified adjusted gross income less than $44,550. The credit amount depends on the number of qualifying children and family income. The maximum credit for 2015 was $499.
Economic Development for a Growing Economy (EDGE) Credit	Incremental income tax withholdings of new or retained employees as approved by the IEDC Board.
Enterprise Zone Employee Income Deduction (Reviewed in 2016)	The lesser of 50% of earnings or $7,500 if the individual lives and works within an enterprise zone.
Enterprise Zone Employment Expense Credit (Reviewed in 2016)	Allowed for increased employment expenditures, equal to the lesser of 10% multiplied by the increased wages or $1,500 multiplied by the number of qualified employees.
Enterprise Zone Investment Cost Credit (Reviewed in 2016)	Percent of qualified investment approved by the IEDC in a business located in an enterprise zone.
Enterprise Zone Loan Interest Credit (Reviewed in 2016)	Allowed for interest received from qualified loans.
Headquarters Relocation Credit	Up to 50% of the costs incurred by an eligible business to relocate its headquarters, division or subdivision principal office, or research center to Indiana.
Historic Rehabilitation Credit (Reviewed in 2015)	20% of qualified expenditures as approved by the DNR. The maximum statewide credit may not exceed $450,000 annually. New credits may not be awarded after June 30, 2016.
Home Insulation Deduction (Reviewed in 2014)	Up to $1,000 for the purchase and installation of home insulation, weather stripping, storm doors, storm windows, and double-pane windows. Repealed effective January 1, 2016.

Tax Provision	Description
Hoosier Business Investment Credit	Up to 10% of qualified nonlogistics business investments directly related to expanding the workforce in Indiana, not to exceed the taxpayer's state tax liability. For logistics investments, the credit equals 25% of the additional qualified investment made during the taxable year. The total nonlogistics credit for all taxpayers is capped at $10 M per year, while the total logistics credit for all taxpayers is capped at $50 M per year. Credits are approved by the IEDC Board..
Indiana 529 College Savings Account Contribution Credit (Reviewed in 2015)	20% of annual contributions to an Indiana College Choice 529 investment plan savings account. The maximum credit per taxpayer is $1,000.
Indiana Colleges and Universities Contribution Credit (Reviewed in 2015)	50% of contributions to institutions of higher education, up to $100 ($200 if filing a joint return).
Indiana Partnership Long-Term Care Insurance Premiums Deduction (Reviewed in 2014)	Amount of premiums paid during the year on a qualified long-term care policy.
Individual Development Accounts Credit (Reviewed in 2015)	50% of the amount contributed to a fund if the contribution is not less than $100 and not more than $50,000.
Industrial Recovery Credit	Percent of qualified investments as approved by the IEDC Board.
Natural Gas-Powered Vehicles	50% of the difference between the price of the qualified vehicle and a similar vehicle that is powered by a gasoline or diesel engine, up to $15,000. The maximum credit per taxpayer is $150,000 per taxable year. The total amount of credits per year may not exceed the lesser of $3 M or the sales tax revenue attributable to natural gas fuel used in providing public transportation.
Neighborhood Assistance Credit (Reviewed in 2014)	50% of contributions to approve projects that assist economically disadvantaged areas or to employ, train, or provide technical assistance to people who reside in these areas. The maximum credit is $25,000. Total tax credits statewide may not exceed $2.5 M in a fiscal year.
Patent-Derived Income Deduction	Up to $5 M in income from plant or utility patents issued beginning in 2008 to businesses or organizations domiciled in Indiana.
Research Expense Credit	For certain qualified research expenses incurred.
Residential Historic Rehabilitation Credit (Reviewed in 2015)	20% of qualified expenditures as approved by DNR for the preservation or rehabilitation of the taxpayer's principal residence. The maximum statewide credit may not exceed $250,000 annually.
School Scholarship Contribution Credit (Reviewed in 2015)	50% of contributions to nonprofit K-12 school scholarship-granting organizations. Total tax credits may not exceed $7.5 M in FY 2015, $8.5 M in FY 2016, and $9.5 M each fiscal year thereafter.
Solar-Powered Roof Vent/Fan Installation Deduction (Reviewed in 2014)	Up to $1,000 deduction if a solar-powered roof vent or fan is installed on a building owned or leased by the taxpayer. Repealed effective January 1, 2016.
Special Rate for Income Derived Inside a Military Base	Rate is 5% of AGI that is derived from sources within a qualified area if the corporation locates its operations in the qualified area. Special rate applies during the year in which the corporation located in that area and the four succeeding years.
Venture Capital Investment Credit	20% of annual qualified venture capital investment up to $1 M. Total new credits awarded may not exceed $12.5 M annually.

Sales Tax

Tax Provision	Description
Aircraft Parts	Materials, parts, equipment, and engines used in the repair, maintenance, refurbishment, remodeling, or remanufacturing of an aircraft or avionics system of an aircraft.
Aviation Fuel	Aviation gasoline, jet fuel, and fuel used as a substitute for aviation gasoline or jet fuel.
Cargo Trailers/RVs Sold to Certain Nonresidents	Sales of RVs and trailers to a resident of another state that has a reciprocal exemption.
Certain Aircraft	Aircraft purchased for rental or leasing if the annual amount of gross lease revenue is greater than or equal to 7.5% of the book value or net acquisition price. Any aircraft rented or leased for predominant use in public transportation. Aircraft sold to a person who is not an Indiana resident.
Certain Racing Equipment	Tangible personal property that comprises any part of a professional motor racing vehicle or a two-seater Indianapolis 500-style race car, excluding tires and accessories.
Research and Development Property	Tangible personal property that has not previously been used in Indiana for any purpose and is acquired for the purpose of experimental laboratory R&D for new products, new uses of existing products, or improving or testing existing products.

Property Tax

Tax Provision	Description
Aircraft Deduction	Aircraft that seat up to 90 passengers or that are used to transport only property. The aircraft must be owned by a taxpayer with an Indiana corporate headquarters or its subsidiary. The deduction equals 100% of the property's AV.
Brownfield Revitalization Zone Deduction	The designating body may grant a 3-, 6-, or 10-year abatement for real and personal property located in a brownfield revitalization zone. The deduction equals the increase in the property's AV multiplied by a percentage based on year and duration.
Certified Technology Park Deduction	Personal property located in a certified technology park and used to conduct high-technology activity. The deduction equals 100% of the property's AV. The term of two to ten years is determined by the county fiscal body.
Coal Combustion Product Deduction	Building designed and constructed to use qualified materials throughout the building. Qualified materials must consist of at least 60% coal combustion products by weight. The deduction is available for three years and equals 5% of the building's AV.
Deduction for Purchases of Investment Property by Manufacturers of Recycled Components	Personal property used to manufacture recycled components composed of at least 15% coal combustion waste generated in Indiana. The deduction equals 15% of the investment property's AV only in the first year that the investment property is subject to assessment.
Enterprise Zone Investment Deduction	Qualified investments including buildings, manufacturing or production equipment, retooling, and infrastructure within an enterprise zone. The deduction equals the increase in AV of the enterprise zone property as compared to the AV in the base year.
Enterprise Zone Obsolescence Deduction (Marion County)	Newly purchased real property in an enterprise zone in Marion County if an obsolescence depreciation adjustment was allowed for the property in the year preceding the year in which the owner purchased the property. The deduction equals the amount of the former owner's obsolescence adjustment multiplied by 100% in year one, 75% in year two, 50% in year three, and 25% in year four.
Geothermal Energy Heating or Cooling Device Deduction	Real property or mobile home equipped with geothermal heating, cooling, hot water, or electricity production. The deduction equals the device's AV.
Hydroelectric Power Device Deduction	Real property or mobile home equipped with a hydroelectric power device. The deduction equals the device's AV.
Infrastructure Development Zone Deduction	Gas storage, transmission, and distribution facilities; broadband and advanced service transmission facilities; and water treatment, storage, and distribution facilities in an infrastructure development zone. Eligible property in the zone is 100% exempt.
Intrastate Aircraft Deduction	Aircraft used for service between qualifying Indiana airports that seat at least nine passengers or that are used to transport only property. The deduction equals 100% of the property's AV.
Low-Income Housing Exemption (Reviewed in 2015)	All or part of real property is exempt from property taxation if (1) the improvements on the real property were constructed, rehabilitated, or acquired for the purpose of providing housing to income-eligible persons, (2) the property is subject to an extended use agreement, and (3) the property owner has entered into an agreement to make payments in lieu of taxes.
Marine Opportunity District Deduction	New manufacturing equipment installed in a maritime opportunity district. The deduction equals 100% of AV in years 1 to 6; 95% in year 7, 80% in year 8, 65% in year 9, and 50% in year 10. The deduction may not reduce a taxpayer's total personal property net assessment in the first year below the previous year's net assessment. The deduction is subject to approval by Ports of Indiana.

Tax Provision	Description
Personal Property Abatements in an Economic Revitalization Area	New manufacturing, R&D, logistical distribution, and information technology equipment located in an economic revitalization area. The local designating body determines the length of the deduction from 1 to 10 years. The designating body must specify an abatement schedule.
Real Property Abatements in an Economic Revitalization Area	Improvements made to real property located in an economic revitalization area. The local designating body determines the length of the deduction from 1 to 10 years. The designating body must specify an abatement schedule.
Rehabilitated Property Deduction (Reviewed in 2015)	Buildings and structures at least 50 years old if the owner paid at least $10,000 for the rehabilitation. The deduction is available for five years and equals 50% of the increase in AV (limited to $124,800 for a single-family dwelling or $300,000 for other property).
Rehabilitated Residential Property Deduction (Reviewed in 2015)	Residential real property that has been rehabilitated. The pre-rehabilitation AV may not exceed $37,440 for a single-family dwelling, $49,920 for a two-family dwelling, or $18,720 per unit if more than two dwelling units. The deduction is available for five years and equals the increase in AV (limited to $18,720 per rehabilitated unit).
Resource Recovery Systems Deduction	Tangible property directly used to dispose of solid waste or hazardous waste by converting it into energy or other useful products. The deduction equals 95% of the system's AV. This deduction currently applies to only one property, located in Marion County.
Resource Recovery/Coal or Oil Shale System Deduction	Tangible property used to convert coal into a gaseous liquid fuel or charcoal. The deduction equals 95% of the system’s AV multiplied by the fraction (Indiana coal converted/total coal converted).
Solar-Energy Systems Deduction	Real property or mobile home equipped with solar energy heating or cooling system. The deduction equals system's cost.
Wind-Powered Devices Deduction	Real property or mobile home equipped with wind-powered equipment designed to provide mechanical energy or produce electricity. The deduction equals the device's AV.

Other

Tax Provision	Description
Certified Technology Park	Special zones established by local units that capture state and local tax revenue for high-technology business development in the zones.
Community Revitalization Enhancement Districts (Reviewed in 2016)	Special district established by local units that may capture state and local tax revenue for development purposes in the districts.
Enterprise Zones (Reviewed in 2016)	Special zone established by municipal units where tax incentives are provided for development in the zones.
Lower Rates for Smaller Riverboats	Special lower wagering tax rates for riverboat casinos that generate less than $75 million in annual gross revenue.
Motorsports Investment District	Geographic area including the Indianapolis Motor Speedway. Revenue is captured from certain incremental sales tax, individual income tax, and admissions fee revenue.
Professional Sports Development Areas	Special areas established by local units that may capture state and local tax revenue for sports and convention development purposes in the areas.
Promotional Free-Play Deduction	Wagering tax deduction for wagers made by casino patrons using noncashable vouchers, coupons, electronic credits, or electronic promotions provided by the casino.
Tax Increment Financing (Reviewed in 2015)	Special district established by local units that capture incremental property tax revenue for development purposes in the districts.

References

Ady, R. M. (1997). Discussion of papers by Ronald Fisher and Michael Wasylenko. *New England Economic Review*, 77-83.

Agha, N. (2013). The Economic Impact of Stadia and Teams: The. *Journal of Sports Economics*, 227-252.

Allen County. (2017, February 28). *Allen County, Indiana, Cash & Investments Combined Statement - 2016.* Retrieved from Indiana Gateway for Government Units: https://gateway.ifionline.org/report_builder/

Alm, J., & Rogers, J. (2011). Do state fiscal policies affect state economic growth? *Public Finance Review, 39*(4), 483-526.

Alstadsæter, A., Barrios, S., Nicodeme, G., Skonieczna, A. M., & Vezzani, A. (2015). *Patent boxes design, patents location and local R&D.* European Commission's Directorate-General for Taxation and.

Anderson Economic Group. (2017). *2017 State Business Tax Burden Rankings.* Chicago: Anderson Economic Group. Retrieved from http://www.AndersonEconomicGroup.com

Anderson, J. E., & Wassmer, R. W. (1995). The decision to 'bid for business': Municipal behavior in granting property tax abatements. *Regional Science and Urban Economics, 25*(6), 739-757.

Anderson, J. E., & Wassmer, R. W. (2000). *Bidding for business: The efficacy of local economic development incentives in a metropolitan area.* WE Upjohn Institute.

Antras, P. a. (2004). Is the US Aggregate Production Function Cobb-Douglas? New Estimates of the Elasticity of Substitution. *Contributions to Macroeconomics*, 1-34.

Arrow, K. J., Chenery, H. B., Minhas, B. S., & Solow, R. M. (1961). Capital-Labor Substitution and Economic Efficiency. *The Review of Economics and Statistics*, 225-250.

Atkinson, R. D. (2007). Expanding the R&E Tax Credit to Drive Innovation, Competitiveness and Prosperity. *The Journal of Technology Transfer, 32*(6), 617-628.

Baade, R. A. (1996). Professional sports as catalysts for metropolitan economic development. *Journal of Urban Affairs, 18*(1), 1-17.

Baily, M. N., & Lawrence, R. Z. (1987). *Tax policies for innovation and competitiveness.*

Baily, M. N., & Lawrence, R. Z. (1992). *Tax incentives for R&D: What do the data tell us?* Council on Research and Technology.

Bartik, T. J. (1991). *Who Benefits from State and Local Economic Development Policies?* Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Bartik, T. J. (2015, September 9). *Benefits vs. Costs of Business Incentives*. Washignton D.C.

Bartik, T. J. (2017). *A New Panel Database on Business Incentives for Economic Development Offered by State and Local Governments in the United States.* Retrieved from http://research.upjohn.org/reports/225

Bartik, T. J., & Erickcek, G. (2014). Simulating the Effects of the Tax Credit Program of the Michigan Economic Growth Authority on Job Creation and Fiscal Benefits. *Economic Development Quarterly, 28*(4), 314-327.

Bloom, N., Griffith, R., & Van Reenen, J. (2002). Do R&D tax credits work? Evidence from a panel of countries 1979-1997. *Journal of Public Economics, 85*(1), 1-31.

Bruce, D., & Deskins, J. (2012). Can state tax policies be used to promote entrepreneurial activity? *Small business economics, 38*(4), 375-397.

Bureau of Labor Statistics. (2017). *Quarterly Census of Employment and Wages.* U.S. Department of Labor. Retrieved 2017

Cassell, M. K., & Turner, R. C. (2010). Racing to the bottom? The impact of intrastate competition on tax abatement generosity in Ohio. *State and Local Government Review, 42*(3), 195-209.

Chirinko, R. S. (2008). σ: The Long and Short of it. *Journal of Macroeconomics, 30*(2), 671-686.

Coates, D. (2007). Stadiums and Arenas: Economic Development or Economic Redistribution? *Contemporary Economic Policy, 25*(4), 565-577.

Coates, D., & Humphreys, B. R. (2000). The stadium gambit and local economic development. *Regulation, 23*, 15.

References

Correa, J. A., Lorca, M., & Parro, F. (2014). Capital-Skill Complementarity: Does capital composition matter?

Coulson, N. E., Liu, C. H., & Villupuram, S. V. (2013). Urban economic base as a catalyst for movements in real estate prices. *Regional Science and Urban Economics, 43*(6), 1023-1040.

Crompton, J. (2004). Beyond economic impact: An alternative rationale for the public subsidy of major league sports facilities. *Journal of Sport Management*.

Czarnitzki, D., Hanel, P., & Rosa, J. M. (2001). Evaluating the impact of R&D tax credits on innovation: A microeconometric study on Canadian firms. *Research Policy, 40*(2), 217-229.

Dalehite, E. G., Mikesell, J. L., & Zorn, C. K. (2005). Variation in property tax abatement programs among state. *Economic Development Quarterly, 19*(2), 157--173.

Davis, J. C., & Henderson, J. V. (2008). The agglomeration of headquarters. *Regional Science and Urban Economics, 38*(5), 445-460.

Ernst & Young LLP. (2017). *Total state and local business taxes: State-by-state estimates for fiscal year 2015.*

Faulk, D. (2002). Do State Economic Development Incentives Create Jobs? An Analysis of State Employment Tax Credits. *National Tax Journal*, 263-280.

Faulk, D., & Hicks, M. J. (2013). *An Analysis of State and Local Tax Incentives in Indiana.* Muncie, IN: Ball State University, Center for Business and Economic Research.

Fisher, P. S., & Peters, A. H. (1998). Industrial incentives: Competition among American states and cities. *Employment Research Newsletter*, 1-4.

Fouts, J. (2014, July 21). Ball State study questions effectiveness of tax abatements. *Indiana economic digest*. Retrieved from http://www.indianaeconomicdigest.net/main.asp?SectionID=31&subsectionID=299&articleID=75570

Gabe, T. M., & Bell, K. P. (2004). Tradeoffs between local taxes and government spending as determinants of business location. *Journal of Regional Science, 44*(1), 21-41.

Gabe, T. M., & Kraybill, D. S. (2002). The Effect of State Economic Development Incentives on Employment Growth of Establishments. *Journal of Regional Science, 42*(4), 703-730.

Gale Group. (n.d.). *Company Finder*. Retrieved April 19, 2017, from Business Insights: Global database.

Gerritse, M. (2014). Competing for firms under agglomeration: Policy timing and welfare. *Regional Science and Urban Economics, 49*, 48-57.

Gold, S. D. (1979). *Property Tax Relief.* Lexington Books.

Grabowski, H. G. (1968). The determinants of industrial research and development: A study of the chemical, drug, and petroleum industries. *Journal of political economy, 76*(2), 292-306.

Hall, B. H. (1993). R&D tax policy during the 1980s: success or failure? *Tax Policy and the Economy, 7*, 1-35.

Hall, B., & Van Reenen, J. (2000). How effective are fiscal incentives for R\&D? A review of the evidence. *Research Policy, 29*, 449-469.

Harden, J. W., & Hoyt, W. H. (2003). Do states choose their mix of taxes to minimize employment losses? *National Tax Journal*, 7-26.

He, Z., & Romanos, M. (2016). Spatial agglomeration and location determinants: Evidence from the US communications equipment manufacturing industry. *Urban Studies, 53*(10), 2154-2174.

Hicks, M. J., & LaFaive, M. (2011). The Influence of Targeted Economic Development Tax Incentives on County Economic Growth: Evidence from Michigan's MEGA Credits. *Economic Development Quarterly, 25*(2), 193-205.

Hicks, M., & Faulk, D. (2016). The Fiscal Impact of Local Property Tax Abatement in Indiana. *Journal of Public and Nonprofit Affairs, 2*(2), 161-173.

Himmelberg, C. P., & Petersen, B. C. (1994). R & D and internal finance: A panel study of small firms in high-tech industries. *The Review of Economics and Statistics*, 38-51.

Indiana Department of Workforce Development. (n.d.). *Job Wages*. Retrieved September 4, 2017, from Hoosiers by the Numbers: http://www.hoosierdata.in.gov/

References

Indiana Economic Development Corporation. (n.d.). *Indiana Economic Development Corporation Transparency Portal.* Retrieved May 10, 2017, from https://transparency.iedc.in.gov/Pages/ContractSearch.aspx

Karkinsky, T., & Riedel, N. (2011). *The Impact of Corporate Taxes on R&D and Patent Holdings.*

Kenyon, D. A., Langley, A. H., & Paquin, B. P. (2012). *Rethinking property tax incentives for busines.* Cambridge: Lincoln Institute of Land Policy.

Klassen, K. J., Pittman, J. A., Reed, M. P., & Fortin, S. (2004). A Cross-National Comparison of R\&D Expenditure Decisions: Tax Incentives and Financial Constraints. *Contemporary Accounting Research, 21*(3), 639-680.

Klier, T., & Testa, W. (2002). Location trends of large company headquarters during the 1990s. *Economic perspectives-Federal Reserve Bank of Chicago*, 12-26.

Lawrence, R. Z. (2015). Recent Declines in Labor's share in US Income: a preliminary neoclassical account. *National Bureau of Economic Research*.

Lester, T. W., Lowe, N. J., & Freyer, A. (2014). Mediating Incentive Use: A Time-Series Assessment of Economic Development Deals in North Carolina. *Economic Development Quarterly, 28*(2), 132-146.

Ljungqvist, A., & Smolyansky, M. (2017). To cut or not to cut? On the impact of corporate taxes on employment and income. *National Bureau of Economic Research*.

Lovely, M. E., Rosenthal, S. S., & Sharma, S. (2005). Information, agglomeration, and the headquarters of US exporters. *Regional Science and Urban Economics, 35*(2), 167-191.

Mansfield, E. (1986). The R&D tax credit and other technology policy issues. *The American Economic Revew, 76*(2), 190-194.

Marion County Capital Improvement Board of Managers. (2016). *Comprehensive Annual Financial Report for the Fiscal Ended December 31, 2015.*

Mergent, Inc. (n.d.). *North American Database*. Retrieved April 19, 2017, from Mergent Intellect Database: http://www.mergentintellect.com/

National Science Foundation. (2016, August). *Business Research and Development and Innovation Survey*. Retrieved from National Center for Science and Engineering Statistics: https://www.nsf.gov/statistics/srvyindustry/#tabs-2

National Science Foundation. (2016, August 2). *Business Research and Development and Innovation: 2013*. Retrieved from National Center for Science and Engineering Statistics: https://www.nsf.gov/statistics/2016/nsf16313/

National Science Foundation. (2017, March 14). *National Patterns of R&D Resources*. Retrieved August 2017, from National Center for Science and Engineering Statistics: https://www.nsf.gov/statistics/2017/nsf17311/

Nunn, S. (1994). Regulating local tax abatement policies. *Policy Studies Journal, 22*(4), 574--588.

Paff, L. A. (2005). State-level R&D tax credits: A firm-level analysis. *The BE Journal of Economic Analysis & Policy, 5*(1).

Papke, L. E. (1993). What do we know about enterprise zones? *Tax Policy and the economy, 7*, 37-72.

Peters, A. H., & Fisher, P. S. (2002). State Enterprise Zone Programs: Have They Worked? *Books from Upjohn Press*.

Peters, A., & Fisher, P. (2004). The failures of economic development incentives. *Journal of the American Planning Association, 70*(1), 27-37.

Piketty, T., & Zucman, G. (2014). Capital is Back: Wealth-Income Ratios in Rich Countries 1700--2010. *The Quarterly Journal of Economics, 129*(3), 1255-1310.

PricewaterhouseCoopers and CB Insights. (2017). *PwC | CB Insights MoneyTree Report.*

RealtyTrac. (2015, August 5). Flipped homes fall to 4.5 percent of all single family sales in Q2 2015 despite increase in average flipping returns. Retrieved from http://www.realtytrac.com/news/home-prices-and-sales/q2-2015-u-s-home-flipping-report/

Rosentraub, M. S. (1999). Sports facilities, redevelopment, and the centrality of downtown areas: Observations and lessons from experiences in a rustbelt and sunbelt city. *Marquette Sports Law Journal*, 219.

Shuai, X., & Chmura, C. (2013). The effect of state corporate income tax rate cuts on job creation. *Business Economics, 48*(3), 183-193.

References

Siegfried, J., & Zimbalist, A. (2000). The Economics of Sports Facilities and their Communities. *The Journal of Economic Perspectives, 14*(3), 95-114.

Skeie, Ø. B., Johansson, Å., Menon, C., & Sorbe, S. (2017). *Innovation, Patent Location and Tax Planning by Multinationals.* OECD Working Paper.

Strauss-Kahn, V., & Vives, X. (2009). Why and where do headquarters move? *Regional Science and Urban Economics, 39*(2), 168-186.

Swindell, D., & Rosentraub, M. S. (1998). Who benefits from the presence of professional sports teams? The implications for public funding of stadiums and arenas. *Public Administration Review*, 11-20.

The PEW Center on the States. (2014). Retrieved September 15, 2014, from Business Incentives Initiative website: http://www.pewtrusts.org/en/about/news-room/news/2014/04/08/the-business-incentives-initiative

Tillinger, J. W. (1991). An analysis of the effectiveness of the research and experimentation tax credit in aq model of valuation. *The Journal of American Taxation Association, 13*(2), 1-29.

U.S. Bureau of Economic Analysis. (n.d.). Retrieved August 29, 2017, from Indiana: GDP in current dollars: https://www.bea.gov/iTable/iTableHtml.cfm?reqid=70&step=10&isuri=1&7003=200&7035=-1&7004=naics&7005=-1&7006=18000&7036=-1&7001=1200&7002=1&7090=70&7007=2016,2015,2014&7093=percentofus

U.S. Bureau of Economic Analysis. (n.d.). *Table 2.7. Investment in Private Fixed Assets, Equipment, Structures, and Intellectual Property Products by Type*. Retrieved August 23, 2017

U.S. Census Bureau. (2016). *State Trade Data.* Retrieved August 29, 2017, from Foreign Trade: https://www.census.gov/foreign-trade/statistics/state/origin_movement/index.html

U.S. General Accounting Office. (1989). *The research tax credit has stimulated some additional research spending.* Washington D.C.: Author. Retrieved from http://www.gao.gov/products/GGD-89-114

U.S. Patent and Trademark Office. (2017, September 16). *Design Patenting By Geographic Region (State and Country): Breakout By Organization*. Retrieved from https://www.uspto.gov/web/offices/ac/ido/oeip/taf/dstcasg/in_dror.htm

U.S. Patent and Trademark Office. (n.d.). *Indiana's Economy*. Retrieved from STATS Indiana: http://www.stats.indiana.edu/sip/Economy.aspx?page=patents&ct=S18

Wassmer, R. W. (2009). Property tax abatement as a means of promoting state and local economic activity. *Erosion of the property tax base: trends, causes, and consequences.*, 221-259.

Wassmer, R. W., Ong, R. S., & Propheter, G. (2016). Suggestions for the Needed Standardization of Determining the Local Economic Impact of Professional Sports. *Economic Development Quarterly, 30*(3), 252-266.

Wilson, D. J. (2009). Beggar thy neighbor? The in-state, out-of-state, and aggregate effects of R&D tax credits. *The Review of Economics and Statistics, 91*(2), 431-436.

Workforce Information Council. (2014). *Exploring the High-Tech Industry.*

Zimbalist, A. (2013, August). Sports facilities and economic development. *Government Finance Review*, pp. 94-96.