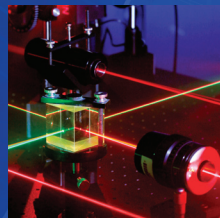
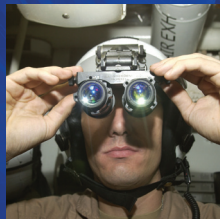


# Building National Security

THE ECONOMIC IMPACT OF  
INDIANA'S DEFENSE INDUSTRY



**KELLEY SCHOOL OF BUSINESS**

INDIANA UNIVERSITY  
Indiana Business Research Center



Dear Colleague,

The State of Indiana, along with the Kelley School of Business at Indiana University, is proud to present *Building National Security: The Economic Impact of Indiana's Defense Industry*, an insightful report prepared by the Indiana Business Research Center at Indiana University. This report reveals that, even though the national economy has struggled throughout the last decade, the State of Indiana has quietly established itself as an environment where defense-related companies are thriving.

In 2001, Indiana was home to fewer than 400 defense contractors, who combined to secure a mere \$1.8 billion in contracts from the U.S. Department of Defense and the Department of Homeland Security. Last year, more than 1,100 Hoosier businesses were awarded defense-related federal contracts worth a total of more than \$4 billion. Those prime contracts generated \$3.1 billion of additional economic activity throughout the state, and also supported nearly 40,000 high-paying jobs for Hoosiers. In fact, as the report highlights, for every 10 jobs with an Indiana defense contractor, an additional 11 jobs were created elsewhere in the state.

As the economy recovers, it is critical to the State of Indiana and its workforce that the defense industry continues to flourish here. In supporting the creation of the industry-led Indiana Aerospace & Defense Council, the State of Indiana is making a concerted effort to help Hoosier businesses continue the successes identified in this report. Still, we must do more. Tomorrow's generation of Hoosier workers is relying on this generation and its leadership to provide the inspiration, programs, and opportunities that will support a prosperous economy and a competitive defense marketplace.

We hope you enjoy this report and come to appreciate, as we have, the importance of the defense industry to Indiana's economy.


Sincerely,



**Becky Skillman**  
*Lt. Governor*  
State of Indiana



**Michael A. McRobbie**  
*President*  
Indiana University



# BUILDING NATIONAL SECURITY

*The Economic Impact of  
Indiana's Defense Industry*

**October 2011**

**Prepared by:**

Indiana Business Research Center  
Kelley School of Business  
Indiana University

**Jerry Conover, Ph.D.**

Director

**Timothy F. Slaper, Ph.D.**

Director of Economic Analysis

**Matthew Kinghorn**

Research Analyst

**Tanya Hall**

Research Analyst

**Ryan Krause**

Research Assistant

**Rachel Justis**

Managing Editor

**Diane Probst**

Graphic Artist

*This study was supported by  
funding from the Indiana Economic  
Development Foundation and from  
Conexus Indiana and its corporate  
partners*

Cover photos courtesy of the  
United States Navy

# CONTENTS

EXECUTIVE SUMMARY	1
Key Findings	1
A PROFILE OF DEFENSE CONTRACTS IN INDIANA	3
Indiana's Key Defense Industry Sectors	4
Indiana's Top Products and Services	5
Indiana's Top Defense Contractors	6
Awards to Indiana Higher Education Institutions	7
The Role of Small Business Development Programs	8
Minority-Owned Businesses	9
THE ECONOMIC CONTRIBUTION OF DEFENSE ACTIVITIES IN INDIANA	10
Summary of Economic Contributions	11
The Annual Economic Contributions of Defense Contracts	12
Defense Contracts Support High-Paying Jobs	12
The Tax Effects of Defense Contracting	13
The Economic Contribution of Defense Payrolls and Military Facilities	13
CONCLUSION	15
APPENDIX	16
About the Data and Results	16
Key Terms	16
Input-Output Analysis Methodology	17



# Executive Summary

**T**he prominence of the defense industry in Indiana may be one of the most important untold stories of the last decade. In the 2010 fiscal year, the U.S. Department of Defense and the Department of Homeland Security combined to award more than \$4 billion worth of contracts to 1,100 Indiana businesses. These businesses employed an estimated 18,200 Hoosiers to fulfill these contracts. Those direct jobs tell only half the story however. The jobs and the paychecks associated with sub-contracts and production throughout the supply chain more than doubles the employment footprint of the defense industry in the state to over 38,000 jobs.

The defense economic footprint in the state has increased greatly over the course of the last 10 years. The value of contracts increased from \$1.8 billion in 2001 to a peak of \$7.8 billion in 2008 and with it, the role of Hoosier businesses in support of our national defense. The rate of growth in Indiana was nearly twice as great as the increase in total U.S. defense contract dollars. While contract dollars did slip in 2010, they remained well above levels seen earlier in the decade.

Defense contracts provided a well-needed shot in the arm to Indiana's economy, thanks to the boost in the state's employment in order to meet the increased demand for defense goods and services. Given that roughly 80 percent of contract dollars over the decade were dedicated to the purchase of manufactured goods, U.S. defense agencies were key customers for many Indiana manufacturers during a period of overall employment decline in this sector. Contracts to Indiana's professional, scientific and technical service providers also increased steadily in recent years.

Not only did defense contracts help provide jobs to the state, but, in an era of stagnant wage growth, these well-paying jobs helped boost Hoosier incomes. Defense contracts are heavily concentrated in high-technology, high-paying industries. Indiana jobs directly supported by defense contracts have an estimated average compensation of \$64,000 in 2010, compared to \$44,600 for all jobs in the state. Defense-related jobs in manufacturing had an average compensation above \$90,000, which, in 2010, was also roughly

*“The combined effects of defense contract dollars in Indiana supported an estimated 38,600 jobs around the state.”*

\$20,000 higher than the average for all manufacturing jobs in the state. Clearly, the nature of defense contracts helps to raise Indiana's standard of living.

This report aims to highlight the economic benefits of defense contracts on the Indiana economy. The first section presents an overview of defense contracting in the state over the past 10 years. This profile details Indiana's key defense industries, highlights the most prominent defense contractors and identifies the regions of the state that benefit most from this spending. The second section presents the results of an input-output analysis that gauged the total contribution of defense contracts to the Indiana economy. This analysis provides estimates of the total economic output, employment, compensation and government revenues generated by this spending. To complete the picture, there are also results from an input-output analysis of wages

paid by defense agencies to service members and other employees in the state.

## Key Findings

- Indiana companies produced \$4.4 billion in defense-related goods and services in 2010. The ripple effects from these contracts supported an additional \$3.1 billion in economic activity to bring the total “economic footprint” of defense contracts in 2010 to an estimated \$7.5 billion.
- The combined effects of defense contract dollars in Indiana supported an estimated 38,600 jobs around the state. Approximately 18,200 of these jobs were with defense contractors directly. The defense supply chain—that is, the production and hiring by defense sub-contractors—and the household spending of their employees support an additional 20,400 jobs in every sector including healthcare, retail and utilities.
- With an employment multiplier of 2.1 in 2010, every 10 jobs at local defense contractors generated an additional 11 “ripple effect” jobs in other Indiana businesses.
- The economic activity generated by defense contracts produced \$375 million in federal revenues in 2010 along with \$240 million

in state and local government collections.

- Additionally, the wages paid to Indiana's defense employees also provides a boost to the state economy. In 2010, the effects of defense payrolls spurred more than \$800 million in economic activity and supported 18,000 jobs. Add these numbers to the effects of defense contracting and the total impacts of defense-related activities jump to \$8.3 billion in economic activity and 56,600 jobs.
- More than three-quarters of Indiana's 2010 defense contract dollars were concentrated in three industries: transportation equipment manufacturing (48 percent of the total); computer and electronic product

*“More than 80 percent of Indiana's 2010 defense contract expenditures were concentrated in three counties: Marion, St. Joseph and Allen.”*

manufacturing (20 percent); and professional, scientific and technical services (10 percent).

- Indiana's four-largest defense contractors claimed 71 percent of the state's 2010 contract dollars, led by AM General (\$1.1 billion in contracts), Rolls-Royce Group (\$733 million), Raytheon (\$665 million) and ITT (\$392 million).
- More than 80 percent of Indiana's 2010 defense contract expenditures were concentrated in three counties: Marion, St. Joseph and Allen. However,

defense spending also made significant contributions to some smaller counties, including Whitley (which ranked fifth among all counties), Lawrence (sixth) and Dubois (seventh).

- Defense contracts are the dominant source of all federal awards to Indiana, accounting for 84 percent of all federal contract dollars in Indiana. Additionally, four of Indiana's top five federal contractors are in the defense industry.

# A Profile of Defense Contracts in Indiana

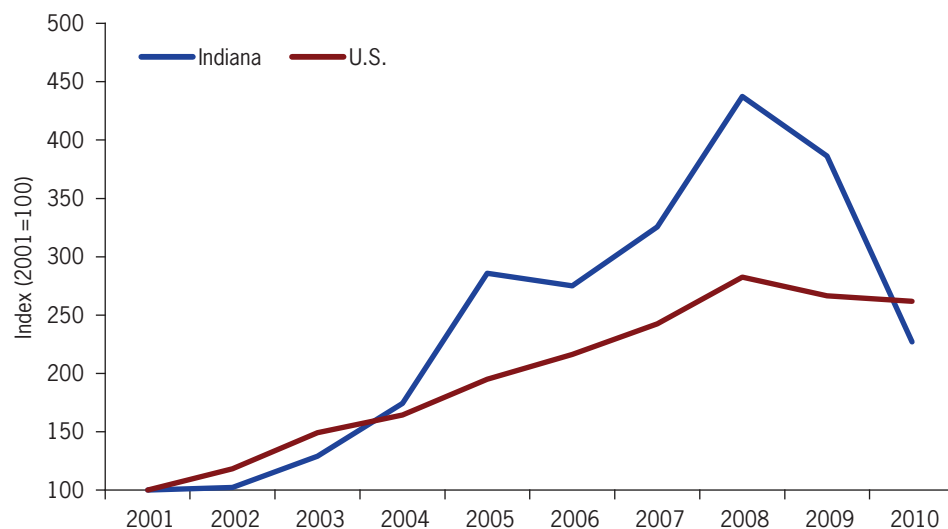
In 2010, more than 1,100 Indiana companies received defense-related contracts from the federal government, with 1,088 firms awarded contracts from the Department of Defense (DoD), and 133 firms working with the Department of Homeland Security (DHS). Overall, 2010 saw Indiana companies claim 9,889 defense contracts worth a total of more than \$4 billion. The value of Indiana's defense-related contracts ranked 23rd among states in 2010.

Since 2001, the value of defense contracts awarded to Indiana has more than doubled, and the annual number of unique contracts awarded has increased nearly five-fold (see **Table 1**). In addition, the number of Indiana defense contractors has grown significantly in the past 10 years.

As **Figure 1** highlights, growth in the value of contracts awarded to Indiana companies far outpaced total defense-related contracting over much of the past decade. At the 2008 peak, Indiana's \$7.8 billion in contracts was more than four-times greater than the 2001 level. All U.S. based contracting increased by just less than three-times over the same period. A large part of Indiana's surge in defense contract dollars can be attributed to a single company: AM General. This South Bend and Mishawaka-based manufacturer of the Humvee—among other transportation-related products—accounted for 44 percent of all defense contract dollars to the state in 2006 and roughly 60 percent of the total in both 2007 and 2008. In all, AM General claimed 41 percent of all defense contract dollars awarded to Indiana companies between 2001 and 2010.

The value of defense-related contracts has declined both in Indiana

**Figure 1: Change in the Value of Defense Contract Awards, Indiana and the United States, FY 2001 to FY 2010**



Source: Indiana Business Research Center, using usaspending.gov data

and nationally since 2008. In fact, Indiana's 2010 mark was roughly half of the 2008 level. Still, the number of contracts awarded to Hoosier businesses, as well as the number of contractors receiving awards, has remained at historically high levels. It has yet to be seen whether the sizeable dip in the value of contracts between 2009 and 2010 is a short-term anomaly or if there has been a

more fundamental shift in the nation's defense needs and priorities.

The decrease in total value notwithstanding, defense continues to be the dominant source of federal contracts awarded to Indiana companies. The Department of Defense alone contributes 84 percent of all federal contract dollars in Indiana. In addition, four of the top

**Table 1: Indiana Defense Contract Awards, FY 2001 to FY 2010<sup>§</sup>**

Fiscal Year	Number of Contractors	Number of Contracts	Total Value of Contracts
2001	362	2,114	\$1,781,599,723
2002	477	3,839	\$1,823,460,354
2003	519	6,615	\$2,299,897,248
2004	786	7,378	\$3,105,494,963
2005	1,073	13,649	\$5,093,579,488
2006	1,097	8,366	\$4,901,644,892
2007	1,160	9,811	\$5,801,657,854
2008	1,196	10,939	\$7,795,067,767
2009	1,216	9,582	\$6,881,788,924
2010	1,136	9,889	\$4,037,339,824

<sup>§</sup> Place, or state, of award may not necessarily be the state where the contract work is performed. This table presents place of award. See page 7 for a discussion on the place of contract performance.  
Source: Indiana Business Research Center, using usaspending.gov data

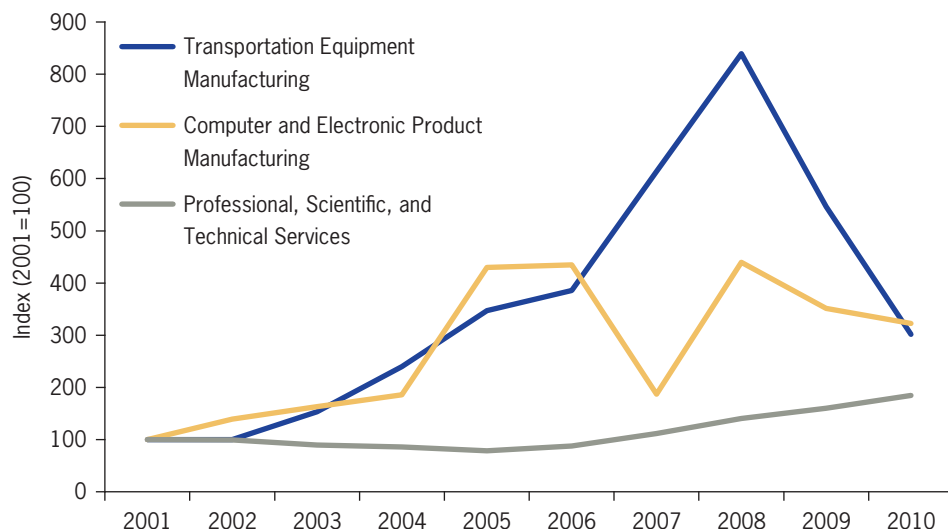
five recipients of federal contracts are defense-related firms.

## Indiana's Key Defense Industry Sectors

Looking over the past 10 years, Indiana companies have attracted a total of \$43.5 billion in defense-related contracts. Not surprisingly, most of this activity was concentrated in manufacturing industries, led by transportation equipment, which garnered more than half of the total value of defense-related contracts over the decade (see **Table 2**). In addition to auto and truck-related manufacturing, the broad transportation equipment sector includes aircraft and guided missile manufacturing activities. Indiana has a strong presence in each of these areas. The sale of computer and electronic products placed a distant second with 16 percent of the total value, followed by professional and scientific services at 6 percent. Together, these three industries combined to claim three out of every four dollars in Indiana's defense-related contracts.

These same industries held the top three positions in 2010, as well. Transportation equipment's position

**Figure 2: Change in the Value of Indiana's Defense Contracts, Select Industries, FY 2001 to FY 2010**



Source: Indiana Business Research Center, using usaspending.gov data

slipped a bit, yet this industry still accounts for the lion's share of activity. By contrast, contract levels in the other two industries exceeded their annual average over the last 10 years. The value of 2010 contracts to Indiana nondurable goods wholesalers and petroleum and coal product manufacturers rounded out the top five. Despite the dip in the value of all contracts to the state, these industries also attracted more

dollars in 2010 than they averaged annually over the decade.

Given that transportation equipment manufacturing dominates Indiana's defense contracting, it is no surprise that the annual change in the value of awards to this industry mirrors the state's trend overall. Contract dollars to this industry grew annually between 2002 and 2008 with particularly sharp increases in the last two years of that period (see **Figure**

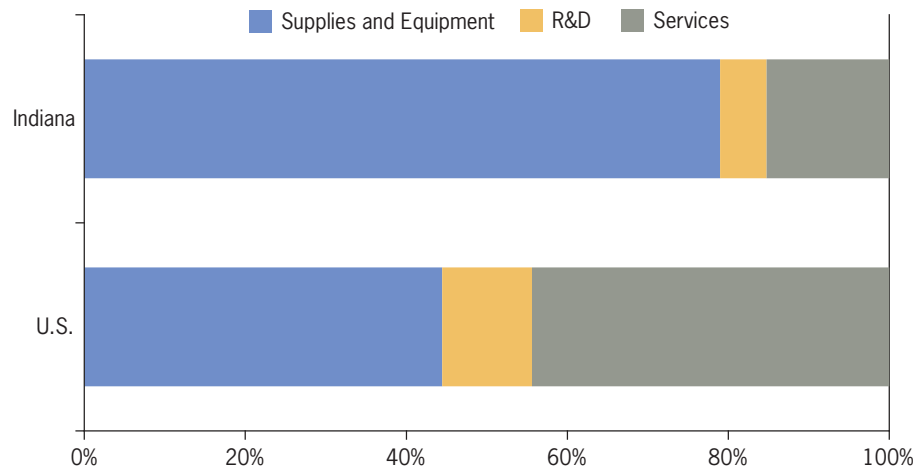
**Table 2: Indiana's Top Defense Industry Sectors by Dollar Value**

Industry Sector	FY 2001 to FY2010			FY 2010		
	Rank	Value of Contracts	Percent of Total	Rank	Value of Contracts	Percent of Total
Transportation equipment manufacturing	1	\$23,532,637,707	54.1%	1	\$1,943,177,471	48.1%
Computer and electronic product manufacturing	2	\$6,910,740,440	15.9%	2	\$801,159,668	19.8%
Professional, scientific, and technical services	3	\$2,498,703,296	5.7%	3	\$402,816,699	10.0%
Nondurable goods merchant wholesalers	4	\$1,618,906,619	3.7%	4	\$208,884,424	5.2%
Fabricated metal product manufacturing	5	\$867,501,470	2.0%	10	\$38,061,134	0.9%
Food manufacturing	6	\$811,066,490	1.9%	7	\$59,316,662	1.5%
Machinery manufacturing	7	\$744,087,323	1.7%	8	\$44,929,889	1.1%
Petroleum and coal products manufacturing	8	\$717,694,677	1.6%	5	\$132,260,251	3.3%
Heavy and civil engineering Construction	9	\$700,718,458	1.6%	9	\$44,114,999	1.1%
Waste management and remediation services	10	\$500,844,699	1.2%	22	\$9,845,218	0.2%
All others		\$4,618,629,856	10.6%		\$352,773,410	8.7%
<b>Total</b>		<b>\$43,521,531,036</b>	<b>100%</b>		<b>\$4,037,339,824</b>	<b>100%</b>

Source: Indiana Business Research Center, using usaspending.gov data



**Figure 3: Share of Contract Value by Product Type, Indiana and the United States, 2010**



Source: Indiana Business Research Center, using usaspending.gov data

2). In fact, the value of transportation equipment contracts in 2008 (\$5.4 billion) was more than eight-times greater than the 2001 mark. Since this high watermark, however, activity in this industry has cooled. Similarly, the value of computer and electronic product contracts in 2010 stood more than one-quarter below its 2008 peak of \$1.1 billion.

By contrast, Indiana's professional, scientific, and technical service providers have seen a steady increase in recent years. Contract dollars to the industry more than doubled between 2005 and 2010. This suggests that the DoD and DHS are contracting with Indiana businesses for services that require higher human capital, which is a welcome sign to Indiana economic developers attempting to complement the state's already strong manufacturing base.

### Indiana's Top Products and Services

Despite the recent upswing in contract dollars for certain types of services, manufacturing continues to dominate the state's defense activities. This fact is evident when comparing Indiana's contracts to the national total by product type. **Figure 3** shows that roughly four-fifths of Indiana's total award amounts

in 2010 purchased supplies and equipment (i.e., manufactured goods) while 6 percent went to R&D and 15 percent to services. Contract dollars to all states in 2010, by contrast, procured equal parts services and manufactured goods (44 percent apiece) while devoting the remaining 11 percent to R&D.

### Indiana's Top Supplies and Equipment Categories

Indiana's largest supplies and equipment category in 2010 was motor vehicles, trailers and cycles with \$915 million in contracts awarded, followed by communication, detection and coherent radiation

**Table 3: Top 10 Supply and Equipment Categories, FY 2010**

Product	Value of Contracts
Motor vehicles, trailers, and cycles	\$915,177,920
Communication, detection, and coherent radiation equipment	\$725,080,108
Engines, turbines, and components	\$404,442,487
Fuels, lubricants, oils, and waxes	\$253,383,911
Aircraft and airframe structural components	\$162,301,436
Subsistence (e.g., food products)	\$149,296,204
Aircraft components and accessories	\$148,374,273
Vehicular equipment components	\$52,387,782
Automatic data processing equipment	\$49,672,018
Guided missiles	\$44,292,625
All other products	\$280,937,172
<b>Total</b>	<b>\$3,185,345,936</b>

Source: Indiana Business Research Center, using usaspending.gov data

**Table 4: Top 10 Services, FY 2010**

Product	Value of Contracts
Professional, administration, and management support service	\$235,438,706
Research and development	\$234,612,685
Maintenance, repair, and rebuilding of equipment	\$118,219,619
Maintenance, repair, or alteration of real property	\$67,440,220
Construction of structures and facilities	\$50,367,979
Modification of equipment	\$41,358,482
Utilities and housekeeping services	\$29,889,494
Automatic data processing and telecommunication services	\$29,792,125
Lease or rental of facilities	\$13,050,612
Medical services	\$12,843,341
All Other Services	\$18,931,918
<b>Total</b>	<b>\$851,945,180</b>

Source: Indiana Business Research Center, using usaspending.gov data



equipment with \$725 million (see **Table 3**). Many of the top 10 product categories relate to transportation equipment and build on the strengths of the Indiana economy and workforce. Others, like communication equipment, automatic data processing equipment, and guided missiles, show that federal defense contracts are supporting the manufacture of more high-technology products as well.

#### Indiana's Top Defense Services

Services also play a role in Indiana's share of the defense budget. As shown in **Table 4**, the professional, administration, and management support service category tops the list at just over \$235 million. Coming in a close second, at a shade under \$235 million is research and development. Other major categories of services include maintenance, repair and rebuilding of equipment with \$118 million in contracts; maintenance, repair or alteration of real property with close to \$67 million; and construction of structures and facilities with \$50 million.

#### Indiana's Top Defense Contractors

##### A Diverse Group of Companies

With more than \$3 billion in awards, Indiana's top 10 defense contractors in 2010 claimed more than 75 percent of the state's total contract dollars (see **Table 5**). These 10 firms spanned a wide range of industries. The largest recipient, AM General, which itself accounted for more than a quarter of Indiana contract dollars

**Table 5: Top Indiana Defense Contractors, FY 2010**

Company	Location	Contract Value	Percent of Total IN Contract Value
AM General	South Bend/Mishawaka	\$1,077,297,716	26.7%
Rolls-Royce Group, PLC	Indianapolis	\$733,056,959	18.2%
Raytheon Company	Indianapolis/Fort Wayne	\$665,257,188	16.5%
ITT Corporation	Fort Wayne	\$392,205,396	9.7%
Calumet Specialty Products	Indianapolis	\$132,208,000	3.3%
Ameriquel Group, LLC	Evansville	\$120,505,603	3.0%
Petroleum Traders	Fort Wayne	\$120,309,790	3.0%
ERAPSCO	Columbia City	\$87,009,407	2.2%
Tri Star Engineering, Inc.	Bedford	\$50,966,293	1.3%
Kimball International, Inc.	Jasper	\$27,704,505	0.7%
All Others		\$630,818,968	15.6%
<b>Total</b>		<b>\$4,037,339,824</b>	<b>100.0%</b>

Source: Indiana Business Research Center, using usaspending.gov data

in 2010, is primarily a manufacturer of motor vehicle-related products including the Humvee. Rolls-Royce supplies the military with a range of aircraft-related goods and R&D. Raytheon manufactures a host of different technological products for defense purposes. ITT Corporation's contribution to Indiana's defense contracts consists mainly of manufacturing wireless communication equipment. Finally, Calumet Specialty Products provides liquid fuel products and Ameriquel Group is one of only three companies approved to supply "Meals, Ready-to-Eat" (MRE) to the DoD.

*“Indiana acts as the place of performance for contracts awarded in other states, too. And given the state's manufacturing strength, it is not surprising that Indiana is a net importer of defense production.”*

**Table 6: Defense Contracts to Indiana Higher Education Institutions, FY 2010**

School	Total Amount of Contracts	Percent of Total IN Contract Value
Purdue University	\$7,971,172	0.20%
University of Notre Dame	\$4,370,698	0.11%
Indiana University	\$3,209,674	0.08%
Ball State University	\$279,589	0.01%
The Lutheran University Association	\$114,465	0.00%
Indiana State University	\$43,100	0.00%
Trine University	\$20,637	0.00%
<b>Total</b>	<b>\$16,009,335</b>	<b>0.40%</b>

Source: Indiana Business Research Center, using usaspending.gov data

## Awards to Indiana Higher Education Institutions

Educational institutions comprised a relatively minor portion of defense contract recipients, with all contracts awarded in 2010 totaling only \$16 million (see **Table 6**). Purdue University led the way with roughly \$8 million in contract dollars followed by the University of Notre Dame and Indiana University. More than half of contracts to educational institutions (\$9.8 million) were designated for research and development, with another \$4 million allotted for education and training services. Ultimately, though, these awards amount to only 0.4 percent of the \$4 billion in contracts awarded to Indiana in 2010.

## The Location of Indiana Contract Awards

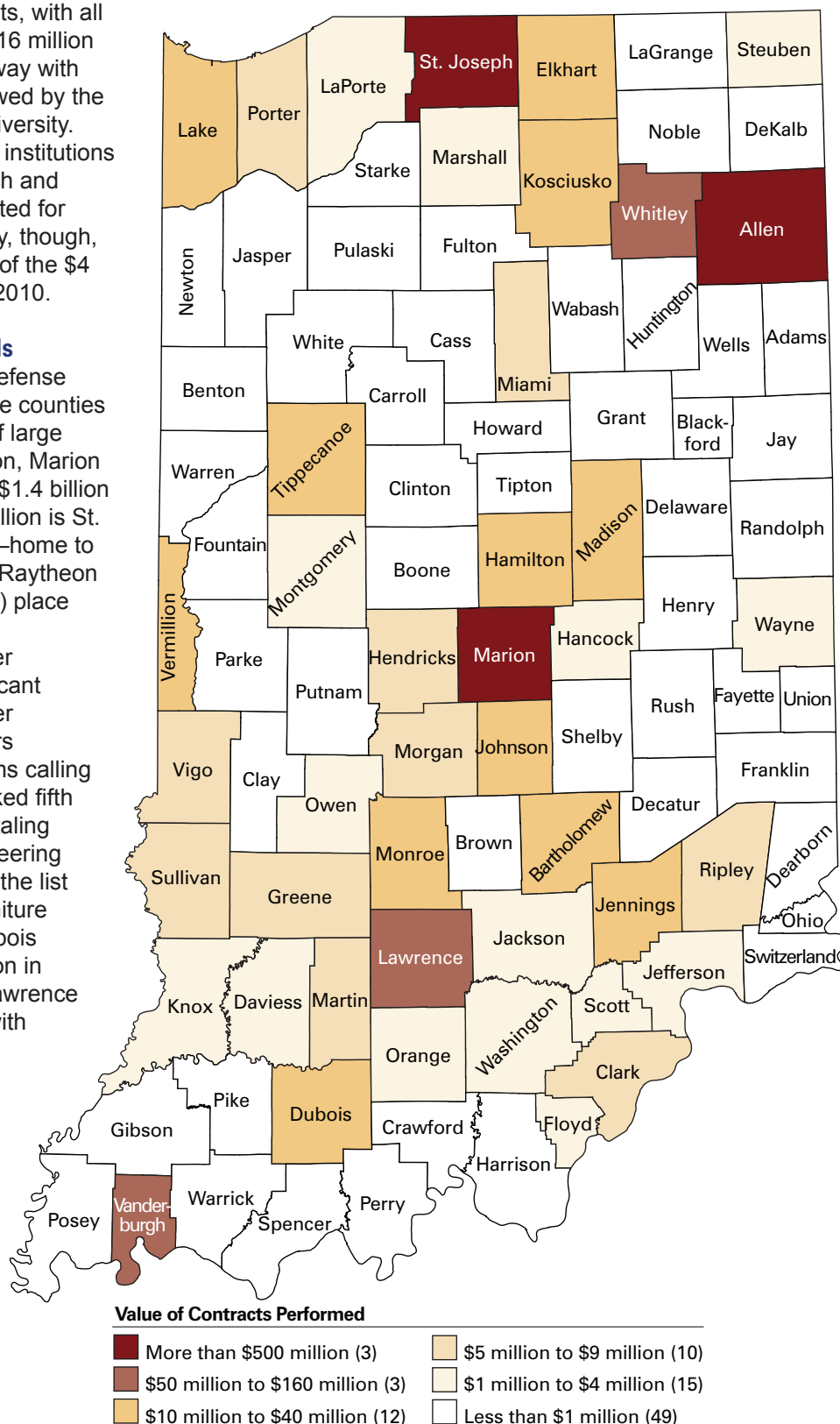
More than 80 percent of Indiana's 2010 defense contract dollars were concentrated in three counties (see **Figure 4**). Thanks to the presence of large players such as Rolls Royce and Raytheon, Marion County (Indianapolis) topped the list with \$1.4 billion in 2010 contracts. Close behind at \$1.1 billion is St. Joseph County (South Bend/Mishawaka—home to AM General and a division of Honeywell. Raytheon and ITT helped Allen County (Fort Wayne) place third with \$863 million in contracts.

While these are three of Indiana's larger counties, defense spending makes significant contributions to some of the state's smaller counties, as well. With U.S. Navy suppliers ERAPSCO and UnderSea Sensor Systems calling Columbia City home, Whitley County ranked fifth among counties in 2010 with contracts totaling \$91 million. Bedford-based Tri Star Engineering helped spur Lawrence County to sixth on the list with \$59 million in 2010 awards while furniture sales by Kimball International pushed Dubois County (Jasper) to seventh with \$39 million in contracts. Of these three communities, Lawrence County had the largest 2010 population with 46,100 residents and Whitley County the smallest at 33,300.

## Where Are Contracts Performed?

The USAspending.gov database allows the user to categorize the location of a contract in two ways: by the location of the entity that received the contract or by the ultimate place of performance for each contract. The data presented thus far have been arranged by the award location yet the production for each contract is not always performed at the same location. For instance, AM General was the state's largest award recipient yet the

**Figure 4: Value of Indiana Defense Contracts by County, FY 2010**



Source: Indiana Business Research Center, using usaspending.gov data

production for a small share of their contracts credited to Indiana was performed at facilities in Texas and Ohio.

Of Indiana's total value of contracts, \$3.7 billion, or 91 percent, were performed in-state. At \$82.5 million (or 2 percent of total contracts), California was the largest recipient of dollars awarded to Indiana-based entities (see **Figure 5**). Other notable place-of-performance locations include Florida with \$44.4 million, Michigan (\$35.4 million) and New Jersey (\$25.8 million).

Of course, Indiana acts as the place of performance for contracts awarded in other states, too. And given the state's manufacturing strength, it is not surprising that Indiana is a net importer of defense production. As we've seen, Indiana companies won roughly \$4.0 billion in defense contracts in 2010 yet Hoosier establishments produced a total of \$4.4 billion in goods and services for DoD and DHS in that same year. This is the important figure to keep in mind when considering the economic impact of defense contracts in the second section of this report.

## The Role of Small Business Development Programs

Defense dollars awarded to Indiana for Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) grew considerably between 2001 and 2010, from just over \$1 million in contracts to almost \$10 million in contracts. As **Table 7** and **Table 8** show, the last three years have been erratic, with Phase 1 SBIR contracts dropping since 2008 and Phase 2 contracts increasing.<sup>1</sup> STTR contracts, on the other hand,

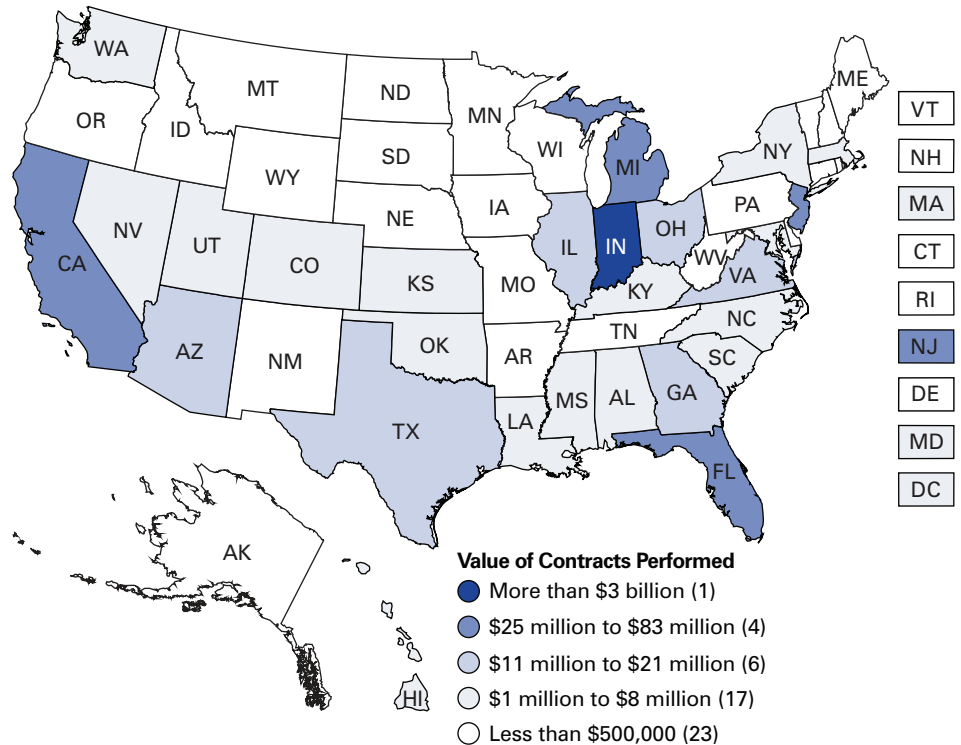
<sup>1</sup> The SBIR Program has three phases. Phase I is a feasibility study to evaluate the scientific and technical merit of an idea. Phase II expands on the results of Phase I and further develops the business idea. Phase III is for the commercialization of the results of Phase II and requires private funding or another non-SBIR source of funds.

have grown in dollar value for both Phase 1 and Phase 2 since 2008. Even though SBIR contracts have decreased in value over the past couple years, the number of contracts

awarded to Indiana companies increased from 25 in 2008 to 37 in 2010.

The top 10 recipients of SBIR and STTR contracts in 2010 are shown

**Figure 5: Ultimate Place of Performance for Contracts Awarded to Indiana Establishments, FY 2010**



Source: Indiana Business Research Center, using usaspending.gov data

**Table 7: Small Business Innovation Research (SBIR) Defense Contract Awards, 2008-2010**

	SBIR Value			SBIR Contracts		
	2008	2009	2010	2008	2009	2010
Phase 1	\$3,767,409	\$1,670,102	\$1,654,021	14	19	19
Phase 2	\$4,903,544	\$5,533,415	\$6,041,999	11	13	18
<b>Total</b>	<b>\$8,670,953</b>	<b>\$7,838,823</b>	<b>\$7,696,020</b>	<b>25</b>	<b>32</b>	<b>37</b>

Source: Indiana Business Research Center, using usaspending.gov data

**Table 8: Small Business Technology Transfer (STTR) Defense Contract Awards, 2008-2010**

	STTR Value			STTR Contracts		
	2008	2009	2010	2008	2009	2010
Phase 1	\$169,891	\$239,943	\$238,753	2	3	3
Phase 2	\$1,224,933	\$1,453,103	\$1,867,884	3	5	4
<b>Total</b>	<b>\$1,394,824</b>	<b>\$1,693,046</b>	<b>\$2,106,637</b>	<b>5</b>	<b>8</b>	<b>7</b>

Source: Indiana Business Research Center, using usaspending.gov data

in **Table 9**. As their names indicate, the majority of these recipients are technology-related companies. The largest recipient, P C Krause and Associates, Inc., is a West Lafayette firm that specializes in engineering, modeling and software.

### Minority-Owned Businesses

Contract awards to minority-owned businesses in Indiana have skyrocketed since 2006, growing from a total of \$27.7 million to a 2010 total of \$139.1 million (see **Figure 6**). The minority group to see the largest percentage increase in dollars awarded over this period was Hispanic-owned businesses, growing from \$1.9 million in 2006 to \$37.2 million in 2010. The largest overall recipient group, and the second-fastest growing in terms of contracts, was Asian/Indian-owned businesses,

**Table 9: Top 10 Firms Awarded SBIR/STTR Contracts, FY 2010**

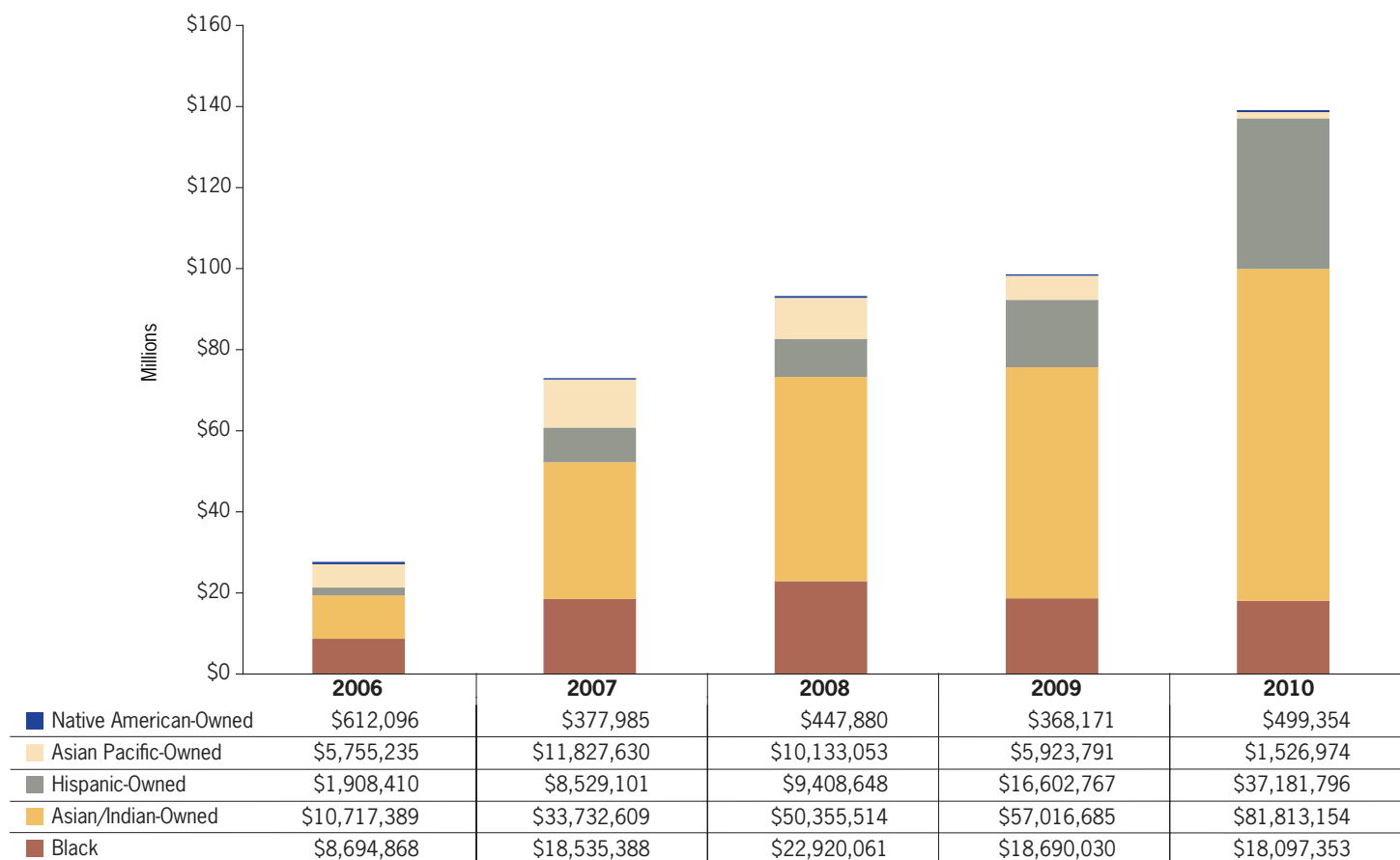
Firm Name	Contract Value	Contracts
P C Krause and Associates, Inc.	\$1,951,375	7
Odyssian Technology LLC	\$849,819	3
Techshot, Inc.	\$696,681	7
Mudawar Thermal System, Inc.	\$683,446	2
Imaginestics, Inc.	\$669,337	1
Engine Research Associates, Inc.	\$589,448	2
Wolf Technical Service, Inc.	\$560,781	3
Omega Wireless Solutions, Inc.	\$499,431	1
Foresite, Inc.	\$498,966	1
Sky Sight Technologies, LLC	\$469,990	3

Source: Indiana Business Research Center, using usaspending.gov data

which grew their contracts from \$10.7 million in 2006 to \$81.8 million in 2010. Black-owned businesses more than doubled their contracts in four years, growing from \$8.7 million in 2006 to \$18.1 million in 2010. Two minority groups saw their

contracts decrease in value over this period: Asian Pacific-owned and Native American-owned businesses. However, these groups together make up less than 1.5 percent of Indiana’s total contracts awarded to minority-owned businesses in 2010.

**Figure 6: Contracts Awarded to Minority-Owned Businesses, FY 2006 to FY 2010**



Source: Indiana Business Research Center, using usaspending.gov data



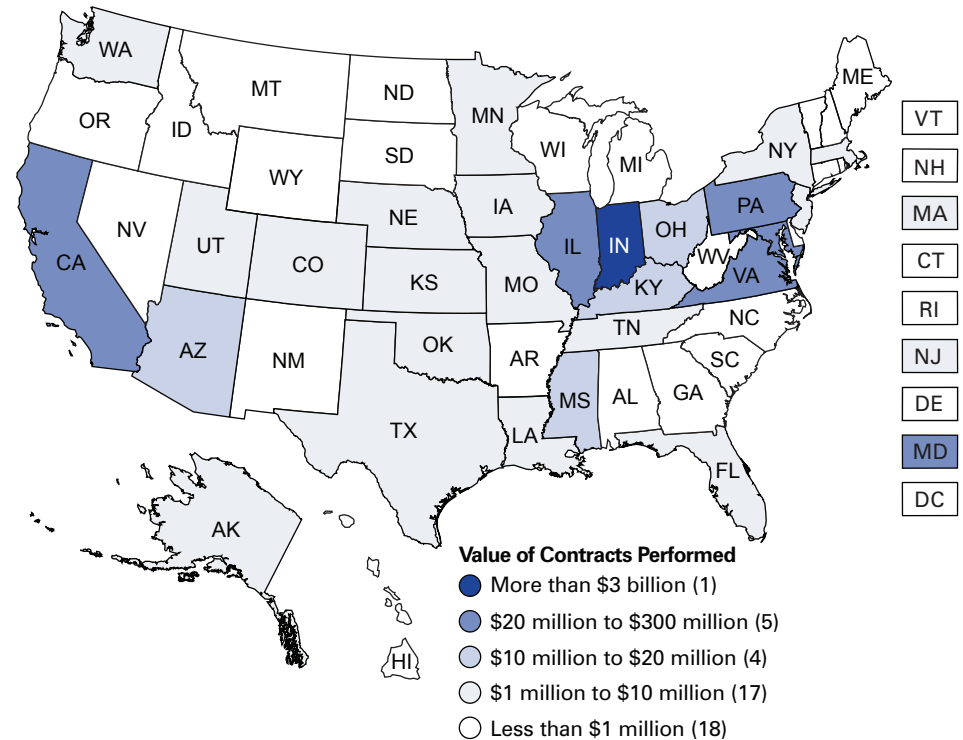
# The Economic Contribution of Defense Activities in Indiana

**A**s discussed previously, the USAspending.gov database allows the user to view contract data based on the award location or the place of performance for each contract. The production for each contract is not always performed at the award location. Indiana companies claimed \$4.0 billion in defense contracts in 2010 yet the actual production for a small share of these awards (\$300 million) was performed in other states. By the same token, Indiana establishments serve as the place of performance for contracts granted elsewhere. In addition to the \$3.7 billion in contracts both awarded and performed in the state, Indiana establishments fulfilled the production of an additional \$700 million in contracts received by entities in other states. In that sense, Indiana was a net importer of defense production in 2010.

In 2010, California sent the highest value of contracts to be performed in Indiana, at \$291 million (see **Figure 7**). Virginia and Pennsylvania companies also had sizeable transfers to the state at \$99 million and \$98 million, respectively. All told, Indiana establishments produced a total of \$4.4 billion worth of goods and services for DoD and DHS in 2010.

The value of Indiana's production is the key figure to consider when assessing the full economic contribution of defense contracts in the state. What matters is the

**Figure 7: Source States for All Contracts Performed in Indiana, FY 2010**



Source: Indiana Business Research Center, using usaspending.gov data

ultimate point of performance—where contractors purchase production inputs and employees live, work and spend. The economic activity initiated when Indiana's defense contractors purchase these inputs—along with the household spending of employees—cascade throughout the state's economy. In order to estimate these effects, IBRC researchers used the IMPLAN economic modeling software to conduct a standard input-output analysis of the state's defense contracts. This model provides a

detailed account of the structure of Indiana's economy.

As an example, consider awards in the light truck and utility vehicle manufacturing industry, which attracted the most contract dollars in 2010. (In input-output terminology, these contracts are the direct effect.) The IMPLAN model estimates that Hoosier businesses in this industry purchase 41 percent of their production inputs and services (measured in dollars) from other Indiana establishments. The estimated economic effects of

*“In addition to the \$3.7 billion in contracts both awarded and performed in the state, Indiana establishments fulfilled the production of an additional \$700 million in contracts received by entities in other states.”*

these supply chain purchases are represented in the “indirect effects” category of the following tables and charts. Additionally, the employees of Indiana’s defense contractors—as well as employees throughout the supply chain—spend their earnings on food, health care, clothing, entertainment, etc. The estimated ripple effects of this spending are reported in the “induced effects” columns.<sup>2</sup>

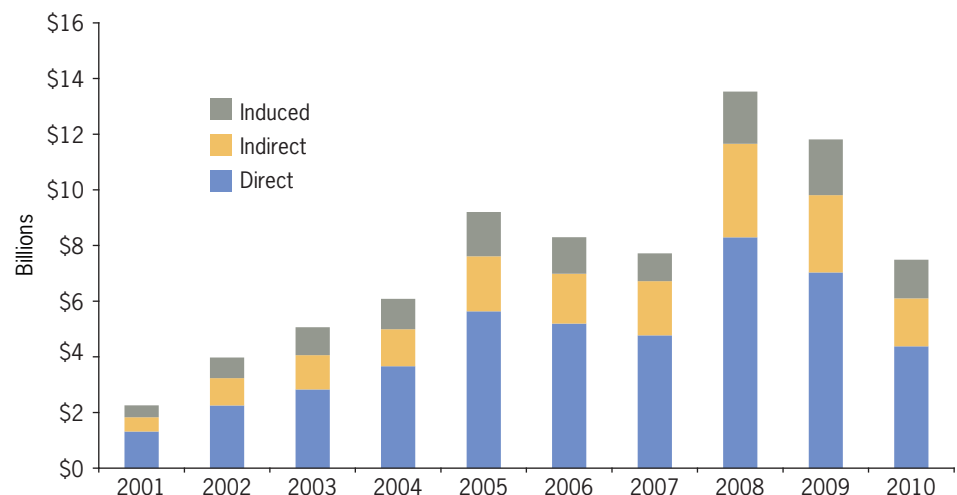
### Summary of Economic Contributions

The \$4.4 billion in Indiana-based defense production is presented in the direct output cell in **Table 10**. These contract dollars support an estimated 18,200 employees at the defense contractors and a total payroll of nearly \$1.2 billion. These figures yield a compensation per job estimate of \$64,000.

The \$4.4 billion in direct output generated an estimated \$3.1 billion in additional economic activity (indirect effect + induced effect) to bring the total economic “footprint” of defense contracts to \$7.5 billion. A useful way to interpret these effects is to look at the multipliers. The ratio of total effects to direct effects gives a multiplier of 1.71, meaning that each dollar of output generated by local defense production stimulates another \$0.71 in economic activity in the state.

The ripple effects of defense contracts also support additional

**Figure 8: Total Economic Output Effects of Defense Contracts, FY 2006 to FY 2010**



Note: All data are reported in 2010 dollars using the GDP price index from the Bureau of Economic Analysis to adjust for inflation. Source: Indiana Business Research Center, using usaspending.gov data and IMPLAN economic modeling software

jobs in the state. In addition to the estimated 18,200 direct employees at defense contractors, the purchase of production inputs from Indiana suppliers account for an estimated 8,400 additional jobs in the state. The household spending of these direct and indirect employees support another 12,000 jobs locally. This brings the total employment effect to an estimated 38,600. The ratio of total employment effects to direct employment yields a multiplier of 2.1, meaning that every 10 jobs at Indiana defense contractors in 2010 supported an additional 11 jobs in the state.

Employment multipliers tend to be higher than output multipliers since household spending supports

many low-wage and part-time jobs in industries such as entertainment, food service and retail. For this same reason, compensation per job for induced employment (\$35,900) is low compared to that for direct and

“Every 10 jobs at Indiana defense contractors in 2010 supported an additional 11 jobs in the state.”

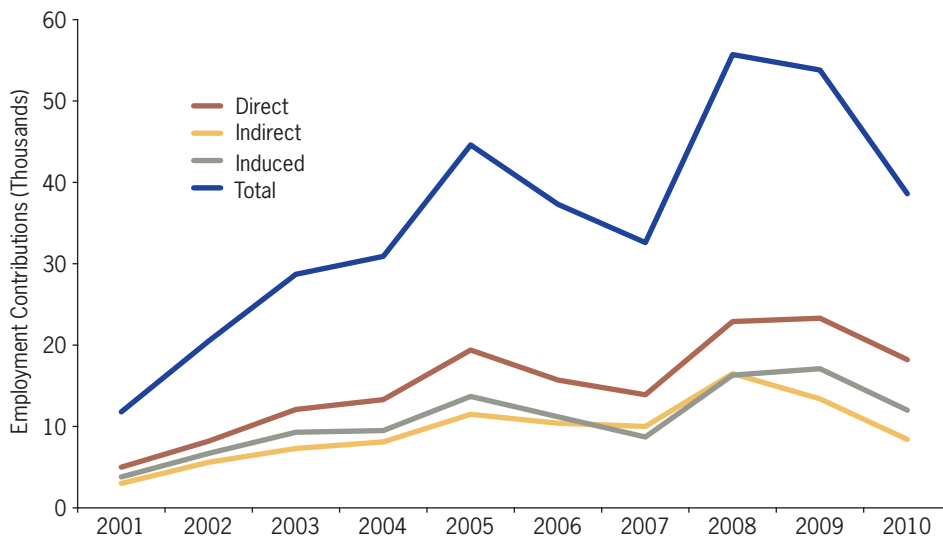
**Table 10: The Contribution of Defense Contracts to Indiana’s Economy, 2010**

	Direct Effect	Indirect Effect	Induced Effect	Total	Multiplier
Output (\$ millions)	\$4,379.2	1,721.8	1,386.5	7,487.5	1.71
Employee compensation (\$ millions)	\$1,165.4	459.6	430.6	2,055.6	1.76
Employment	18,200	8,400	12,000	38,600	2.1
Compensation per job	\$64,000	54,700	35,900	53,300	-

Note: Compensation includes wages and salaries as well as benefits and employer contributions to government social insurance. For the purposes of these results, the research team included estimates of self-employed income in employee compensation. However, these are typically reported separately. Source: Indiana Business Research Center, using usaspending.gov data and IMPLAN economic modeling software

<sup>2</sup> See the appendix for a more detailed explanation of the key terms used in this report.

**Figure 9: Indiana Employees Supported by Defense Contracts, FY 2001 to FY 2010**



Source: Indiana Business Research Center, using usaspending.gov data and IMPLAN economic modeling software

indirect employment. As noted earlier, the majority of defense contracts are concentrated in high-wage industries like transportation equipment manufacturing, computer and electronics manufacturing and professional and scientific services, which explains the excellent compensation per job figure for direct employment. The 2010 compensation per job for all defense contract-supported employment stands at an estimated \$53,300.

The number of jobs supported by defense contracts has changed over time, as well. The contract dollars awarded to Indiana companies in 2001 supported an estimated 5,000 jobs directly and 11,800 jobs total once the ripple effects are factored in. In 2008, the estimated employment effects jump to 22,900 direct jobs and 55,700 total (see **Figure 9**). The total output effect in 2010 is 38,600—roughly one-third less than in 2008.

### The Annual Economic Contributions of Defense Contracts

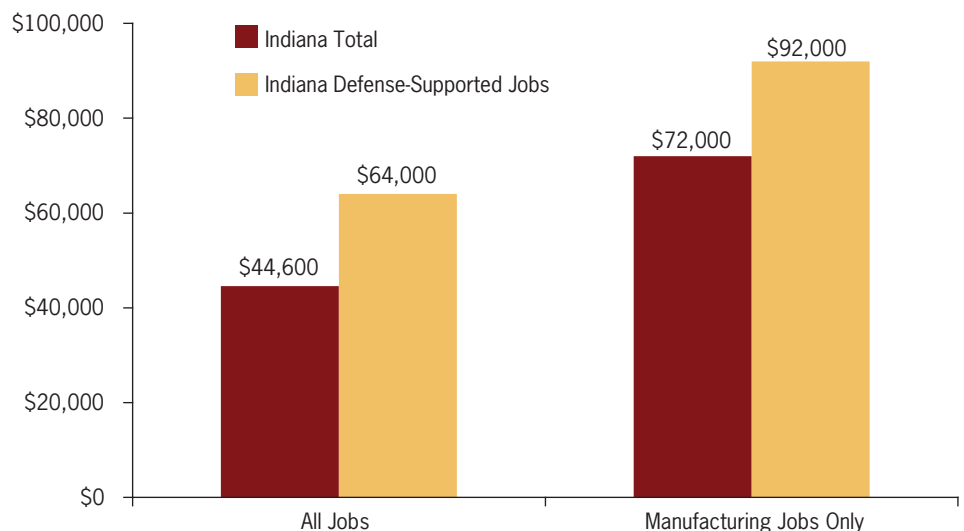
The magnitude of the defense spending contribution to the state economy has varied based on the total dollar value of contracts in any given year. In 2001, the total output effect spurred by defense spending in the state was close to \$2.3 billion. The output effect escalated along with the value of contracts, culminating in 2008 when \$8.3 billion in direct defense-related production spurred an estimated \$13.5 billion in total economic activity in Indiana (see **Figure 8**). As stated earlier, the total output effect in 2010 stood at \$7.5 billion. Direct impacts have the highest values, followed by indirect and, then, induced impacts.

### Defense Contracts Support High-Paying Jobs

One defining characteristic of defense spending in Indiana is that the contracts tend to be concentrated in high-wage industries such as transportation equipment manufacturing, computer and electronics manufacturing and professional and scientific services. According to the IMPLAN model, Indiana's average compensation per worker for all jobs was \$44,600 in 2009. The estimated average compensation for direct defense-supported jobs was nearly \$20,000 greater (see **Figure 10**).

Now, this is not exactly an apple-to-apples comparison given that the Indiana total includes the full spectrum of industries including large numbers of low-wage jobs in retail, food service, entertainment and the like. That said, there is a similar gap when comparing manufacturing jobs alone. Indiana's average compensation per manufacturing job was \$72,000 in 2009 compared to \$92,000 for manufacturing jobs directly supported by defense contracts. It is clear by this measure that the nature of defense contracts helps to boost the state's standard of living.

**Figure 10: Indiana's Compensation per Job, State Total and Direct Defense-Supported, 2009**



Note: The compensation per defense-supported job reflects direct effect jobs only. Indirect and induced effects are not included.  
Source: Indiana Business Research Center, using usaspending.gov data and IMPLAN economic modeling software

## The Tax Effects of Defense Contracting

The direct, indirect and induced economic activity created by defense contracts in Indiana also generates federal, state and local government revenues. The IMPLAN model calculates tax revenue estimates from corporate profit taxes, indirect business taxes (e.g., sales, property and excise taxes), personal taxes (e.g., income and property taxes) and employer and employee contributions to social insurance. The largest share of federal revenue comes from contributions to social insurance while indirect business taxes are the largest source of state and local revenues.

At the 2008 peak, all economic activity related to defense contracts generated \$562 million in federal revenues and \$356 million in state and local collections (see **Figure 11**). The decline in 2010 contract dollars has had an effect on government tax collections. The economic activity around Indiana's 2010 defense contracts produced \$375 million in federal revenues and \$240 million in receipts at the state and local level.

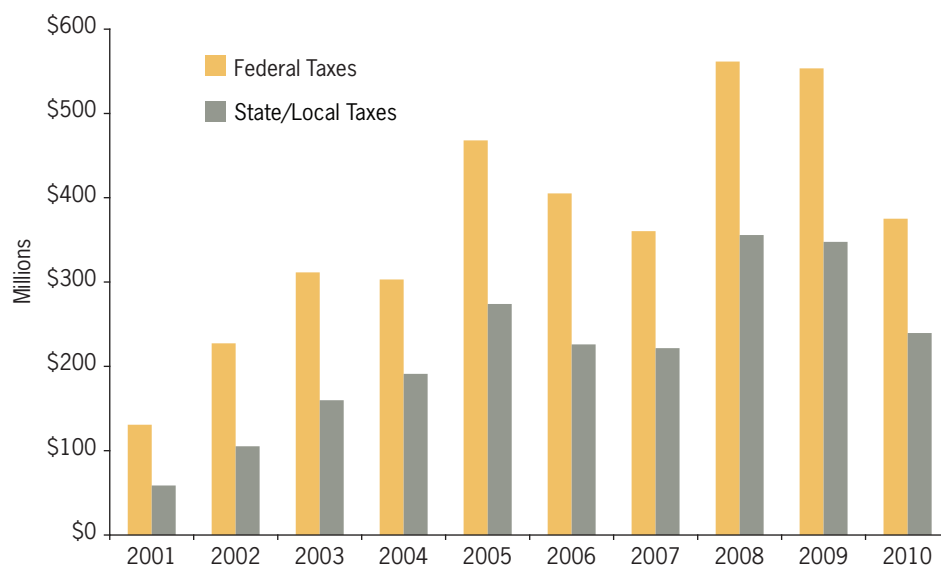
## The Economic Contribution of Defense Payrolls and Military Facilities

Up to this point, the focus has been on defense contracts exclusively. However, DoD and DHS also inject money into the state economy through wages paid to their Indiana employees. While anything purchased at Indiana's defense facilities will show up in the contracts database, wages paid by defense agencies to service members and other employees do not. Records show that DoD and DHS employed 11,300 in Indiana in 2010 with a payroll of \$803.3 million.

When analyzing the effects of employee household spending, the IMPLAN model deducts from total income an estimate of savings along with personal and payroll taxes

*“The household spending of Indiana’s 11,300 defense workers supports an estimated 6,700 additional jobs in the state, which brings the total employment effect to 18,000.”*

**Figure 11: Total Tax Impacts of Defense Contracts, FY 2001 to FY 2010**



Source: Indiana Business Research Center, using usaspending.gov data and IMPLAN economic modeling software

**Table 11: Economic Contributions of Defense Payrolls in Indiana, 2010**

	Direct Effect	Induced Effect	Total	Multiplier
Output (\$ millions)	\$472.0	\$333.8	\$805.7	1.71
Employment	11,300	6,700	18,000	1.6
Employee compensation (\$ millions)	-	-	\$251.7	-
Federal revenue (\$millions)	-	-	\$52.8	-
State/local revenue (\$millions)	-	-	\$53.6	-

Note: With household spending, there are no indirect effects (i.e., supply chain effects).

Source: Indiana Business Research Center, using usaspending.gov data and IMPLAN economic modeling software

paid by employees to arrive at a “disposable income” dollar amount. From this figure, the model makes additional deductions to account for the purchase of goods and services from outside the state, for example, dollars spent going on vacation to Disney World. After these deductions, the estimate of defense employee disposable income spent in Indiana is \$472 million (see **Table 11**). This spending spurs an additional \$333.8 million in induced spending to bring

the total economic activity generated by defense payrolls to \$805.7 million. Add this figure to the total output effect of defense contracts reported earlier (\$7.5 billion) and the impact of all defense-related activities in Indiana jumps to \$8.3 billion.

The household spending of Indiana's 11,300 defense workers supports an estimated 6,700 additional jobs in the state, which brings the total employment effect to 18,000. When combined with



the total employment effect of 2010 defense contracting (38,600), the total employment contribution of all defense activities climbs to 56,600.

The additional 6,700 jobs spurred by this household spending had a total employee compensation of \$251.7 million, which equates to an average of \$37,600 in compensation per job. This spending also generated an estimated \$52.8 million in federal tax revenues and \$53.6 million in state and local collections.

Above and beyond the payroll at facilities like Crane Naval Surface Warfare Center, Camp Atterbury or Muscatatuck Urban Training Center,

there is also spending through these bases, and installations like them through the state, for equipment, goods and services. For example, the 2010 performance of Crane-related contracts—that is, the contract work completed across the nation in 2010—totaled about \$1.3 billion. Of that, almost \$500 million was performed in Indiana.

Unfortunately, it is unclear how much of this spending is recorded and available through USAspending.gov. The IBRC researchers did not want to double-count contract awards and economic impact, but initial analysis shows that a

significant volume of the base-related expenditures on equipment, material, maintenance and professional services are not present in the publically available dataset of USAspending.gov. Reconciling DoD/DHS accounting was not in the scope of this report, but one thing is clear. The economic impact estimates presented in this report underestimate the true size and importance of the Departments of Defense and Homeland Security expenditures in the state.

# Conclusion

**T**he importance of defense contracts to the Indiana economy is clear. The combined economic effects of this spending generated \$7.5 billion total economic output in 2010 and supported an estimated 38,600 jobs. Add in defense payrolls and those figures jump to \$8.3 billion in output and 56,600 jobs, and these values for the economic impact in the state are *conservative* estimates.

Defense spending has an even greater impact on the state economy when considering the types of jobs these contracts create. Defense dollars to Indiana are heavily concentrated in high-tech, high-wage pursuits such as auto, truck and aircraft-related manufacturing; communication equipment manufacturing; and professional and scientific services. As a result, the jobs supported by defense contracts tend to pay well above the state average. In this sense, not only does defense contracting generate a significant number of

jobs, it generates the type of jobs that Indiana needs.

And the number of these jobs has grown over the decade. The estimate for the total jobs supported by defense spending increased nearly five-fold between 2001 and 2008, when the value of contracts peaked at \$7.8 billion. The numbers have slipped since then, but the 2010 employment effect was still more than three-times greater than the 2001 mark.

This fluctuation in the value of defense contracts awarded to Hoosier businesses will bear watching in the coming years. Growth in contract dollars has significant positive ripple effects throughout the state's economy, but declining contract awards would place those positive effects in jeopardy. Contract levels are bound to change as the nation's defense needs evolve and federal budget priorities shift. The direction of these changes will be an important economic indicator for Indiana.

*“The estimate for the total jobs supported by defense spending increased nearly five-fold between 2001 and 2008, when the value of contracts peaked at \$7.8 billion.”*

# Appendix

## About the Data and Results

USAspending.gov is a website launched in 2007 by the U.S. Office of Management and Budget to provide a single searchable database for all federal awards. The data from this website refer to the prime contract awardees only. However, it is common for defense contractors to partner with one another on large projects. So, large portions of some contracts awarded to a contractor in California or Virginia could be sub-contracted to Indiana companies and those dollars brought to the state. The USAspending.gov database does not capture these types of agreements and, therefore, they are not represented in this analysis. Of course, the opposite can take place. Indiana defense contractors can sub-contract out-of-state firms. As of now, there is no way to track these transactions accurately and no way of knowing if these practices turn out to be a net positive or net negative for Indiana.

That is not to say that this analysis fails to capture economic relationships between defense contractors and their suppliers. The purpose of the input-output analysis is to measure these relationships. However, this study captures only the relationships between Indiana contractors and their Indiana suppliers. Thus, the principal focus of this study is the economic effects of defense prime contracts awarded to Indiana companies.

Note that contracts are assigned to the fiscal year in which they are signed but the execution of some contracts can extend over multiple years. To learn more about the data, visit [www.usaspending.gov/learn?tab=FAQ](http://www.usaspending.gov/learn?tab=FAQ).

## Key Terms

- **Direct Effects:** Refers to the increase in final demand or employment in Indiana that can be attributed specifically to defense contracts.
- **Indirect Effects:** A measure of the change in dollars or employment caused when defense contractors increase their purchases of goods and services from suppliers and, in turn, those suppliers purchase more inputs and so on throughout the economy. An auto supply manufacturer, for instance, will buy component parts from a supplier. The manufacturers of those components buy electricity to power their plants, buy material inputs for those components, and employ people to run the equipment. These transactions are the indirect ripple effects associated with the defense contractor's purchases.
- **Induced Effects:** These reflect the changes—whether in dollars or employment—that result from the household spending of employees at defense contractors and their suppliers. Induced spending will increase or decrease as output changes along the economic supply chain. For example, as a defense contractor's production and sales increases, the output of its supply chain increases correspondingly. Those output changes also result in changes in household income and spending of suppliers' employees. Induced effects represent the change in overall economic output and employment resulting from such household spending changes.
- **Total Effects:** The total of all economic effects is the size of the economic impact and is the sum of the direct, indirect and induced effects. The IMPLAN model also tracks the tax effects associated with all the transactions and economic activity associated with the direct and ripple effects. For example, household spending at retailers generates state sales tax. In addition, those retailers also pay property taxes to local governments. As a result, this analysis was also able to estimate the federal, state and local government tax flows.
- **Multiplier:** The multiplier is the magnitude of the economic response in a particular geographic area associated with a change—either an increase or a decrease—in the direct effects. For example, multiply every dollar of defense contractor output in 2010 by 1.71 to find an estimate of the total contribution of this activity to Indiana's economy. Another way to look at it is that every dollar of output supports \$0.71 in additional economic activity in the state.
- **Output:** The value of an industry's total production. Output includes both the price of production inputs and the value-added of the industry.
- **Employee Compensation:** This measure includes wages and salaries as well as benefits and employer contributions to government

social insurance. This term can be thought of as the total cost of labor to an employer. For the purposes of this study, compensation includes both employee compensation and self-employed income (i.e., proprietor's income). However, these are typically reported separately.

## Input-Output Analysis Methodology

IBRC researchers employed standard input-output analysis techniques using the IMPLAN economic modeling software to estimate the total contribution of defense contracts to Indiana. The makers of IMPLAN produce annual models for the U.S., states and sub-state areas. These models provide the detailed accounting of the economic relationships in a given geography that is needed to estimate the ripple effects of any economic change.

The IBRC has IMPLAN models dating back to 2003. Researchers analyzed the effects of annual contract amounts with the corresponding IMPLAN model for that year. Contract amounts for 2001 and 2002 were analyzed using the 2003 IMPLAN model for Indiana. This could lead to slightly inaccurate estimates if there were significant changes in the nature of Indiana's economy between 2001 and 2003. Additionally, 2009 is the most current year for IMPLAN models at the time of this writing. Therefore, Indiana's 2010 contract dollars were analyzed using the 2009 IMPLAN model for the state.

Each contract in the database has a North American Industry Classification System (NAICS) code associated with it. The NAICS code indicates the specific industry that describes the good or service provided by a given defense contractor (e.g., light truck manufacturing, professional services, etc.). In all, defense contracts to Indiana were awarded in 264 different

industries in 2010. The IMPLAN model features its own industry classification scheme. There is not a one-to-one relationship between the NAICS and IMPLAN classification systems so researchers used industry code crosswalks to assign contracts to the appropriate IMPLAN sector. IMPLAN changed its classification scheme in 2007 so the company provides multiple crosswalks to allow for accurate allocations for any given year.

There were a few cases where the IMPLAN model indicated that a specific industry did not exist in Indiana in a certain year, yet the defense contract database showed contracts in that industry. In these few cases, IBRC researchers modeled the effects of these contracts in a closely related industry.

### About IMPLAN Economic Impact Modeling Software

Minnesota IMPLAN Group, Inc. (MIG) is the company responsible for developing IMPLAN data and software. Using classic input-output analysis, IMPLAN can be used to measure the economic effects of an economic event, such as a factory closing or a new plant opening, or the size of the economic footprint of an economic entity like a production facility, headquarters or university.

### The Economic Theory behind IMPLAN

IMPLAN is built on a mathematical input-output (I-O) model that expresses relationships between sectors of the economy in a chosen geographic location. In expressing the flow of dollars through a regional economy, the input-output model assumes fixed relationships between producers and their suppliers based on demand. It also omits any dollars spent outside of the regional economy—say, by producers who import raw goods from another area, or by employees who commute and do their household spending elsewhere.

The idea behind input-output modeling is that the inter-industry relationships within a region largely determine how that economy will respond to economic changes. In an I-O model, the increase in demand for a certain product or service causes a multiplier effect, layers of effect that come in a chain reaction. Increased demand for a product affects the producer of the product, the producer's employees, the producer's suppliers, the supplier's employees, and so on, ultimately generating a total effect in the economy that is greater than the initial change in demand. Say demand for Andersen Windows' wood window products increases. Sales grow, so Andersen has to hire more people, and the company may buy more from local vendors, and those vendors in turn have to hire more people ... who in turn buy more groceries. The ratio of that overall effect to the initial change is called a regional multiplier and can be expressed like this:

$$(Direct\ Effect + Indirect\ Effects + Induced\ Effects) / (Direct\ Effect) = Multiplier$$

Multipliers are industry and region specific. Each industry has a unique output multiplier, because each industry has a different pattern of purchases from firms inside and outside of the regional economy. (The output multiplier is in turn used to calculate income and employment multipliers.)

Estimating a multiplier is not the end goal of IMPLAN users. Most wish to estimate other numbers and get the answers to the following questions: How many jobs will this new firm produce? How much will the local economy be affected by this plant closing? What will the effects be of an increase in product demand? Based on those user choices, IMPLAN software constructs "social accounts" to measure the flow of dollars from purchasers to producers within the region. The data in those social accounts will set up the precise



equations needed to finally answer those questions users have—about the impact of a new company, a plant closing, or greater product demand—and yield the answers.

IMPLAN constructs its input-output model using aggregated production, employment, and trade data from local, regional, and national sources, such as the U.S. Census Bureau's annual County Business Patterns report, and the U.S. Bureau of Labor Statistics' annual report called Covered Employment and Wages. In addition to gathering enormous amounts of data from government sources, the company also estimates some data where they haven't been reported at the level of detail needed (county-level production

data, for instance), or where detail is omitted in government reports to protect the confidentiality of individual companies whose data would be easily recognized due to a sparse population of businesses in the area.

IMPLAN's accessibility and ease of use also make it a target of criticism by some economists, who charge that in the wrong hands, the software—or any input-output model—will produce inflated results at best, and at worst, completely ridiculous projections. Anyone can point and click their way to an outcome without fully understanding the economics in which the tool is grounded and without knowing how to look at data sets with a nuanced eye. The IBRC has two analysts that

have attended advanced training in the use of the IMPLAN modeling software. The estimates that the IBRC analysts generate are pressure-tested and triple-checked to ensure that they are accurate and reflect the most trustworthy application of the modeling software. In all instances, the most conservative estimation assumptions and procedures are used to produce the IMPLAN results.

Most of the above IMPLAN software description was culled from the magazine article "The Number Factory," *Twin City Business*, February 2008. It can be found online at [www.tcbmag.com/features/features/95796p1.aspx](http://www.tcbmag.com/features/features/95796p1.aspx).