Indiana's Global Exports
Report for 2008

A Report for the
INDIANA ECONOMIC DEVELOPMENT CORPORATION

Produced July 2008 by the

KELLEY SCHOOL OF BUSINESS
INDIANA UNIVERSITY
Indiana Business Research Center

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Executive Summary

The year 2006 was a good year for exports, and 2007 was even better. Indiana exported $25.9 billion in goods in 2007, an increase of 14.4 percent over its 2006 export total. This robust growth rate represents a two-fold increase in the same figure from 2005 to 2006, which was 5.3 percent. Indiana's export sales increased to eight of its top 10 trading partners (Japan and the Netherlands being the exceptions).

While below the general pace for the nation and Midwest in 2006, Indiana outpaced the surrounding region and the United States in export growth in 2007. These trends are presented in **Figure I**. In the United States, exports increased by 12.1 percent in 2006. Buoyed by a rate of export growth that was above the national average, Indiana's rank in export sales moved from 13th in 2006 to 12th in 2007.

Indiana was not the only state with higher exports. In fact, all but seven states increased export sales, and 20 states experienced an increase in the rate of export growth. For the last three years, export growth has been fairly consistent for the Midwest region and for the nation.

In a year in which Indiana made special efforts to step up its economic relationship with the country, Germany saw a dramatic 50 percent increase in Indiana imports. As a result, Germany cracked Indiana's top five export destinations. Brazil and China, two emerging economies that continue to drive world economic growth despite a general slowdown in the developed economies, are also figuring significantly into Indiana's export economy. Brazil had the greatest percentage increase in purchase of Indiana exports at 56 percent in 2007. China rose to sixth on Indiana's list of top export destinations as it continued its upward trend in buying Indiana goods.

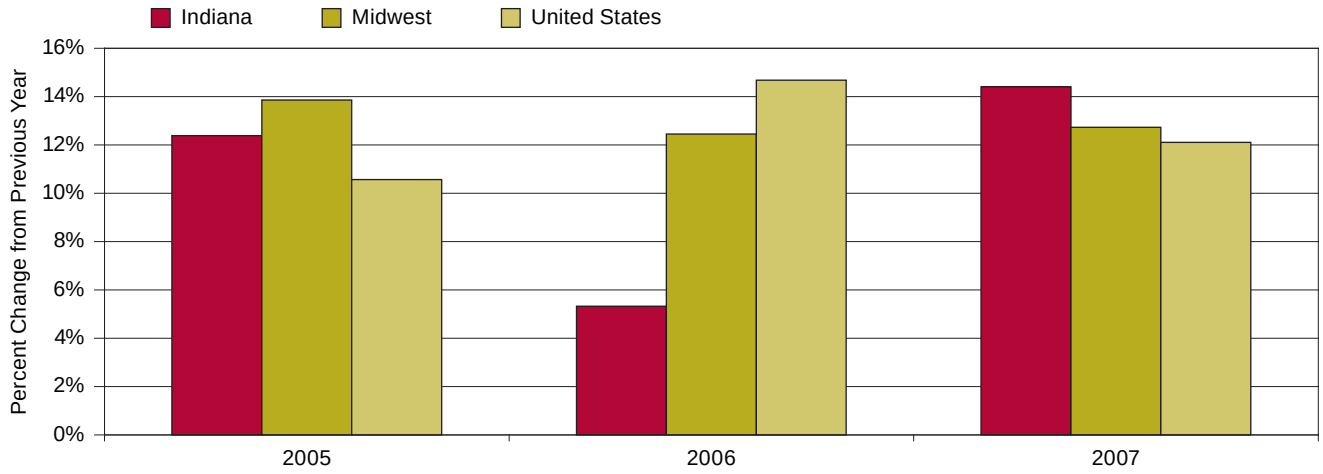
Canada ranked first in terms of dollar-value increase from 2006 to 2007, but its percentage share of Indiana exports continues to diminish. The country, which has long been the state's predominant trading partner, has seen its share of Indiana's exports fall from a peak of 54 percent in 1998 to 41 percent in 2007.

> "Indiana exported $25.9 billion in goods in 2007, an increase of 14.4 percent over its 2006 export total."

Vehicles and machinery remain Indiana's top two export commodities and both have had an expansion in their export sales in recent years. The rapid growth of pharmaceutical product exports—23 percent growth at an average annual rate since 2001—has made it Indiana's fourth largest export commodity. The exports of optical and medical instruments have also registered a healthy annual average growth rate of 9.5 percent between 2001 and 2007.

Note: The majority of data for this report come from WISER Trade and is the source unless otherwise stated.

Figure I: Annual Increase in Exports for Indiana, the Midwest and the United States



Trade Outlook for 2008

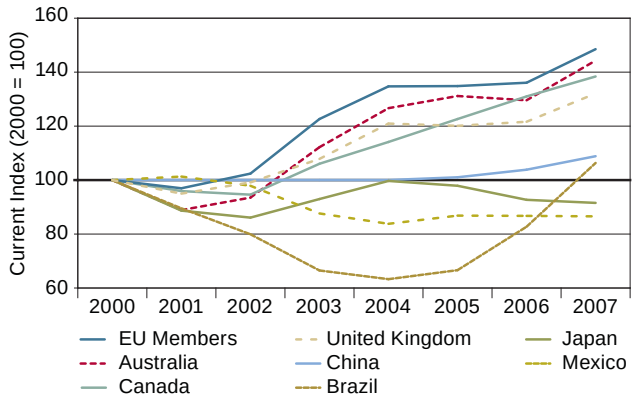
Indiana's connection to the global economy continues to become stronger. One source of this connection is exports. This report, prepared annually for the Indiana Economic Development Corporation, tracks the industry mix and the destinations of Indiana's exports to help in understanding the importance of exports as sources of employment and economic growth in Indiana. It also examines whether there are discernible trends for future export growth in the global marketplace.

The report is structured as follows: The first section highlights global economic growth and attempts to assess whether conditions are favorable for Indiana's exporters. Section II discusses recent state and national export trends. Section III surveys Indiana's export destinations. The last section examines the state's principal export industries.

Trade Outlook

World economic growth remained stable in 2007, though the onset of the housing crisis, the shakeup in financial markets and the stubborn increases in energy prices threaten healthy growth in 2008. United States exports slowed from a growth rate of 14.7 percent in 2006 to 12.1 percent in 2007. Indiana's export growth was below the national trend in 2006, but then rebounded, increasing 14.4 percent from 2006 to 2007. The value of the state's exports in 2007 exceeded the 2006 total by $3.2 billion. Early figures from February 2008, however, suggest that slower global economic growth may translate to slower growth for Indiana exports for the remainder of 2008.

Figure 1: Foreign Exchange Trends for Indiana's Top Trading Partners, 2000 to 2007



Source: Federal Reserve

Table 1: Real GDP, 2007 to 2009*

Nation	Percentage Change from Previous Year		
	2007	2008	2009
Australia	4.3	3.5	3.0
Brazil**	4.8	4.5	4.5
Canada	2.6	2.4	2.7
China**	11.4	10.7	10.1
France	1.9	1.8	2.0
Germany	2.6	1.8	1.6
Japan	1.9	1.6	1.8
Korea	4.9	5.2	5.1
Mexico	3.0	3.6	4.3
Netherlands	3.0	2.4	2.3
United Kingdom	3.1	2.0	2.4
United States	2.2	2.0	2.2
Euro area	2.6	1.9	2.0

*Data for 2007 are actual, while data for 2008 and 2009 are forecasts
**Nonmember growth estimates by OECD
Source: Organisation for Economic Cooperation and Development

Table 1 presents the Organisation for Economic Cooperation and Development's (OECD) economic growth forecasts for Indiana's leading export destinations.[1] For the world economy, the International Monetary Fund forecasts 2008 economic growth to be 3.8 percent and 4.9 percent in 2009. This growth will be driven by emerging economies such as China, Brazil, India and Russia. The IMF forecast for advanced economies—Indiana's primary trading partners—is an anemic 1.3 percent for both 2008 and 2009.

In contrast, the economic growth of Indiana's principal trading partners was relatively strong in 2007. As a result, purchase of Indiana's exports worldwide grew at a double-digit pace.

The current foreign exchange environment is favorable for continuing strength in exports. Except for Mexico and Japan, the cost of foreign exchange in U.S. dollars has increased for U.S. trading partners since 2001. The yuan, China's currency, has only registered a gentle adjustment with respect to the dollar recently, as **Figure 1** shows.

Despite the weakening of the U.S. dollar vis-à-vis the Canadian dollar, Indiana's exports to Canada—Indiana's largest export market—increased by a mere 3 percent from 2005 to 2006. From 2006 to 2007, exports to Canada rebounded to 8.6 percent. Vehicle exports played an important role in that rebound, increasing by 10.3 percent from 2006 to 2007. Export

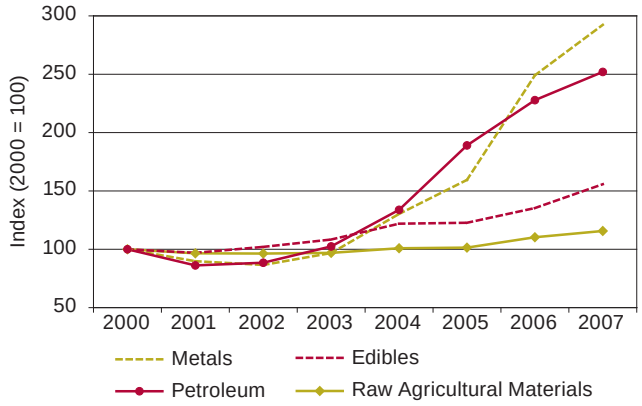
growth of industrial machinery from Indiana to Canada also bounced back after a disappointing year in 2006. A 1 percent drop in industrial machinery exports to Canada from 2005 to 2006 was followed by a 5.1 percent increase from 2006 to 2007.

Figure 2 shows the latest annual change in the top five export categories from the United States and Indiana to Canada. The second-largest upswing came in vehicles and parts, which had the highest dollars value (shown by the triangles on the graph). Exports of iron, steel and related products saw the largest percentage increase, both in Indiana and the United States. Indiana's exports of iron, steel and related products to Canada increased more than 13 percent.

What the weakening dollar gives in terms of helping export sales, rising commodity prices takes away in terms of profitability. Indeed, a weak dollar increases the prices of raw materials, ranging from coal to copper to crops. Fueled largely by China and India's insatiable hunger for raw materials, the strong global demand has dramatically increased the cost of commodities. **Figure 3** shows the trends in commodity prices since 2000. Raw material prices from petroleum to scrap steel have more than doubled since the economic downturn in 2001 and 2002. Many economists and market watchers expect It won't be long before the index for raw agricultural materials follows suit. While a weakening dollar makes U.S. goods cheaper in world markets, the rising cost of inputs will put a profit squeeze on producers.

A weak U.S. dollar will have mixed effects, and, like rising gasoline prices, the burden of those effects will be spread unevenly.

Figure 3: World Primary Commodity Prices

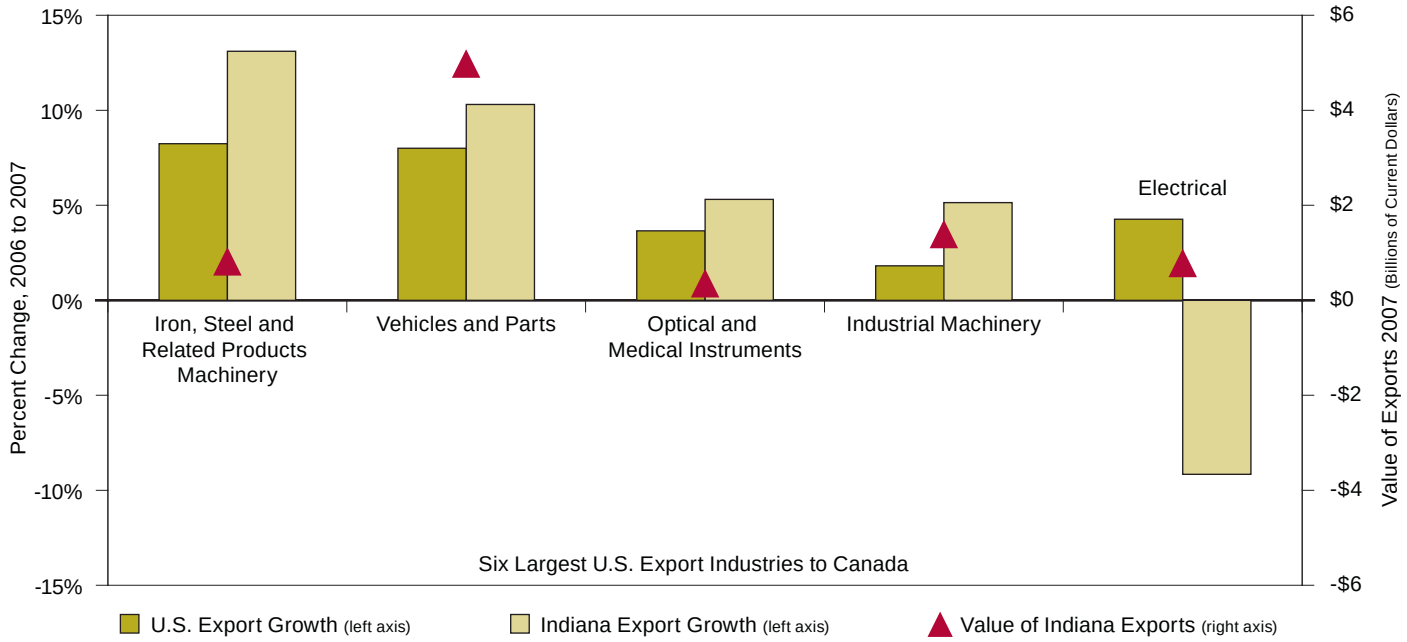


Source: International Monetary Fund

Notes

1. The OECD forecasts growth for member countries and also for other large economies, such as China and Brazil.

Figure 2: Comparing U.S. and Indiana Exports to Canada by Industry, 2007



Indiana's Exports in 2007

As Figure 4 shows, Indiana exports have been on a steady growth trend from 1996 to 2007, with the relative weakness in 2001 and 2002 attributed to the economic slowdown in most advanced countries. Indiana exports rose from $11.0 billion to $25.9 billion in this period.

After weaker growth from 2005 to 2006, the rate of increase for Indiana exports from 2006 to 2007 was strong. Exports rose 14.4 percent from 2006 to 2007, more than double the rate from 2005 to 2006. As shown in **Figure 5**, export growth in nearly all industries has greatly exceeded the rate of GDP growth by industry.

Figure 6 shows annual change in exports for Indiana, the Midwest and the United States from 1997 to 2007. Indiana exports recovered from the 2001 recession more quickly

Figure 4: Indiana Exports, 1996 to 2007

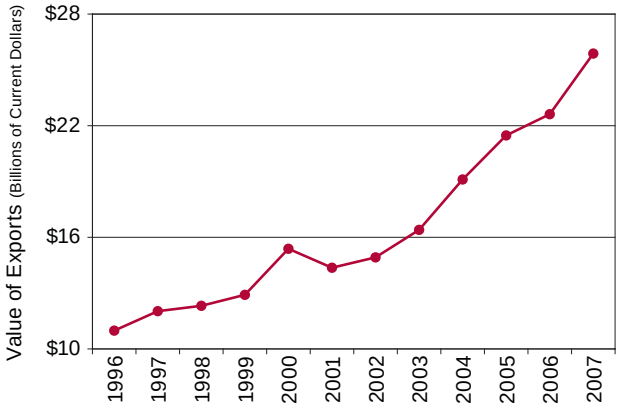
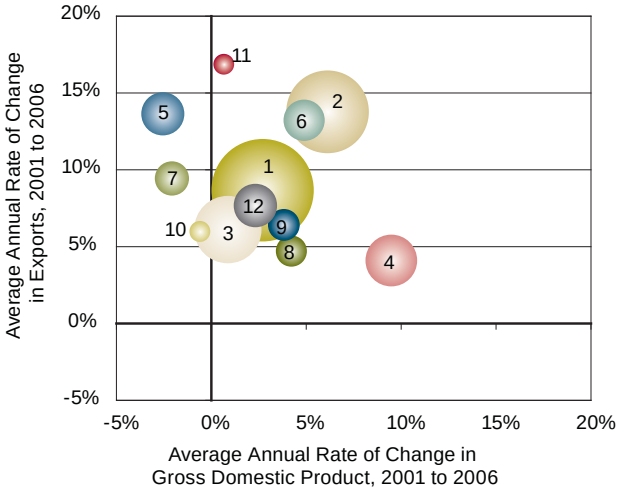


Figure 5: Comparing Indiana's Growth in Exports and GDP by Industry, 2001 to 2006



1. Transportation Equipment
2. Chemicals
3. Machinery (Except Electrical)
4. Computer and Electronic Products
5. Primary Metal Manufacturing
6. Miscellaneous Manufactured Commodities
7. Electrical Equipment, Appliances and Components
8. Plastics and Rubber Products
9. Fabricated Metal Products, Nesoi*
10. Food and Kindred Products
11. Printing, Publishing and Similar Products
12. Other

*Not elsewhere specified or included
Note: Industry classifications based on NAICS industry codes. WISER Trade data based on the Harmonized System for Commodities
Sources: WISER Trade (exports) and the Bureau of Economic Analysis (gross domestic product)

Figure 6: Annual Change in Indiana, Midwestern and U.S. Exports, 1997 to 2007

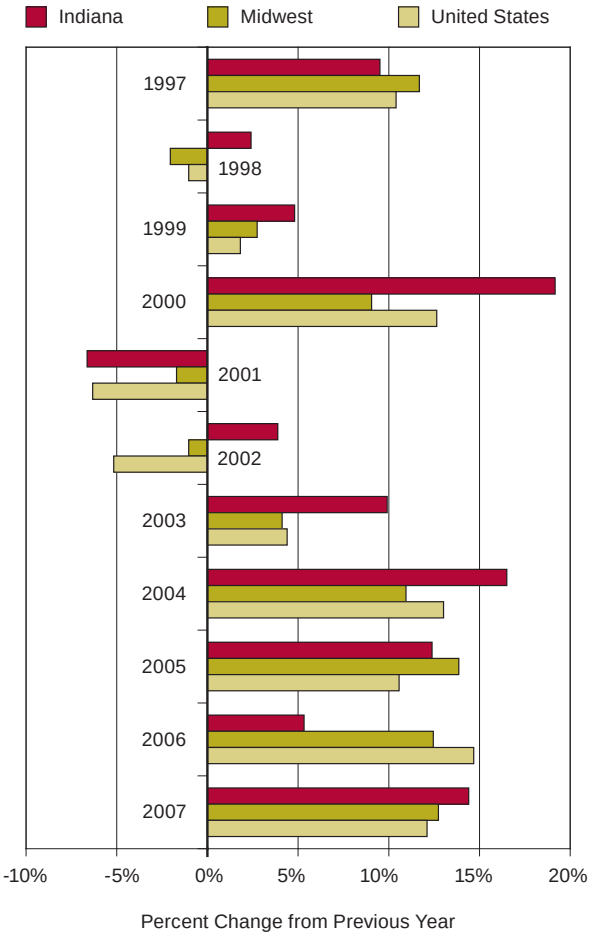
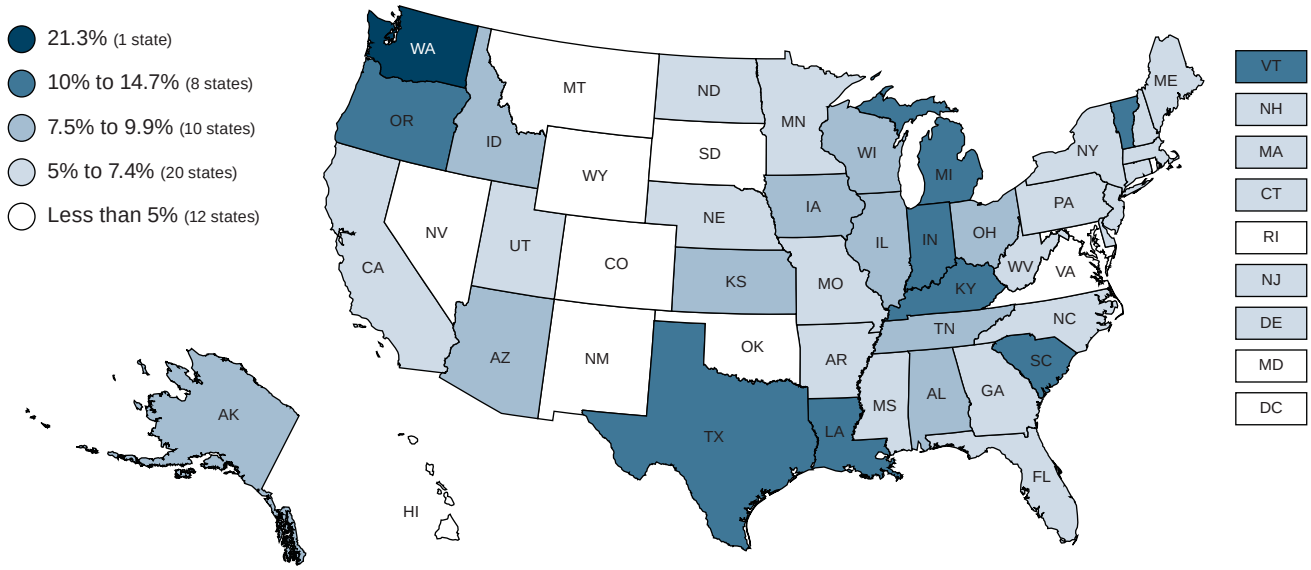


Figure 7: State Export Dependency—Export Sales to GDP by State, 2007

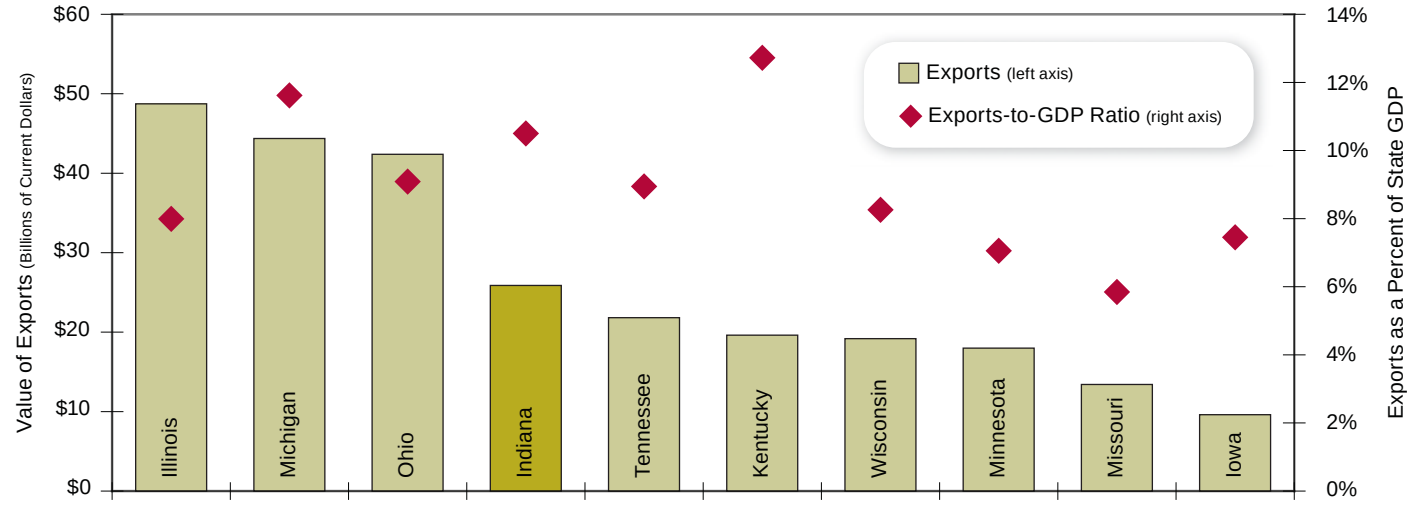


Sources: WISER Trade (exports) and the Bureau of Economic Analysis (gross domestic product)

than the Midwestern neighbors and the nation as a whole. In 2006, however, this better-than-average performance was reversed. Much of the softening in Indiana exports can be attributed to deceleration of exports to Canada, Indiana's largest export destination.

Any significant deceleration in export growth may have a considerable effect on Indiana, a state that is relatively dependent on selling manufactures abroad. In 2006, Indiana ranked eighth among the 50 states in terms of the ratio of exports to gross domestic product (GDP). It maintained this ranking in 2007. While GDP—the sum of all value-added components like wages and profits—is not conceptually the same as sales (because sales includes the price of intermediate inputs as well as value added), the ratio can provide a rough measure of the relative dependence a state has on exports. **Figure 7** shows how Indiana's export-to-GDP ratio of 10.5 percent compares with the rest of the country. It should come as no surprise that Washington, a state that manufactures and exports large-ticket products such as commercial aircraft, ranks number one in terms of the export-to-GDP ratio.

Figure 8: Midwestern States Export Dependency Total Exports and Export-to-GDP Ratio, 2007



Sources: WISER Trade (exports) and the Bureau of Economic Analysis (gross domestic product)

Figure 9: Value of Exports by State in Current Dollars, 2007

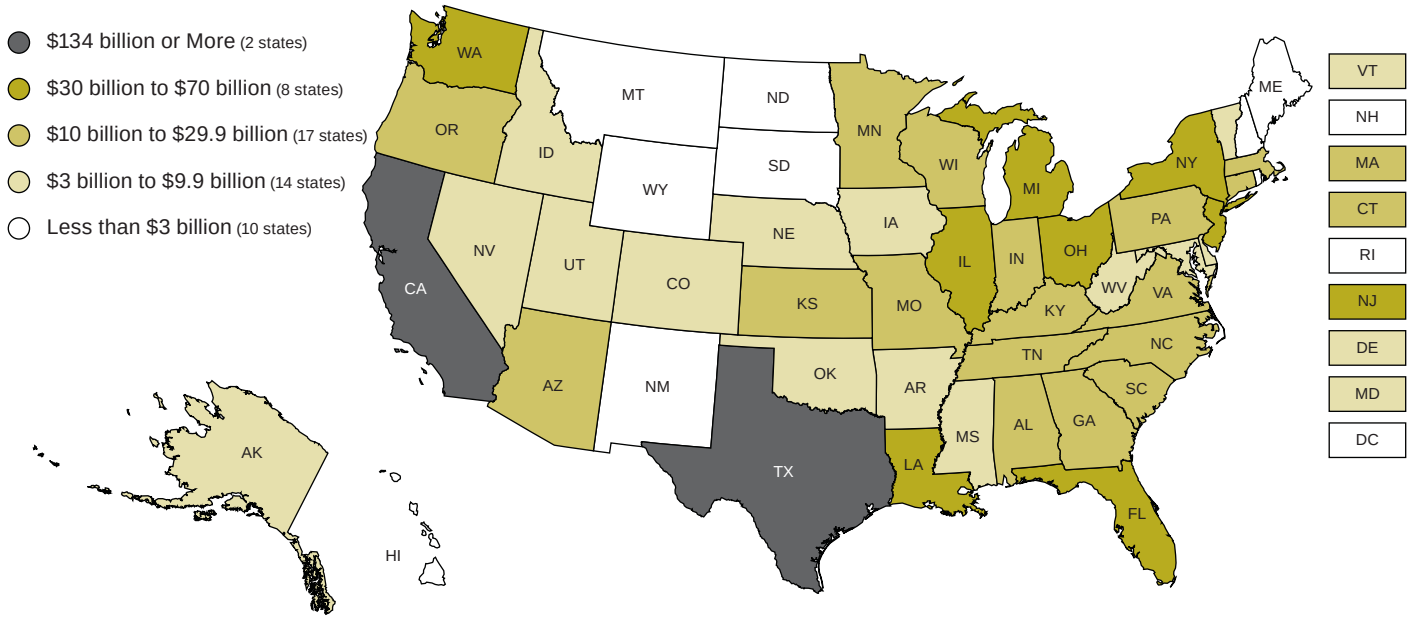
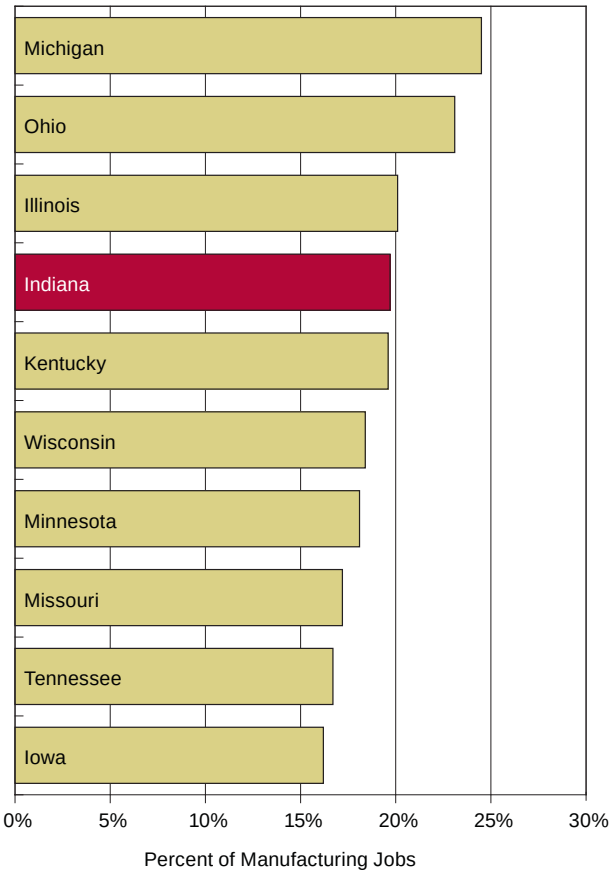


Figure 8 compares Indiana's 2007 export sales and the export-to-GDP ratio with its broadly defined Midwestern neighbors: Illinois, Iowa, Kentucky, Michigan, Minnesota, Missouri, Ohio, Tennessee and Wisconsin. In terms of export sales dollars, Indiana is in the middle tier. It is not surprising that states with higher levels of GDP than Indiana—for example, the Midwestern states of Illinois, Michigan and Ohio—would also have a greater dollar volume than Indiana. Export dependency, however, provides a better measure of the relative importance of global transactions for a state. Only the Midwestern states of Michigan and Kentucky are more export dependent than Indiana, according to this rough measure of export reliance. **Figure 9** shows how the 50 states compare regarding the dollar value of export sales.

Figure 10 shows the percentage of manufacturing employment that is dependent upon exports in Indiana and the Midwest. In 2006, the most recent year for which reliable data are available, Indiana ranked fourth among the 10 Midwestern states in export-oriented manufacturing employment.

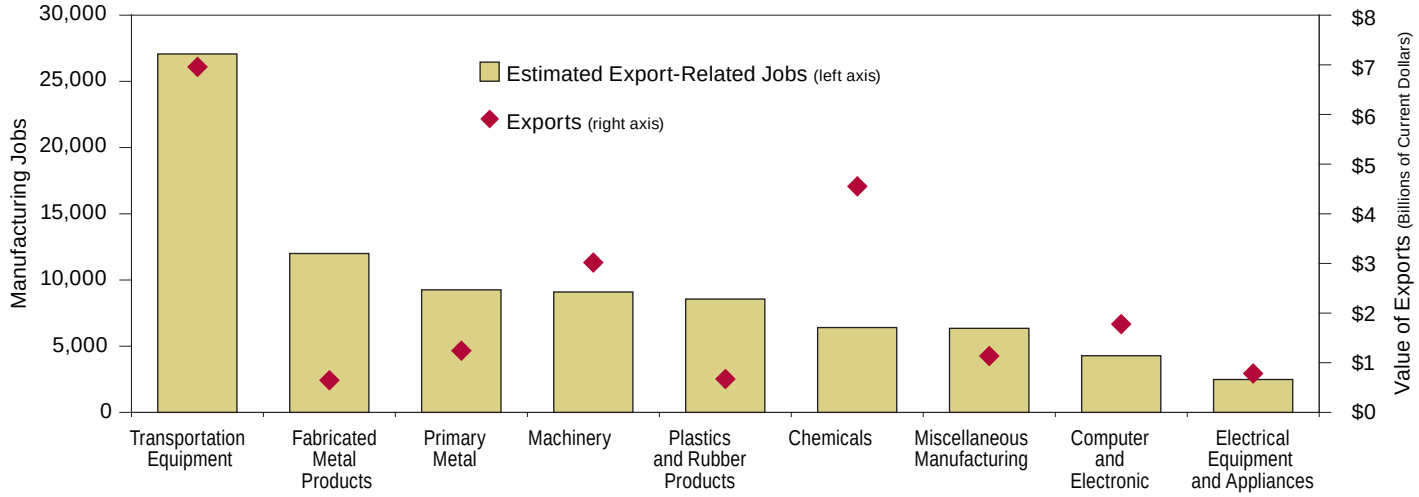
Figure 11 provides greater industry detail for Indiana. In 2006, export sales supported more than 27,000 jobs in transportation equipment manufacturing. The data also suggest that the number of jobs is not necessarily tied to the dollar value of export sales. For example, a relatively small dollar value of exports in fabricated metal products drives a large number of jobs.

Figure 10: Manufacturing Employment Devoted to Exports, 2006



Source: U.S. Census Bureau

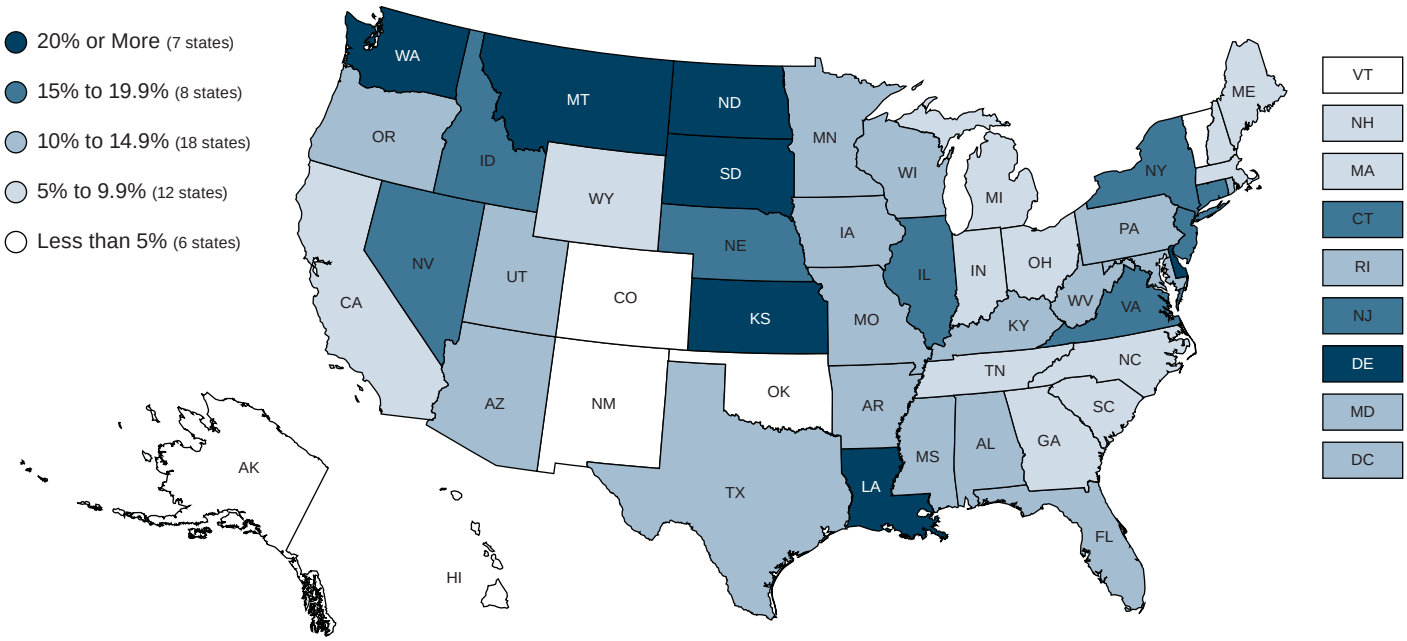
Figure 11: Indiana Export-Related Employment in Manufacturing, 2006



Note: Employment and exports are defined by NAICS industry codes
Sources: WISER Trade (exports 2006), International Trade Administration and the U.S. Census Bureau (percentage of export-related employment by industry for 2006) and Bureau of Economic Analysis (employment by industry 2006)

"In 2006, export sales supported more than 27,000 jobs in Indiana's transportation equipment manufacturing industry."

Figure 12: Average Annual Rate of Change in Exports, 2005 to 2007



Though 2007 was a year of solid export growth, Indiana's three-year average growth rate from 2005–2007 is still below the U.S. average, as shown in **Figure 12**. Indiana's three-year average growth rate was driven down by the relatively poor performance in 2006. This more recent trend is also evident when Indiana is compared to the other Midwestern states.

Figure 13 compares the rates of export increase and the relative dollar-value of exports in the Midwestern states. The horizontal axis shows the average annual rate for export growth from 2001 to 2007. The vertical axis plots the change in exports from 2006 to 2007. The bubble size shows the relative value of exports in 2006. The diagonal line divides the chart into halves. A bubble above the line indicates that the most recent year's growth exceeds the 2001 to 2007 trend. In other words, Indiana exports accelerated in 2007. Bubbles below the line indicate that the most recent year's growth is below trend—that is, exports were decelerating in 2007. This was the case for Michigan and Missouri. In 2006, Indiana was the only Midwestern state that had decelerating export growth, but in 2007, that turned around dramatically.

Figure 13: Export Trends in the Midwest

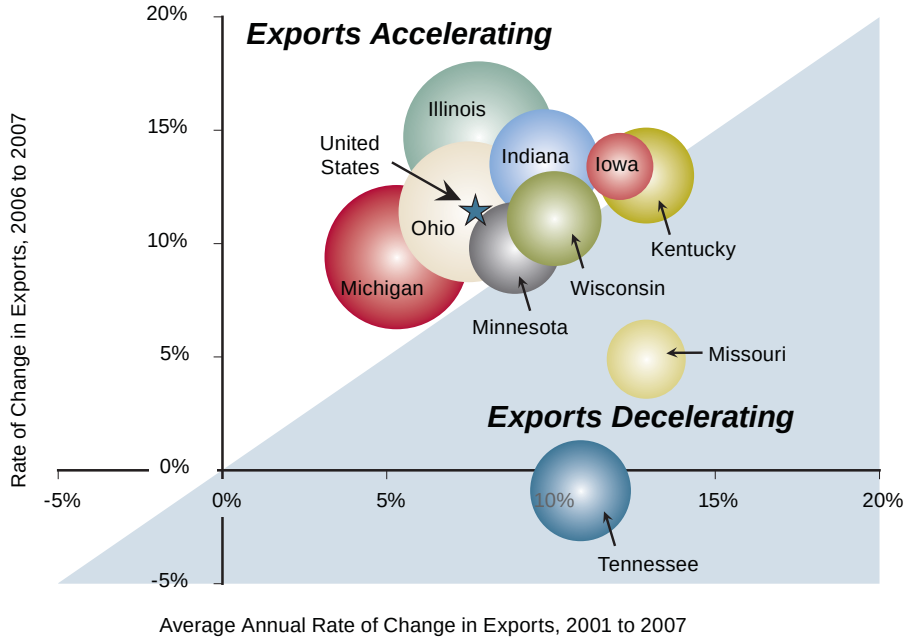
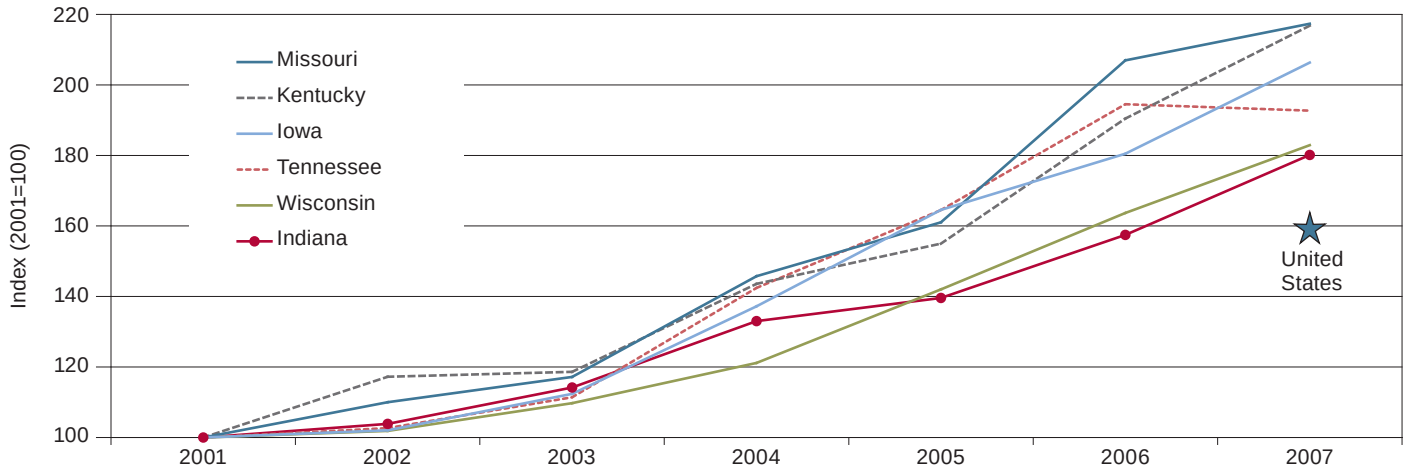


Figure 14 compares Indiana's export growth from 2001 to 2007 with the leading Midwestern states and the United States as a whole. The graph uses an index based in 2001, the year of the most recent recession. While Indiana exports have done better on average than the nation since 2001, export growth has not been as robust as its more dynamic peers.

Figure 14: Export Index for Selected Midwestern States, 2001 to 2007



Indiana's Export Destinations

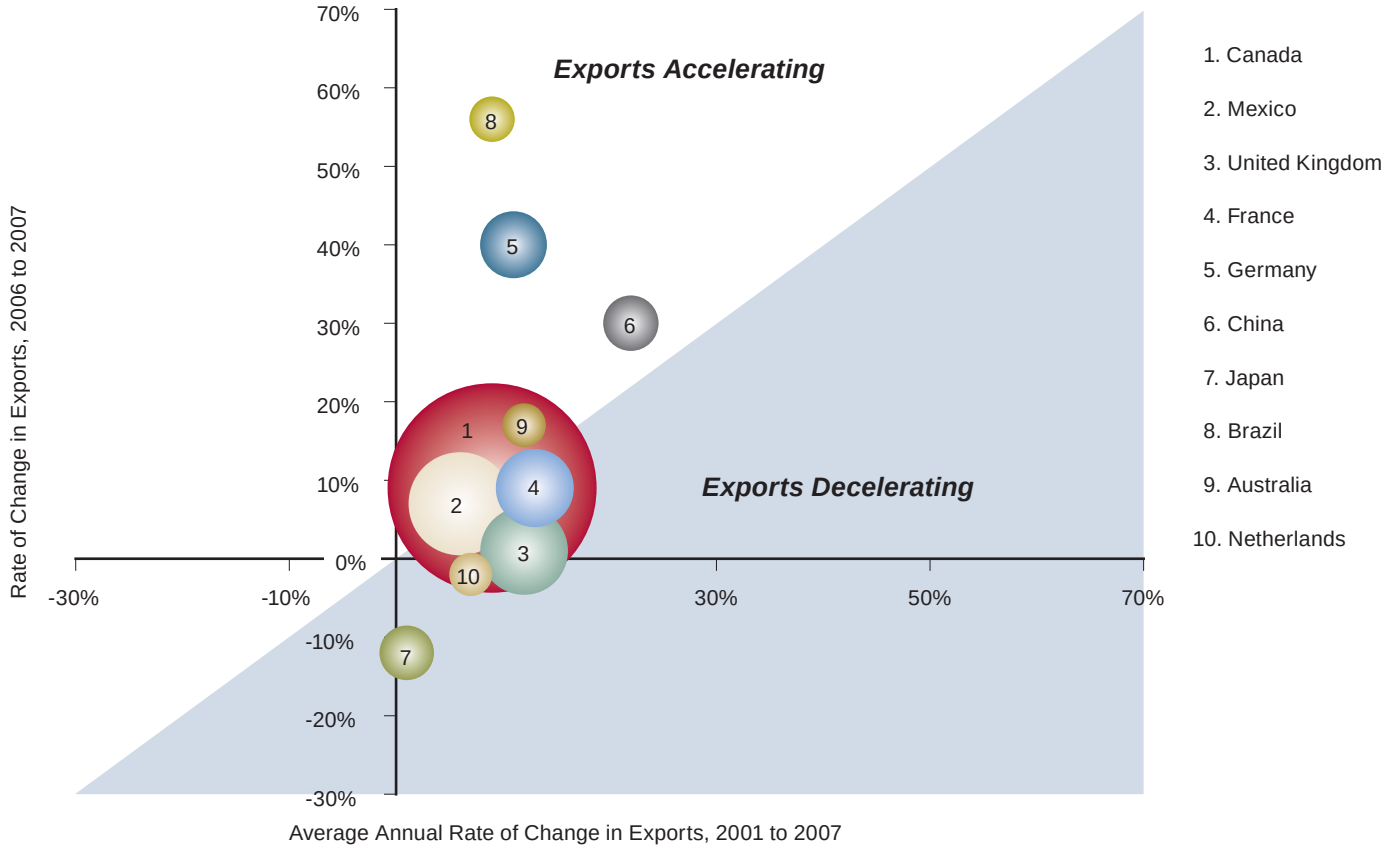
Canada has long been Indiana's leading export sales market. Since 2000, when Mexico overtook the United Kingdom in export sales, Mexico has been consistently in the number two spot. **Table 2** summarizes Indiana's exports to top country destinations in 2007. In addition to the current-dollar value of exports to the top 10 destinations, the table presents the growth in exports over three time periods.

The top 10 destinations comprised 83.9 percent of Indiana's export sales in 2007. **Figure 15** presents a picture of **Table 2**. Canada's bubble clearly dominates the graph, and lies right along the diagonal line. Other notable destination countries with particularly strong upswings in export sales are Brazil, China and Germany. **Figure 16**, a column graph with countries ordered left to right according to 2007 export sales value, presents a similar story.

Table 2: Indiana's Top Export Destinations—Value and Average Annual Rate of Change

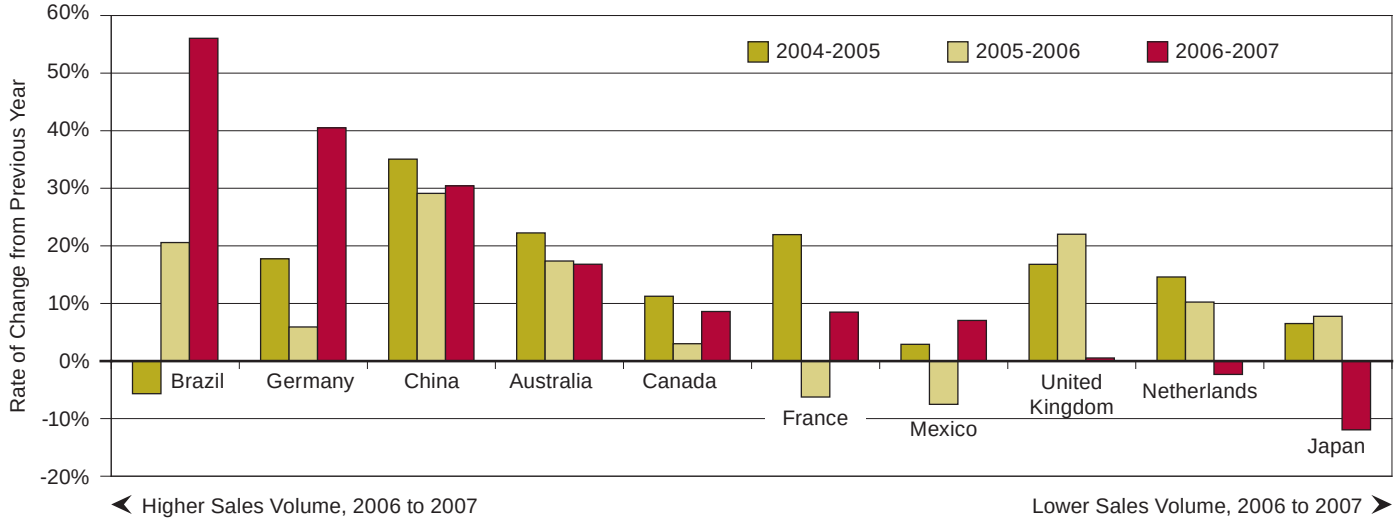
Export Destination	Value of Exports (Millions of Current Dollars)			Average Annual Rate of Change		
	2007	2006	2005	2006-2007	2001-2007	1997-2007
World Total	$25,878	$22,620	$21,476	13.5%	9.8%	7.7%
Canada	$10,727	$9,842	$9,550	8.6%	9.1%	6.0%
Mexico	$2,606	$2,428	$2,618	7.0%	6.4%	15.9%
United Kingdom	$1,900	$1,890	$1,516	0.5%	11.7%	9.5%
France	$1,501	$1,378	$1,467	8.5%	13.5%	15.9%
Germany	$1,100	$734	$691	40.5%	11.4%	8.9%
China (Mainland)	$758	$559	$418	30.4%	22.2%	17.2%
Japan	$737	$831	$769	-12.0%	0.8%	-0.3%
Brazil	$512	$292	$238	56.0%	9.4%	9.4%
Australia	$470	$397	$334	16.8%	11.5%	7.8%
Netherlands	$462	$473	$427	-2.3%	6.8%	2.9%

Figure 15: Export Trends for Indiana's Top Ten Destinations



Note: Size of bubble reflects the relative dollar value of exports in 2007.

Figure 16: Annual Change in Exports for Indiana's Top 10 Export Destinations



Indiana exported goods to 198 countries in 2007, but only 28 had export sales greater than $100 million. **Figure 17** presents those destination countries receiving Indiana exports of more than $100 million. These 28 countries accounted for 93.9 percent of all Indiana exports. The longer-run changes in the global economy are evident in the export statistics for Indiana in many of the smaller export destinations. While there has been strong export growth to many European countries, Indiana exports to several, traditionally important European trading partners have fallen off or declined. Exports to Sweden, for example, have been mostly flat over the last few years. Indiana exports to Greece have dropped from over $100 million in 2004 to barely $20 million in 2007. Meanwhile, exports to several fast-growing Asian countries continue to expand. For example,

Figure 17: Destinations for Indiana's Exports Exceeding $100 Million, 2007

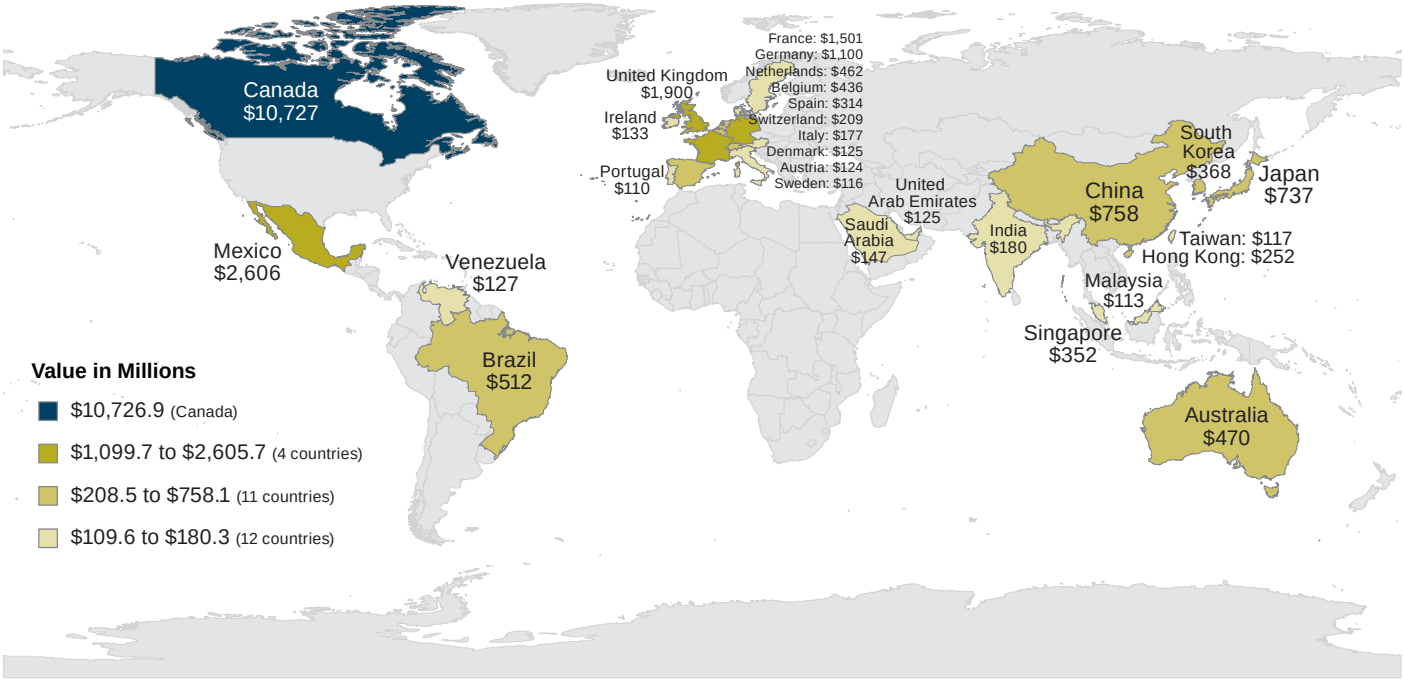
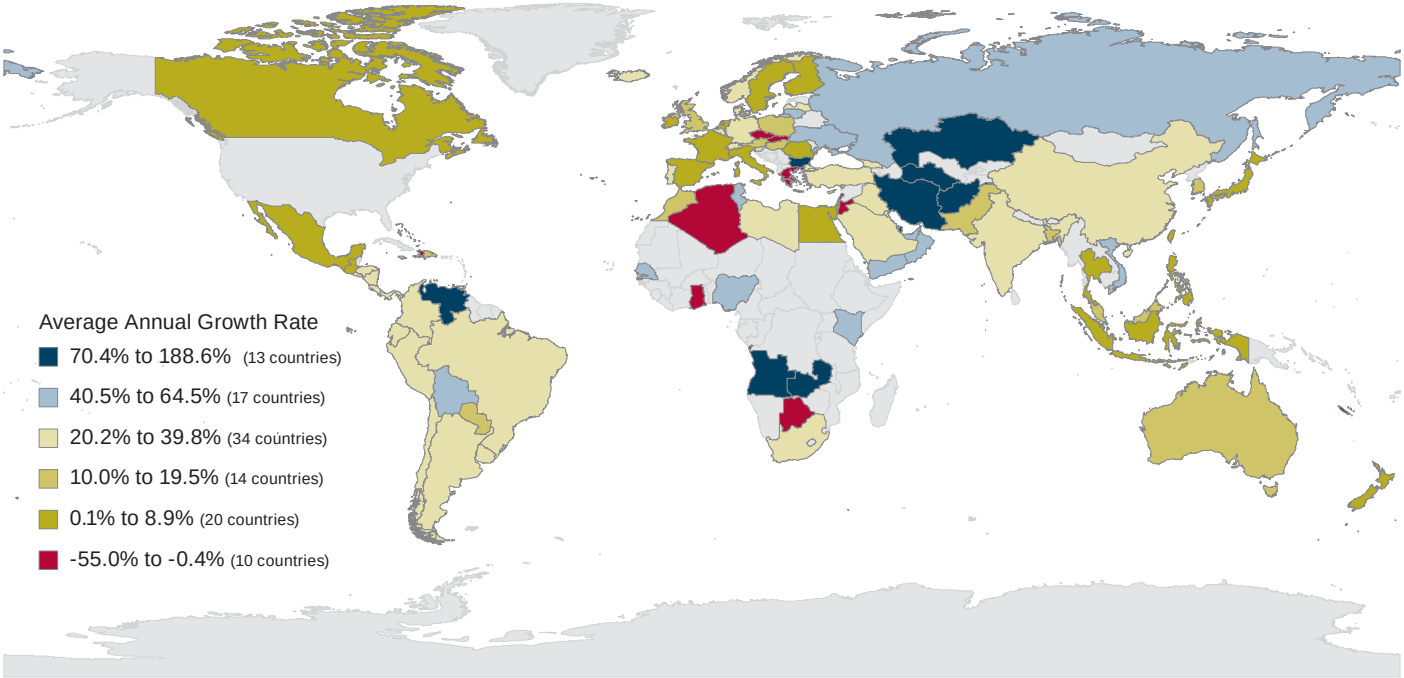


Figure 18: Change in Indiana Exports by Destination, 2004 to 2007



Note: Countries shown are those with export purchases from Indiana greater than $1 million in 2007.

Indiana exports to Hong Kong totaled $252 million in 2007. India joined the $100 million club in 2005. Since 1997, exports from Indiana to China have increased five-fold.

Figure 18 presents export growth rates from 2004 to 2007 across the globe for countries that purchase more than $1 million from Indiana. The smaller countries tend to have the greatest growth rates, with some rates in the triple digits. The average annual rate from 2004 to 2007 for all partners was 10.1 percent, despite the fact that 64 countries had average growth rates in excess of 20 percent. The average was moderated by Canada's 7.6 percent average annual growth rate and the fact that Canada accounted for 41.5 percent of Indiana exports in 2007. Mexico, at number two with a 10.1 percent share of Indiana exports, also pulled the average down with a three-year annual average rate of less than 1 percent. **Figure 19** shows how the other top 10 countries compare with respect to their share of Indiana's exports.

Figure 20 presents a profile of Indiana export sales top six destinations between 2001 and 2007. Compared to the European export markets, the growth of exports to Canada and Mexico have lagged somewhat. Export growth to China has accelerated dramatically in 2006 and 2007. Since 2001, Indiana exports to China have nearly quadrupled.

"Since 1997, exports from Indiana to China have increased five-fold."

Figure 19: Top Indiana Export Destinations, 2007

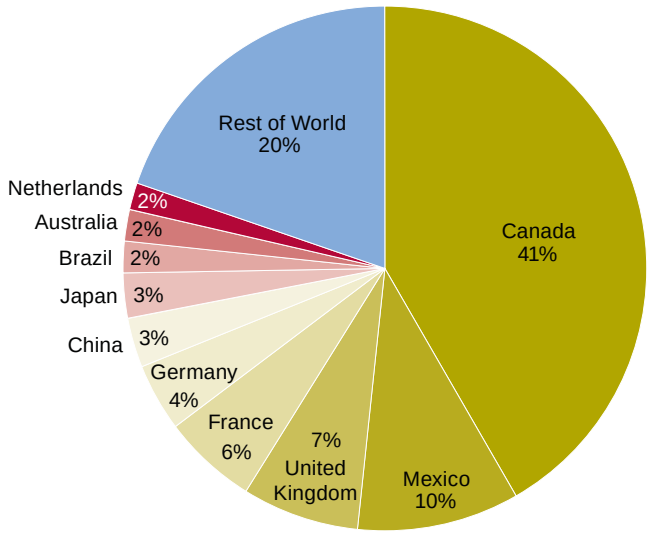
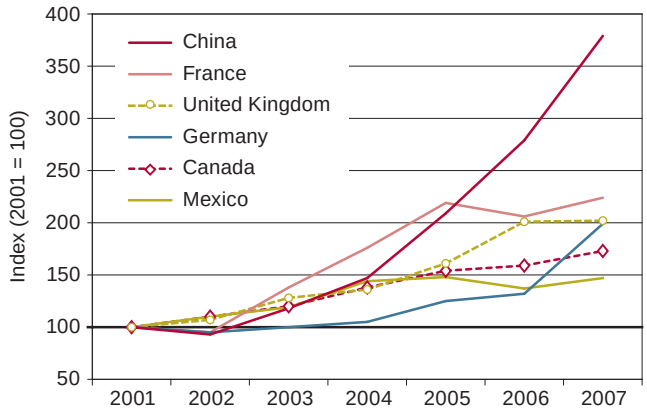


Table 3 identifies the largest changes in export sales by industries, both positive and negative, for Indiana's top 10 export destinations in 2007. This presentation provides some sense of the role that each of the leading export destinations and each of the leading export industries have in changes in Indiana exports. For example, electrical machinery exports increased by $229 million from 2006 to 2007, even though the largest trading partners registered a decline in purchases of Indiana's electrical machinery goods. It also shows that pharmaceutical export sales to France declined. Fortunately, that decline was offset by a surge in exports to Germany. The uptick in industrial machinery looks to have been across-the-board while the changes in exports in both medical instruments and organic chemicals appear to have been uneven.

Most of the changes in the nature of Indiana's exports can be accounted for by the top three destinations. **Figure 21**, **Figure 22** and **Figure 23** plot these countries' imports of the more important Indiana products.

Indiana shipments to Canada rose from 2006 to 2007 by $885 million, primarily due to a respectable 10.3 percent (or $464 million) increase in vehicles and parts exports, a 17.2 percent (or $85 million) increase in iron and steel product exports, and a 39.2 percent (or $60 million) increase in pharmaceutical exports.

Figure 20: Indiana Export Index for Top Six Destinations, 2001 to 2007



After big gains from 2005 to 2006, exports to the United Kingdom leveled off in 2007, as **Figure 22** shows. Only industrial machinery enjoyed a double-digit increase in exports from 2006 to 2007, which was enough to offset the declines in optical and medical instruments and organic chemicals.

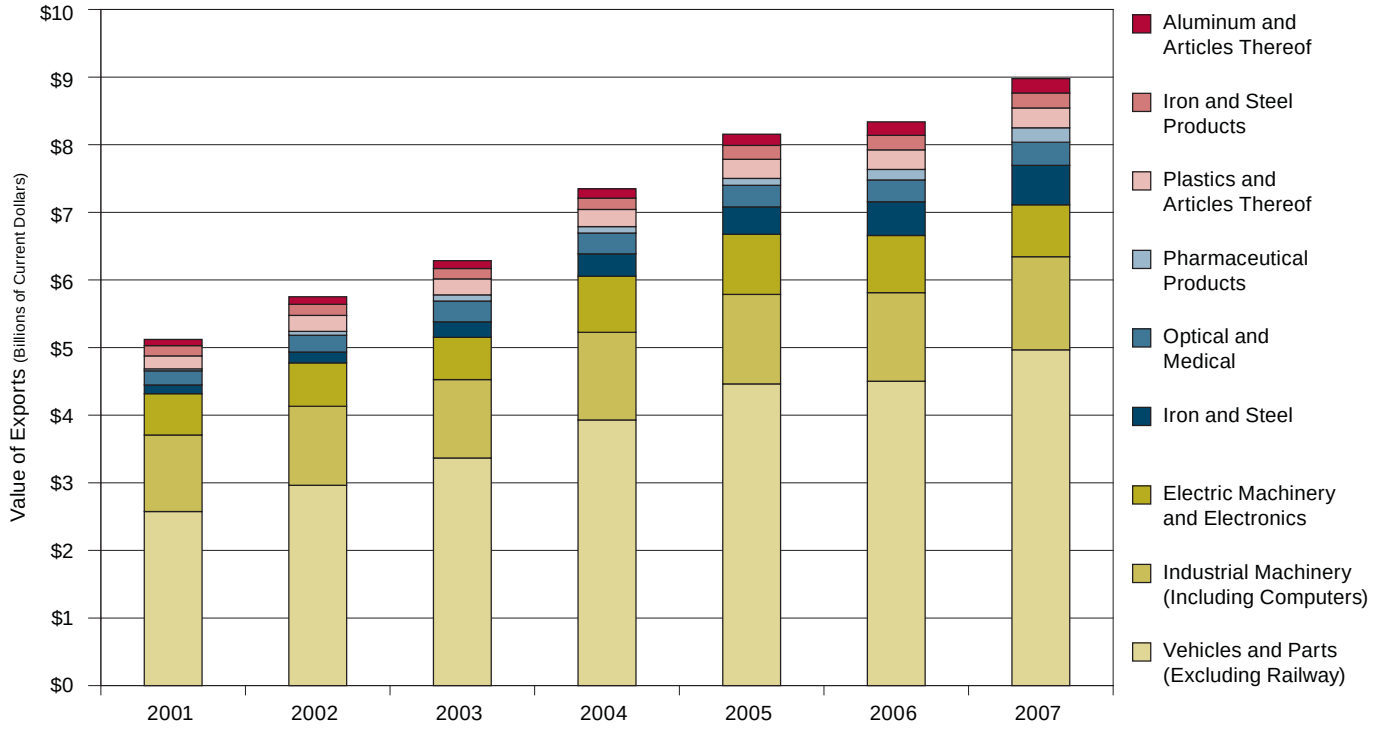
Exports to Mexico have been inconsistent, as seen in **Figure 23**. Were it not for the uptick in Mexican purchases of industrial machinery by 24 percent (or $251 million), Indiana exports to Mexico would have suffered another decline in 2007.

Table 3: Indiana's Largest Positive and Negative Changes in Exports by Industry for 10 Largest Export Destinations, 2006 to 2007 (in Millions of Dollars)

Export Destination	Vehicles and Parts	Electric Machinery	Industrial Machinery	Optical and Medical Instruments	Organic Chemicals	Pharmaceutical Products
World Total	$652	$229	$1,105	$88	$171	$200
Australia	$35		$14			
Brazil		$10	$86		$10	$30
Canada	$464	-$77	$67	$17		$61
China	$13	$13	$80		$18	
France		$14	$22		$335	-$207
Germany	-$31	$35	$23	$66		$222
Japan	-$15		$22	-$20	-$77	
Mexico	-$16	-$71	$251		$16	
Netherlands	-$26					-$14
United Kingdom	$11	$15	$63	-$27	-$114	$35

Note: Shaded cells indicate destination countries that did not experience at least a $10 million movement in exports by industry

Figure 21: Indiana Exports to Canada by Industry, 2001 to 2007



"After big gains from 2005 to 2006, exports to the United Kingdom leveled off in 2007."

Figure 22: Indiana Exports to the United Kingdom by Industry, 2001 to 2007

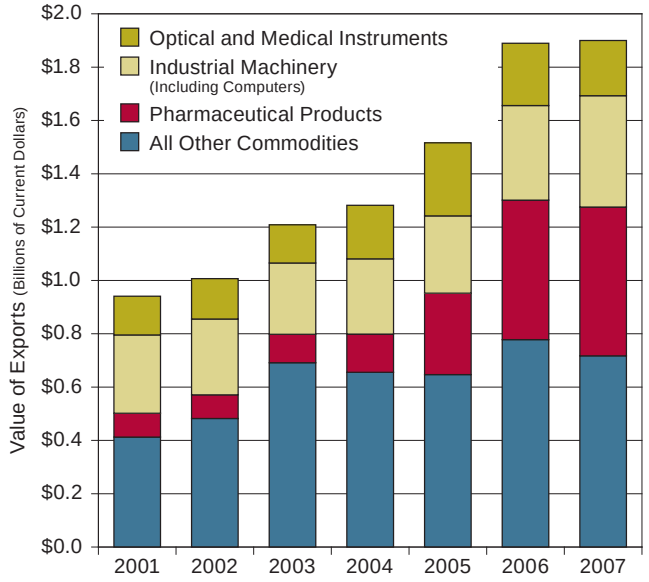
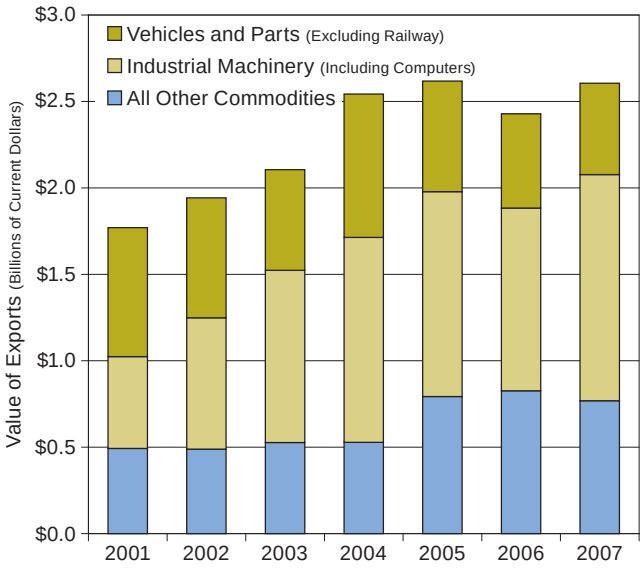


Figure 23: Indiana Exports to Mexico by Industry, 2001 to 2007



Indiana's Export Industries

Table 4 presents the top 10 export industries for the state in 2007, as well as rates of change from 2006–2007 and 2001–2007. Figure 24 graphically presents the tabular data. Vehicle and parts exports, together with industrial machinery, account for a vast majority of Indiana exports. Since 2001, the fastest growing exports have been pharmaceutical products, followed by iron and steel. Organic chemical exports have also been increasing at a faster rate than the Indiana average. While registering double-digit growth earlier in the period, the rate of growth in optical and medical instrument exports was about half the Indiana average for 2007. Pharmaceutical exports, while still strong, grew more slowly in 2007 than in earlier years.

Because vehicle and parts and industrial machinery exports comprise such a large share of Indiana exports and because pharmaceutical product exports are growing so quickly, these industries merit special attention.

Vehicles

Figure 25 shows the share of U.S. vehicle exports in 2007 for destination countries with export purchases greater than $200 million. While Canada captured 46.5 percent of this export category in 2007 and Mexico captured 12.5 percent, the relative share for these two countries has been declining recently. Other destination countries have become more

Table 4: Indiana's Top 10 Export Industries

Industries[a]	Exports[b] 2007	Percent Change[c] 2006-2007	Percent Change[c] 2001-2007
Vehicles and Parts (Excluding Railway)	$6,534	10.5%	8.6%
Industrial Machinery (Including Computers)	$5,363	23.1%	9.4%
Electric Machinery and Electronics	$2,019	12.0%	7.4%
Pharmaceutical Products	$1,887	11.2%	22.7%
Organic Chemicals	$1,655	10.9%	10.0%
Optical and Medical Instruments	$1,556	5.8%	9.5%
Iron, Steel and Articles Thereof	$1,172	25.0%	17.8%
Plastics and Articles Thereof	$936	-7.2%	7.0%
Miscellaneous Chemical Products	$657	-3.8%	7.4%
Aluminum and Articles Thereof	$433	16.2%	7.9%

a. Industries defined by the Harmonized System of Commodity Classifications
b. Value of exports in millions
c. Average annual growth rate

"The fastest growing exports are pharmaceutical products."

Figure 24: Indiana's Top 10 Export Industries

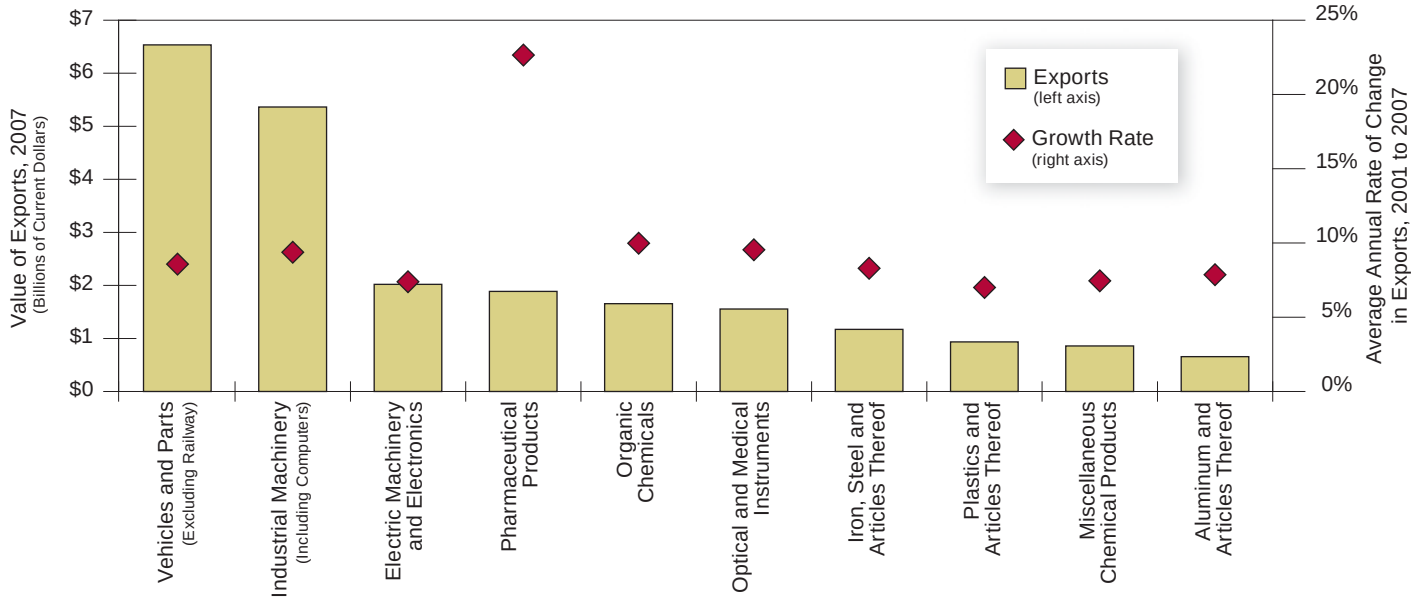
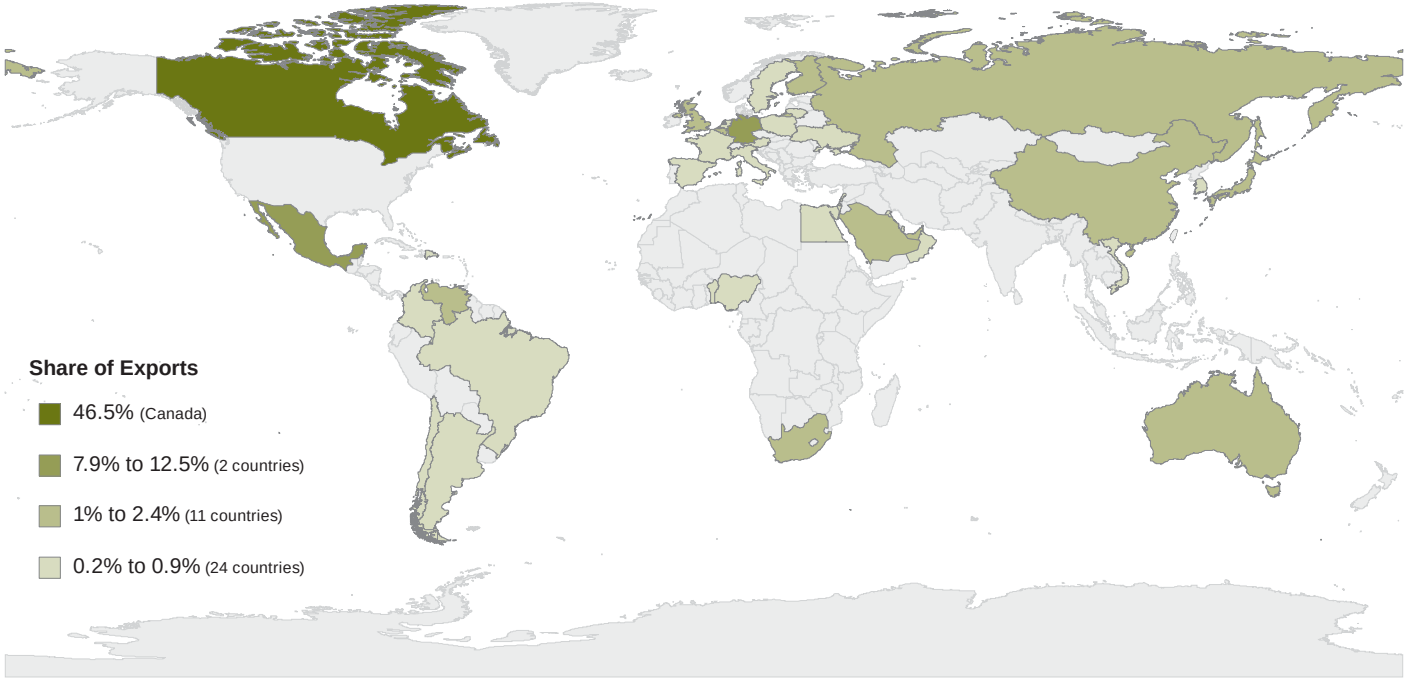
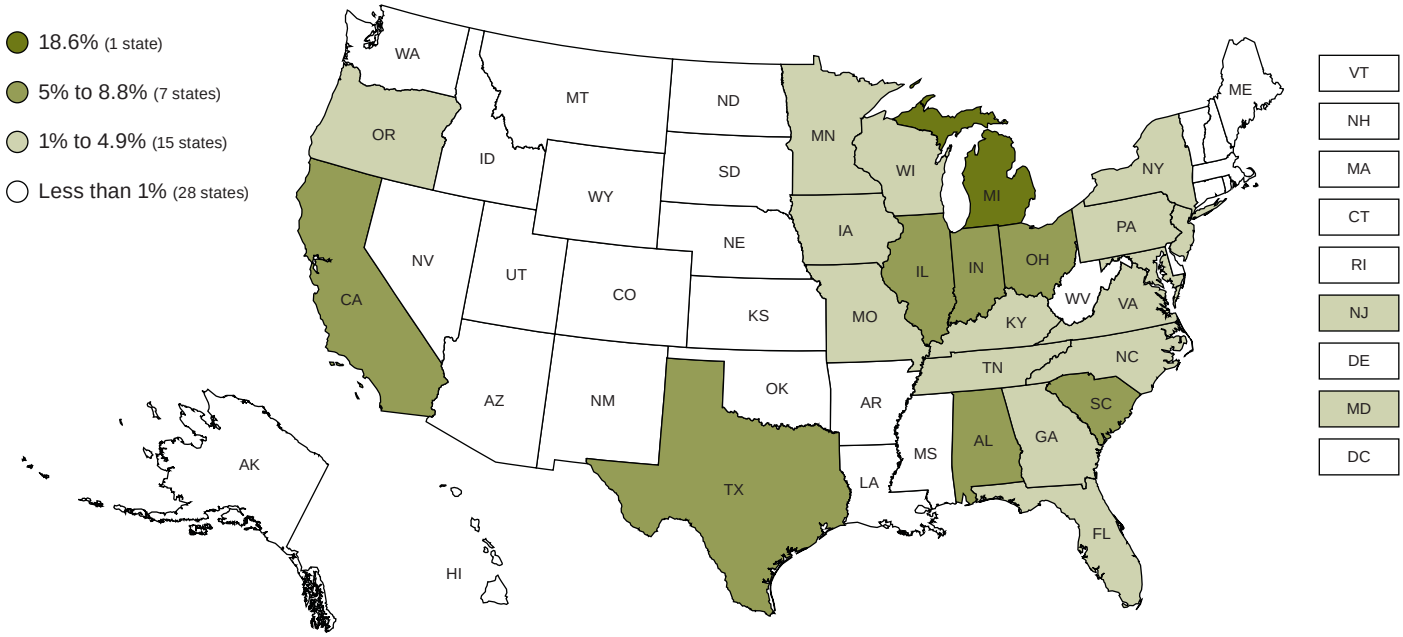


Figure 25: Exports of Vehicles and Parts (Excluding Railway), 2007 Destination Countries for U.S. Exports of Greater than $200 Million



"Canada captured 46.5 percent of vehicle exports in 2007."

Figure 26: Share of U.S. Vehicle Exports (Excluding Railway), 2007



important markets. For example, Germany's share increased from 7 percent in 2006 to 7.9 percent in 2007.

Figure 26 presents the source of these vehicle and parts exports on a state-by-state basis. With an 18.6 percent share of U.S. vehicle and parts exports, Michigan's exports are more than twice as great as the runner-up state of Ohio. Indiana ranks fifth, contributing 6.1 percent of U.S. exports of vehicles and parts. Texas and Illinois rank third and fourth, respectively.

Whether Indiana can maintain the number five spot into the future is an open question. **Figure 27** shows that there has been a significant re-alignment of vehicle exports among the states. The top five states have had similar growth rates from 2001 to 2007, but the states that are ranked sixth through eleventh appear to be up and coming. Their vehicle and parts exports have had growth rates that are twice those of the Great Lake States (and Texas).

Figure 28 shows how the top five destinations for Indiana's vehicle exports compare. As noted above, Canada has been the largest market and most consistent export market for Indiana's vehicles and parts. While the Mexican market received over $500 million in Indiana vehicle exports in 2007, the market has not been consistent. In 2004, exports to Mexico jumped nearly $250 million, only to tumble by nearly $190 million the following year. Since 2001, Indiana exports of vehicles and parts to Mexico have fallen at an average rate of 5.7 percent a year. The destination countries that are smaller markets have erratic growth rates and volumes. For example, The Netherlands and Austria dropped out of the top five destinations in 2006 to be replaced by Venezuela and Australia in 2007.

While vehicles and parts is Indiana's largest export category, the export of industrial machinery grew rapidly in 2007 and the gap between the first and second ranking is closing.

"Canada has been the largest market and most consistent export market for Indiana's vehicles and parts."

Figure 27: Leading States in the Export of Vehicles and Parts (Excluding Railway), 2001 to 2007

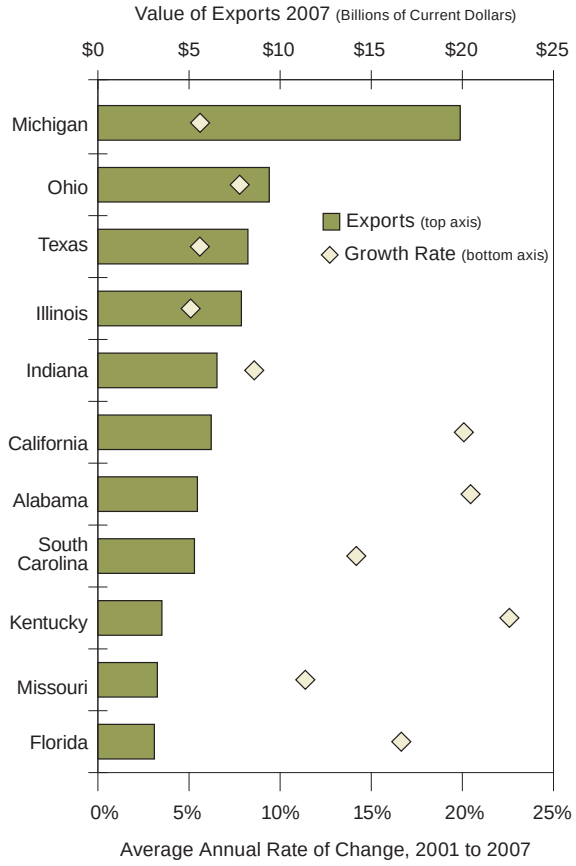
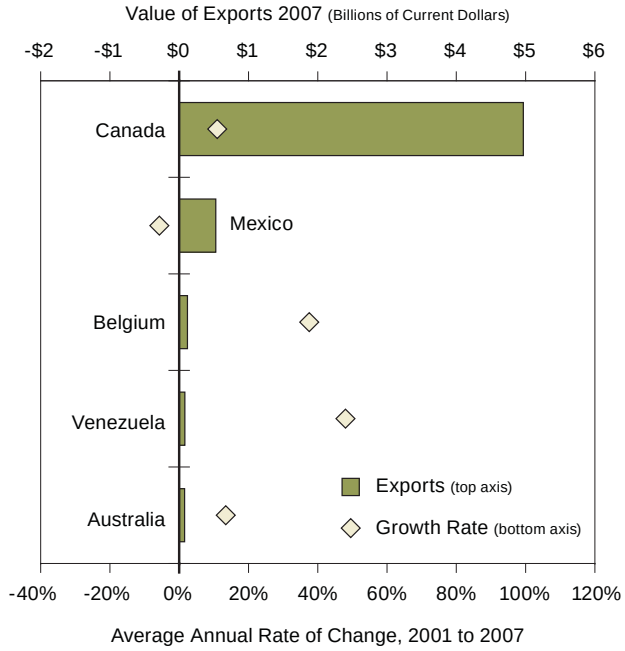


Figure 28: Indiana's Top Five Export Destinations for Vehicles and Parts (Excluding Railway), 2007



"In 2007, China overtook Japan to become Indiana's fourth-largest machinery export destination."

Industrial Machinery

Figure 29 presents export value and growth among the top state exporters of industrial machinery. Indiana remained just out of the top 10 in 2007, despite a 25.9 percent increase over 2006. **Figure 30** plots the 2007 value of exports and the 2001–2007 rate of growth for industrial machinery exports to Indiana's top five destinations. In 2007, China overtook Japan to become Indiana's fourth-largest machinery export destination. Exports to China increased at an 18.2 percent annual rate of change from 2001 to 2007. Brazil, another developing-country powerhouse, just missed the top five after nearly doubling its machinery exports from Indiana between 2006 and 2007.

Hidden in this "top five" presentation is that the larger market for Indiana industrial machinery is much more diverse and exports to those destination countries have surged. Taken together, Indiana exports to Canada, Mexico, the United Kingdom, China and Japan—about 65 percent of the export market—grew by 16 percent from 2006 to 2007. The next five destination countries—representing about 21 percent of machinery exports from Indiana—grew by 30 percent from 2006 to 2007. The remaining destination countries purchased 42 percent more industrial machinery from Indiana in 2007 than they did in 2006.

Pharmaceuticals

Leading pharmaceutical exporting states are shown in **Figure 31**. California and Massachusetts are the leaders among the states with 16.9 percent and 13.6 percent of pharmaceutical exports, respectively. (While Puerto Rico contributes 32 percent of the nation's pharmaceutical exports, it is not included in the state rankings.) With 9.5 percent of the state share of pharmaceutical exports, Indiana ranks third. In addition to its third place ranking among the states, Indiana has had faster than average growth in exports and its growth rate ranks third among the top 10 pharmaceutical states, just edging out Pennsylvania for the 2001–2007 period (see **Figure 32**).

Figure 29: Leading States in the Export of Industrial Machinery, 2001 to 2007

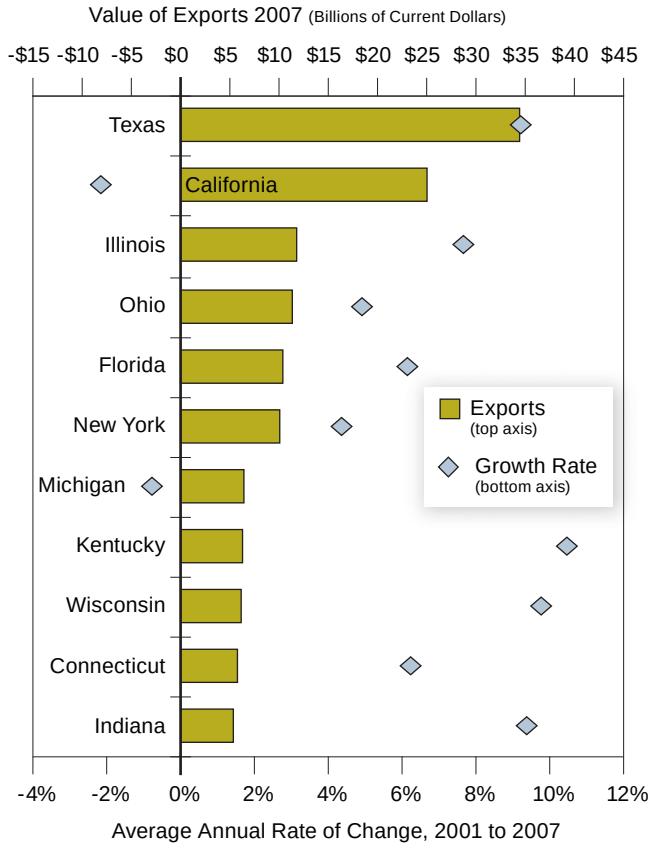


Figure 30: Indiana's Top Five Export Destinations for Industrial Machinery

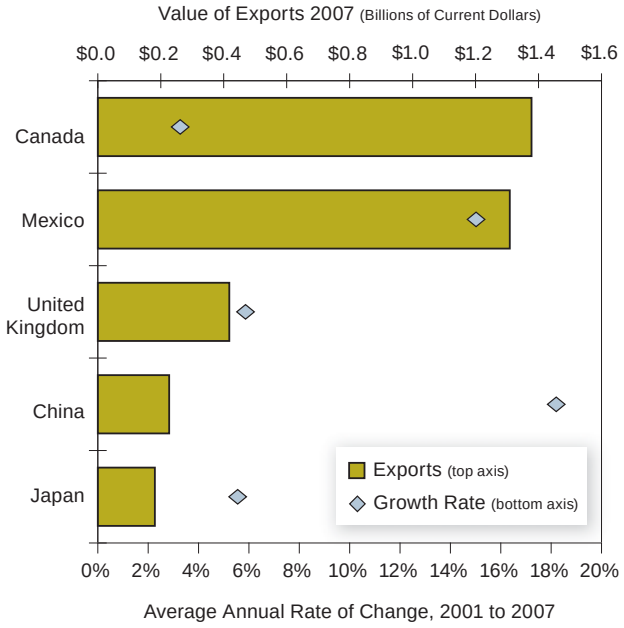


Figure 31: Share of U.S. Pharmaceutical Exports, 2007

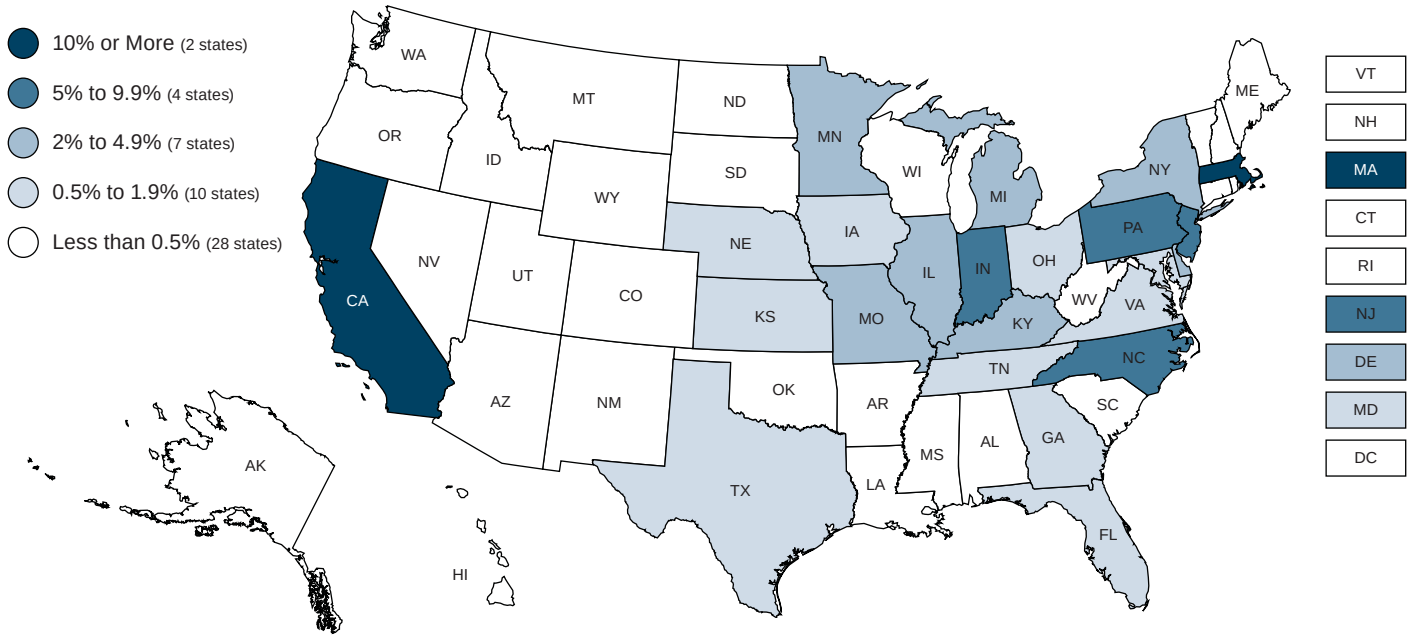


Figure 32: Leading States in the Export of Pharmaceuticals, 2001 to 2007

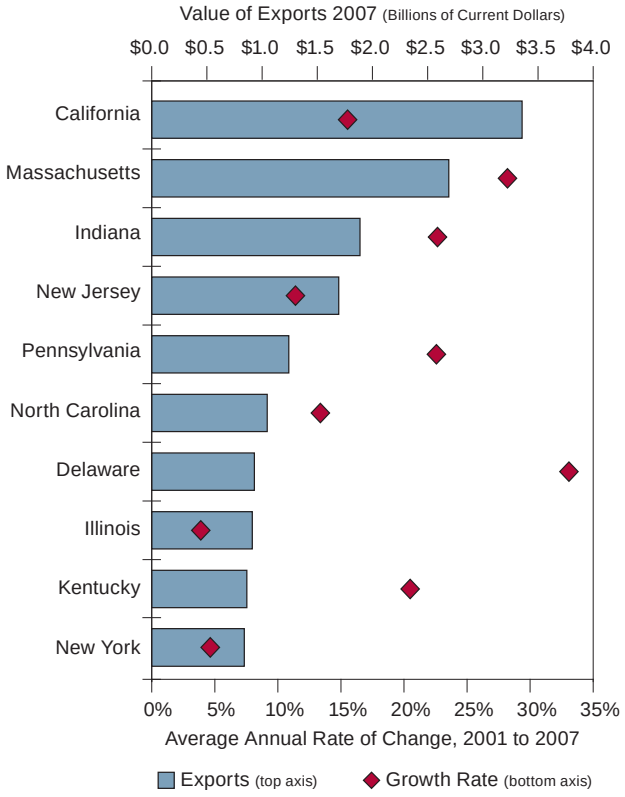


Figure 33: Indiana's Top Five Export Destinations for Pharmaceutical Products

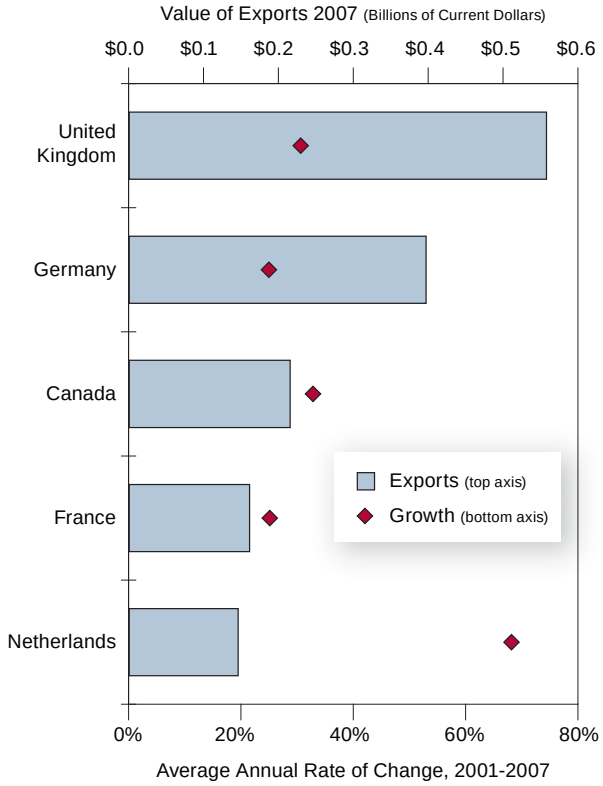


Figure 34: Exports of Pharmaceutical Products, 2007 Destination Countries for U.S. Exports of Greater than $50 Million

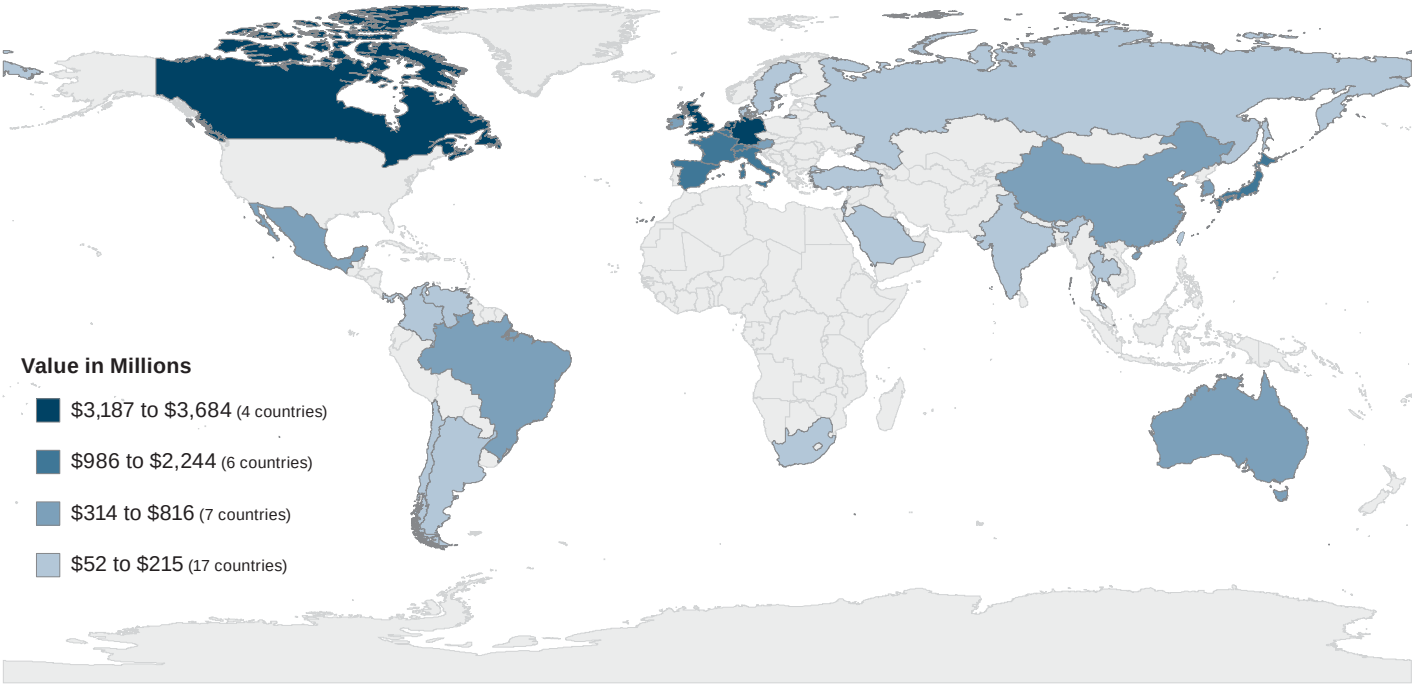
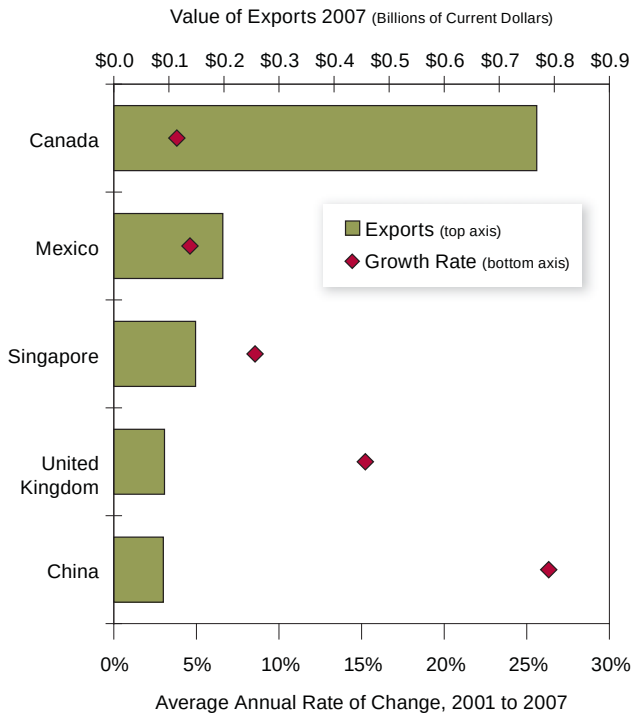


Figure 33 presents the top five export destinations for Indiana's pharmaceuticals. There is, by all appearances, great strength in the European market. Four of the top five export destinations for Indiana's pharmaceuticals are in Europe. This is also documented by the destinations map in **Figure 34**. There is a note of caution for evaluating the size of the pharmaceutical markets: Demand and sales for these products can be erratic. Spain, for example, imported $189 million worth of pharmaceutical products in 2002 from the United States. By 2004, that total had more than doubled to $467 million. In 2006, U.S. exports of pharmaceuticals to Spain had fallen to $231 million. Then, in 2007, came another dramatic change. The total value of U.S. pharmaceuticals exported to Spain jumped 334 percent to total over $1 billion.

Electrical Machinery

While the value and growth rate is not as impressive as for industrial machinery, electrical machinery is an important export category for Indiana. Four of the top five importers of Indiana's electrical machinery are the same as for industrial machinery. **Figure 35** shows sales volume and growth rates of Indiana's top five export destinations for electrical machinery—Canada, Mexico, Singapore, the United Kingdom and China. China's

Figure 35: Indiana's Top Five Export Destinations for Electrical Machinery



purchases of Indiana's electrical machinery imports increased at an average annual rate of 26 percent from 2001 to 2007. China's imports of Indiana electrical machinery moderated last year but did not decline. Taken as a group, however, the top five Indiana markets did decline. Indiana exports to the leading five electric machinery markets fell 3.7 percent in 2007. Electric machinery exports still grew at a respectable 12.8 percent in 2007 due to a 62.9 percent increase in the other smaller markets.

Organic Chemicals

Figure 36 graphs the top five export destinations of Indiana's organic chemical production. Brazil made it back into the top five after last year's absence. The sixth-largest export destination for Indiana's organic chemicals is China, which saw an 81.9 percent jump from 2006 to 2007. After a 43.7 percent increase in exports to the United Kingdom in 2006, Indiana saw its organic chemical exports to the nation fall 38.6 percent. In dollar terms, this represents a drop of $113 million. While U.K. imports of organic chemicals from Indiana have fluctuated somewhat since 2003, 2007 was the first year that the value of imports dropped below $200 million. Exports to France have also fluctuated in recent years, leaping 50 percent in 2007 to almost $1 billion.

Optical and Medical Instruments

Figure 37 profiles Indiana's optical and medical instrument export markets. The top two markets—Canada and the United Kingdom—have remained fairly stable over the last few years. Switzerland rocketed into fourth place in 2005 when its imports more than doubled from 2004, and in 2006, its imports of Indiana optical and medical instruments almost tripled again. In 2007, it surpassed Japan to become the third-highest Indiana export market for optical and medical equipment. Germany leaped to the fifth spot after a staggering 122 percent increase from 2006 to 2007. Denmark and Australia, at sixth and seventh respectively, also saw solid double-digit increases from 2006 to 2007.

Plastics

The longer-term average growth in plastic exports, as show by **Figure 38**, is more positive than in more recent years. Canada, Mexico, the Netherlands, China and the United Kingdom represent 61 percent of Indiana plastic product exports. These top five destination countries imported 2.3 percent less in 2007

Figure 36: Indiana's Top Five Export Destinations for Organic Chemicals

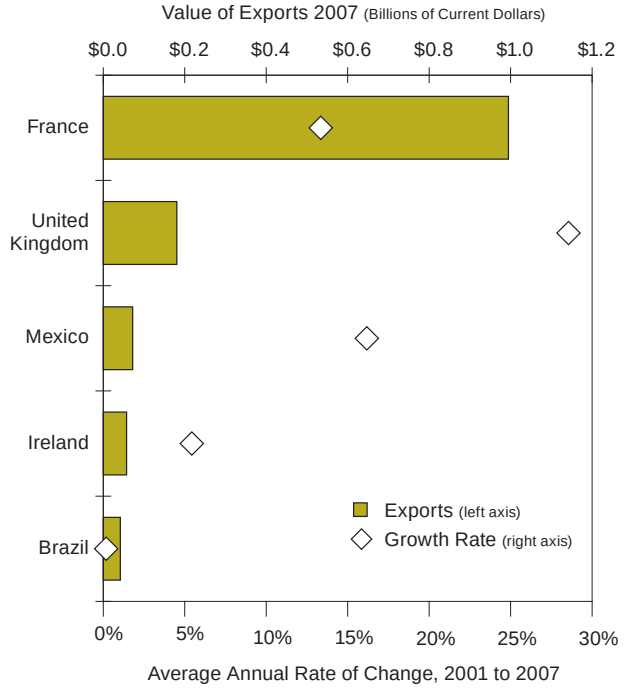


Figure 37: Indiana's Top Five Export Destinations for Optical and Medical Instruments, 2007

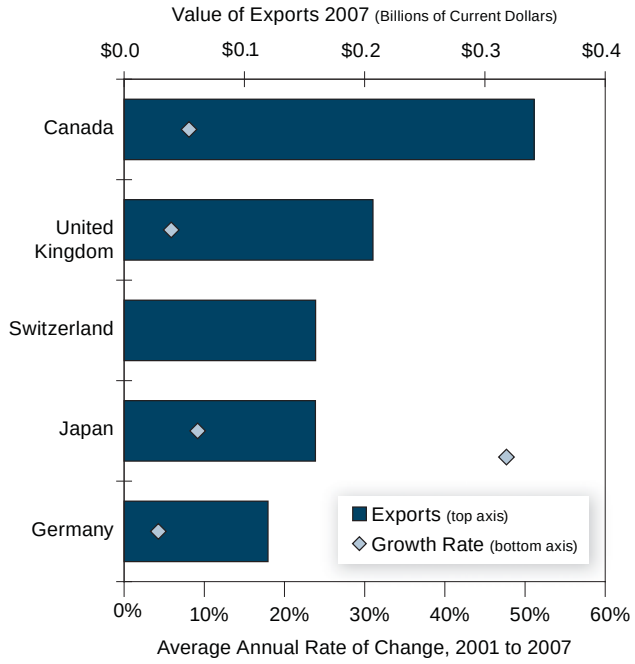


Figure 38: Indiana's Top Five Export Destinations for Plastic Products

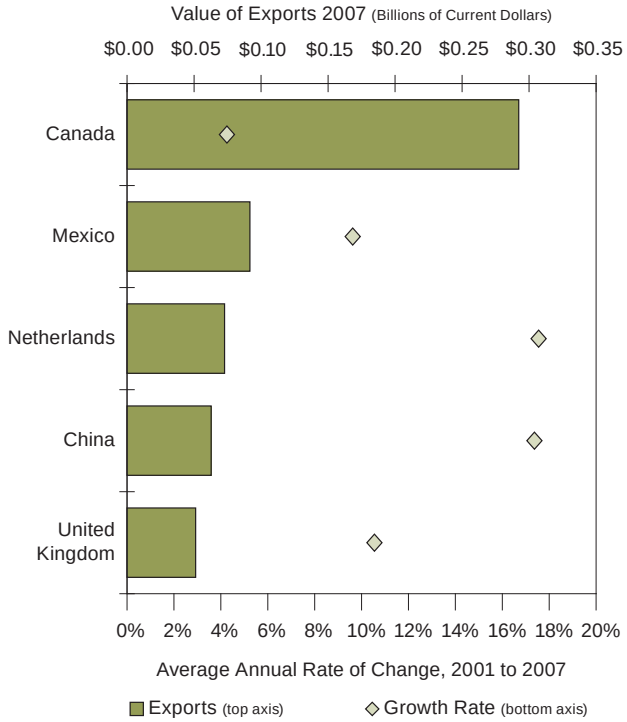
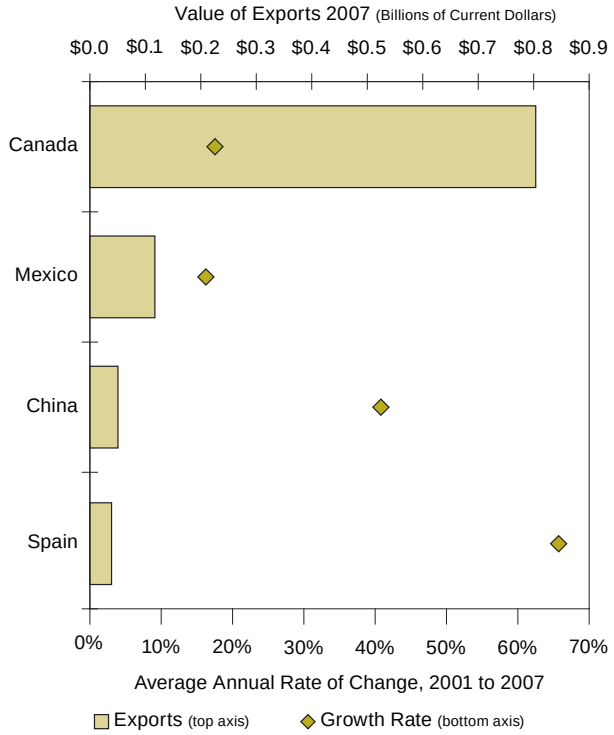


Figure 39: Indiana's Top Four Export Destinations for Iron, Steel and Related Products



than in 2006, contributing to the 7 percent drop in Indiana plastics exports for all destination countries. The performance in 2007 and early results in 2008 are below the 2001–2007 trend average rate of growth of 8.2 percent.

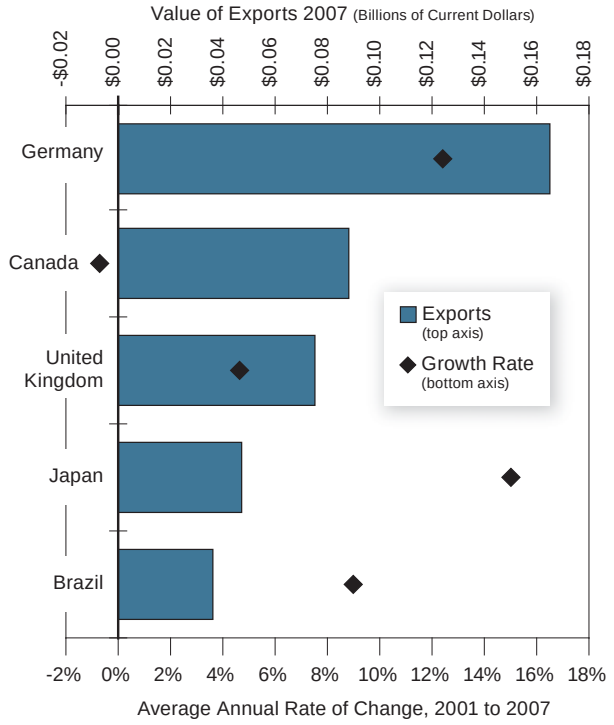
Iron, Steel and Iron and Steel Products

Figure 39 presents Indiana's iron, steel and related product exports to Canada, Mexico, China and Spain. As the graph demonstrates, there are few markets of significant size for iron, steel, and iron and steel products. There is evidence of strong growth in the purchases for these Indiana manufactured products, but the small initial volume of exports helps to put these impressive growth rates in context.

Miscellaneous Chemicals

While the market for Indiana iron and steel and related product export almost solely revolves around Canada, the market for miscellaneous chemicals is not as concentrated, as **Figure 40** shows. Four out of five countries on the leader board are the same as in 2006. The top five export destinations—Germany, Canada, the United Kingdom, Japan and Brazil—account for

Figure 40: Indiana's Top Five Export Destinations for Miscellaneous Chemical Products



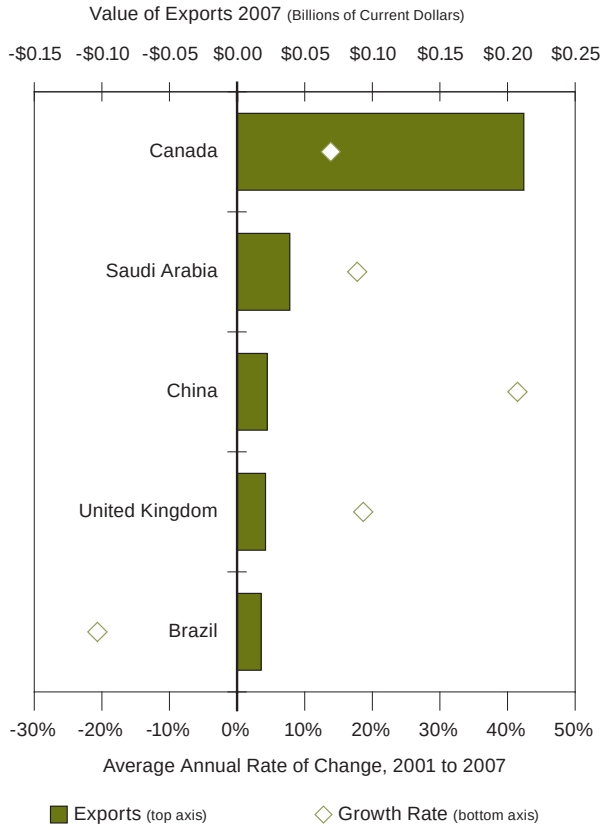
62.7 percent of Indiana exports of miscellaneous chemicals. From 2001 to 2003, exports for all destinations surged by 42.6 percent, but since 2003, exports have remained fairly flat. Due to a 33 percent drop in exports destined for Canada, Indiana exports of miscellaneous chemicals fell nearly 4 percent in 2007. Weakness in the German and United Kingdom markets was also evident, growing at well below the average for all Indiana exports in 2007. Were it not for the surge in exports to Brazil (115 percent growth) and Japan (28 percent growth), the aggregate value of exports of miscellaneous chemicals would have dropped by significantly more than 4 percent.

The international miscellaneous chemical market appears to be anything but stable. Early figures through March 2008 suggest that the top five destinations will continue to fluctuate.

Aluminum Products

Figure 41 shows that Canada is still the largest market for Indiana exports of aluminum products. Canada, Saudi Arabia, China, United Kingdom and Brazil account for 72 percent of Indiana's export market for aluminum products. After several years of meteoric growth, China's imports of Indiana aluminum were down by about $9 million (28 percent) from 2006. Except for Canada, the export volumes are relatively small. As a result, small dollar-value changes register as large percentage changes. Until markets like China, Saudi Arabia or Brazil become well-established, the Canadian market will continue to dominate.

Figure 41: Indiana's Top Five Export Destinations for Aluminum Products, 2007



Appendix A: Indiana Exports for All Commodities

Rank	Description	Annual		January–March		Percent Change*		Commodity as a Percent of Total		Change	
		2006	2007	2007	2008	2006–2007	2007–2008	2007	January–March 2008	2006–2007	January–March 2008
	Total: All Commodities	**$22,620**	**$25,878**	**$6,121**	**$6,377**	**14.4**	**4.19**	**100.0**	**100.0**	**$3,258**	**$256**
1	Vehicles (Excluding Railway)	$5,881	$6,534	$1,531	$1,514	11.09	-1.11	25.2	23.7	$652	-$17
2	Industrial Machinery (Including Computers)	$4,258	$5,363	$1,198	$1,368	25.96	14.14	20.7	21.4	$1,105	$169
3	Electrical Machinery	$1,790	$2,019	$481	$522	12.8	8.44	7.8	8.2	$229	$41
4	Pharmaceutical Products	$1,687	$1,887	$451	$516	11.87	14.39	7.3	8.1	$200	$65
5	Organic Chemicals	$1,484	$1,655	$506	$271	11.5	-46.51	6.4	4.2	$171	-$235
6	Optical and Medical Instruments	$1,468	$1,556	$382	$445	5.99	16.49	6.0	7.0	$88	$63
7	Plastic Products	$1,007	$936	$251	$232	-6.99	-7.5	3.6	3.6	-$70	-$19
8	Iron and Steel	$612	$858	$163	$191	40.3	17.27	3.3	3.0	$246	$28
9	Miscellaneous Chemical Products	$682	$657	$164	$171	-3.76	4.22	2.5	2.7	-$26	$7
10	Aluminum Products	$368	$433	$94	$127	17.62	35.4	1.7	2.0	$65	$33
11	Furniture	$244	$323	$79	$75	32.4	-4.91	1.2	1.2	$79	-$4
12	Articles of Iron or Steel	$301	$314	$76	$79	4.19	4.04	1.2	1.2	$13	$3
13	Printed Books and Newspapers	$271	$266	$70	$62	-1.71	-11.49	1.0	1.0	-$5	-$8
14	Rubber Products	$206	$239	$55	$63	15.99	13.88	0.9	1.0	$33	$8
15	Wood Products	$204	$232	$54	$55	13.76	1.81	0.9	0.9	$28	$1
16	Aircraft and Spacecraft	$160	$188	$42	$56	17.25	33.63	0.7	0.9	$28	$14
17	Nickel Products	$126	$186	$38	$59	47.33	57.74	0.7	0.9	$60	$22
18	Glass and Glassware	$166	$174	$40	$32	4.83	-21.24	0.7	0.5	$8	-$9
19	Miscellaneous Articles of Base Metal	$138	$142	$34	$31	2.88	-10.02	0.5	0.5	$4	-$3
20	Copper Products	$79	$135	$21	$42	70.56	106.32	0.5	0.7	$56	$22
21	Paper Products	$123	$131	$32	$34	7.01	4.62	0.5	0.5	$9	$1
22	Special Classification Provisions, Nesoi	$110	$109	$35	$19	-0.7	-46.9	0.4	0.3	-$1	-$16
23	Albuminoidal Substances, Modified Starch, Glue, Enzymes	$83	$103	$24	$33	24.15	35.95	0.4	0.5	$20	$9
24	Ships and Boats	$77	$97	$24	$33	26.28	36.66	0.4	0.5	$20	$9
25	Toys, Games and Sports Equipment	$42	$96	$13	$17	128.55	38.29	0.4	0.3	$54	$5
26	Tanning and Dying Products	$83	$88	$17	$23	6.24	32.8	0.3	0.4	$5	$6
27	Cereals	$67	$88	$17	$20	30.22	22.84	0.3	0.3	$20	$4
28	Inorganic Chemicals	$66	$72	$17	$18	9.49	0.9	0.3	0.3	$6	$0
29	Food Industry Residues and Waste	$55	$66	$17	$16	21.17	-6.96	0.3	0.2	$12	-$1
30	Base Metals Nesoi and Cermets	$58	$63	$13	$17	8.54	35.45	0.2	0.3	$5	$5
	Total of Top 30 Commodities	**$21,896**	**$25,011**	**$5,940**	**$6,141**	**14.2**	**3.4**	**96.6**	**96.3**	**$3,115**	**$201**

Note: Total dollar value expressed in millions
*Using the standard percent change formula, not rate of change as used elsewhere
Source: WISER Trade