Is Indiana Exporting Enough?

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If there is one thing that politicians on both sides of the aisle can agree on, it is that exports are good. Economic developers routinely look for new ways to spur export activity, as it is commonly thought to promote economic growth with very little downside. In general, Indiana has a fairly strong export profile. In 2011, Indiana's exports totaled 11.6 percent of its GDP—higher than the national ratio of 9.9 percent.[1] In addition, Indiana exports have been growing at a faster rate than the nation as a whole. This should not be too surprising given Indiana's strength in manufacturing—particularly in transportation equipment manufacturing, which accounts for 14.7 percent of all U.S. exports.

It remains unclear, however, to what degree Indiana is exporting to its full potential given the prominence of high-export industries in the state. To address this question, the Indiana Business Research Center investigated which industries may be under-exporting and identified at least 10 industries that may benefit from policies and programs to encourage companies to export.

What Is an Export Gap?

Industries are not evenly distributed across the U.S. economy. They tend to be concentrated in certain geographic areas and, more often than not, in specific states. For instance, Michigan is known for motor vehicle manufacturers, California is known for tech firms, and New York is known for its concentration of financial services firms. Indiana is no different in this respect. Certain industries represent a larger share of Indiana's employment relative to total U.S. employment, whereas other industries represent a smaller share. While particular industries might dominate a state's workforce, it is far from certain that those industries will also dominate the state's exports. Concentration of employment is only one factor that affects how much a particular industry exports from a particular state.

> *If an industry represents a large share of Indiana's employment, but does not represent as much of the state's total exports, then Indiana is missing potential foreign markets for its products.*

In order to assess whether an industry (or a set of industries) were under-exporting, we needed a rough measure of an export gap. Theoretically, if an industry represents a large share of Indiana's employment, but does not represent as much of the state's total exports, then Indiana may be missing potential foreign markets for its products. We define an export gap as the discrepancy between a state's concentration of employment in a given industry relative to the national average and the state's concentration of exports in that industry relative to the national average.[2] In other words, we measure the export gap as the difference between the state's location quotient (LQ) and its export quotient (EQ).

The LQ is a commonly used measure of local employment concentration. It is the ratio of an industry's share of a region's (Indiana) employment to the industry's share of U.S. employment. An industry LQ above 1 indicates a higher-than-average concentration of employment for that industry in a particular state.

The EQ is a ratio that we developed to assess export concentration. It is the ratio of an industry's share of a region's exports (Indiana is the region in this case) to the industry's share of total U.S. exports.

To assess the export gap of any particular industry, we subtract the industry's Indiana EQ from its Indiana LQ, and if this difference is positive, we identify the industry as "under-exporting." We label it as such because the higher concentration of employment in the state suggests the industry may be missing an opportunity to export more from Indiana than it currently is.

Key Under-Exporting Industries

Table 1 shows the top 10 under-exporting industries in Indiana, as determined by the export gap measure calculated from the most recently available employment and export data.[3] We excluded industries whose nationwide exports were below $3 billion (since Indiana companies' opportunities for export expansion in these industries would necessarily be limited) and industries with no export activity in Indiana.

The top-10 list consists entirely of industries whose employment concentration in Indiana exceeds their employment concentration in the nation as a whole. Interestingly, the list also includes a number of industries whose export concentration in Indiana does exceed their overall export concentration in the nation. The positive export gap, however, suggests that these industries are not realizing their full export potential.

The iron and steel and ferroalloy industry tops the list. This industry's share of Indiana employment is more than 20 times its share of U.S. employment, and yet its share of Indiana's exports is only 2.7 times its share of U.S. exports. A number of other industries related to motor vehicle manufacturing also adorn the top-10 list: engines, turbines, and power transmission equipment; alumina and aluminum and processing; motor vehicle parts; and, of course, motor vehicles. These industries also exhibit greater export concentration in Indiana than in the United States as a whole. However, as with the iron and steel and ferroalloy industry, this figure is dwarfed by these industries' immense concentration of employment in Indiana.

Table 1: Top 10 Under-Exporting Industries

NAICS	Industry	Indiana LQ	Indiana EQ	Export Gap
3311	Iron and Steel and Ferroalloy	20.8	2.7	18.14
3336	Engines, Turbines, and Power Transmission Equipment	10.8	3.8	6.96
3253	Pesticides, Fertilizers and Other Agricultural Chemicals	6.7	0.4	6.30
3361	Motor Vehicles	7.9	2.1	5.80
3313	Alumina and Aluminum and Processing	6.7	2.0	4.73
3314	Nonferrous Metal (Except Aluminum) and Processing	4.6	0.5	4.09
3363	Motor Vehicle Parts	7.2	3.2	4.02
3342	Communications Equipment	3.0	0.2	2.79
3112	Grain and Oilseed Milling Products	3.6	1.1	2.43
3272	Glass and Glass Products	2.8	0.7	2.03

Source: Indiana Business Research Center

This evidence raises the question: *How can Indiana lead the nation in employing people in these industries and yet lag the nation in exporting from them?*

Before postulating an explanation for these findings, it is important to review changes over time to see whether the discrepancies are growing or shrinking. The evidence suggests a somewhat permanent and systematic export deficiency in the under-exporting industries in Indiana. As **Table 2** shows, seven of the top 10 under-exporting industries saw an EQ decline between 2002 and 2011.

Despite a weak trend toward smaller EQs, these data reveal no monumental shifts in either direction. Only one industry (engines, turbines, and power transmission equipment) exhibited a magnitude EQ change greater than 1.

Where Are the Products Going?

In order to generate hypotheses about what could be driving the export gaps, we examined the destinations

Table 2: Top 10 Under-Exporting Industries, 2002 and 2011

		Share of U.S. Exports		Share of Indiana Exports		EQ	
NAICS	Industry	2002	2011	2002	2011	2002	2011
3336	Engines, Turbines, and Power Transmission Equipment	1.8%	1.9%	9.6%	7.2%	5.2	3.8
3272	Glass and Glass Products	0.5%	0.3%	0.8%	0.2%	1.5	0.7
3363	Motor Vehicle Parts	6.1%	3.6%	22.6%	11.4%	3.7	3.2
3313	Alumina and Aluminum and Processing	0.5%	0.5%	1.2%	1.0%	2.4	2.0
3253	Pesticides, Fertilizers and Other Agricultural Chemicals	0.6%	0.7%	0.5%	0.3%	0.9	0.4
3314	Nonferrous Metal (Except Aluminum) and Processing	1.1%	2.9%	0.8%	1.5%	0.7	0.5
3342	Communications Equipment	2.2%	2.2%	0.4%	0.4%	0.2	0.2
3112	Grain and Oilseed Milling Products	0.8%	0.9%	0.6%	1.0%	0.7	1.1
3311	Iron and Steel and Ferroalloy	0.7%	1.2%	1.4%	3.3%	2.0	2.7
3361	Motor Vehicles	4.0%	4.3%	4.8%	8.9%	1.2	2.1

Source: Indiana Business Research Center

Table 3: Five-Country Concentration Ratios in the Top 10 Under-Exporting Industries

NAICS	Industry	U.S. Concentration	Indiana Concentration	Percentage Point Difference
3311	Iron and Steel and Ferroalloy	74%	97%	23
3336	Engines, Turbines, and Power Transmission Equipment	46%	68%	22
3253	Pesticides, Fertilizers and Other Agricultural Chemicals	65%	78%	13
3361	Motor Vehicles	67%	95%	28
3313	Alumina and Aluminum and Processing	74%	76%	2
3314	Nonferrous Metal (Except Aluminum) and Processing	66%	76%	10
3363	Motor Vehicle Parts	84%	92%	8
3342	Communications Equipment	49%	66%	17
3112	Grain and Oilseed Milling Products	48%	69%	21
3272	Glass and Glass Products	61%	95%	33

Source: Indiana Business Research Center

Table 4: Five-Country Concentration Ratios in the Negative Export Gap Industries

NAICS	Industry	Export Gap	U.S. Five-Country Concentration	Indiana Five-Country Concentration	Percentage Point Difference
3311	Motor Vehicle Bodies and Trailers	-3.7	82%	99%	17
3336	Transportation Equipment, Nesoi	-0.8	48%	5%	-43
3253	Printed Matter and Related Product, Nesoi	-0.5	72%	18%	-54
3361	Computer Equipment	-0.3	58%	29%	-29
3313	Electrical Equipment and Components, Nesoi	-0.2	58%	22%	-36

Note: Nesoi stands for "not elsewhere specified or indicated."
Source: Indiana Business Research Center

for exports from these industries. It is important to understand which countries are purchasing products from Indiana and whether the distribution of destination countries differs between Indiana and the United States as a whole. Perhaps these export gaps can be explained by a lack of market diversity—that is, exporting to too small a set of destinations.

To assess the concentration of destination countries, we calculated a five-country concentration ratio for each industry at both the U.S. and Indiana levels. This is the share of total exports from a given industry going to the top five destination countries for that industry (see **Table 3**).

Indiana's markets for the under-exporting industries are less diverse. In every one of the top 10 under-exporting Indiana industries, Indiana's exports are more concentrated in the top five export destinations than are the U.S. exports. In 8 of the 10 industries, Indiana's five-country concentration ratio exceeds the United States' by double-digits. This certainly suggests that lack of diversification among destination countries may be contributing to these industries' export gaps—that is, Indiana may not be taking advantage of potential markets—although this evidence by itself is not definitive.

In order to assess this hypothesis—that under-exporting industries are overly dependent on a handful of countries—we wanted to determine if all of Indiana's exports were more concentrated among a few destination countries. Turning the attention to those Indiana industries that were "over-exporting," or that had a negative export gap, one sees a more diverse portfolio of destination countries, as shown in **Table 4**.

There were five manufacturing-related industries in which Indiana out-exported the broader United States: motor vehicle bodies and trailers; transportation equipment; printed matter and related product; computer equipment; and electrical equipment and components. With the exception of motor vehicle bodies and trailers, Indiana exports from these industries are far more dispersed among destination countries than are U.S. exports. While this does not conclusively prove that concentration of export destinations contributes to the export gap, it certainly provides support for the hypothesis.

How Shall We Then Expand Exports?

Given these findings, what can economic development practitioners do to spur more exporting from Indiana businesses? Much of the academic research on firms' decisions to export has been conducted on non-U.S. firms. One study of Columbian firms showed that sunk costs strongly influenced the decision to continue exporting.[4] In other words, prior exporting breeds future exporting. A study of Mexican firms showed that the presence of multinational exporters increased the probability of exporting by other firms in the same industry and region.[5] A more recent study of Columbian firms produced similar results: entry costs, exchange rate expectations and prior export experience influenced the decision to export.[6] The authors of that study also report finding that "export revenue subsidies are far more effective at stimulating exports than policies that subsidize entry costs." Entry costs are the costs associated with choosing to start exporting to a particular country, such as the time and money it requires to build knowledge about, and develop an infrastructure in, a foreign country. Across all three studies, firm-level characteristics, such as profitability and size, appeared to play a large role in determining the export decision.

One notable study examined U.S. firms' decision to export and found some very interesting results. Examining data from all the manufacturing plants that responded to the Census Bureau's Annual Survey of Manufactures, the authors of this study examined firms' choice to begin or stop exporting.[7] They found results generally consistent with the aforementioned studies conducted in other countries, although they note that spillovers from other plants' export activities are negligible in determining whether a given plant will export. Also, state export promotion expenditures have little impact on firms' decision to export. This is important because previous research also showed that direct expenditures to lower the costs of exporting have little effect, while programs that bolster exporting revenues have a more pronounced effect. Given that factors outside the government's control play such a large role in determining export decisions (e.g., firm profitability, exchange rates), subsidy programs that are linked to export revenues seem to be the best policy option if governments intend to do something to promote exports.

Conclusion

The evidence presented in this report suggests that Indiana is not reaching its exporting potential in some of its most important industries. Companies producing iron and steel, engines and turbines, motor vehicles and parts, as well as many other products could potentially constitute a much greater share of Indiana's exports than they currently do based on their share of Indiana's employment. A lack of diversification in export destination countries may be to blame. In going forward and advising companies on how to expand export activity, we would advise economic development practitioners to study companies' current export destinations and encourage a broader range of potential partner nations.

To learn more, read the full report at www.ibrc.indiana.edu/studies/ExportGapReport.pdf. ■

Notes:

1. Data are sourced from WiserTrade and the Bureau of Economic Analysis.
2. The measure is not perfect because it treats all employment the same in terms of value added. Value-added, or gross domestic product, per worker differs across industries. GDP per worker in the production of medical devices, for example, will be greater than GDP per worker in food processing. That said, GDP per worker in a particular industry would not be expected to differ greatly across geographic boundaries.
3. The most recently available employment data are from 2010, and the most recently available export data are from 2011.
4. Mark Roberts and James Tybout, "An Empirical Model of Sunk Costs and the Decision to Export," *American Economic Review* 87:4 (1997): 545-564.
5. Brian Aitken, Gordon Hanson and Ann Harrison, "Spillovers, Foreign Investment, and Export Behavior," *Journal of International Economics* 43:1-2 (1997): 103-132.
6. Sanghamitra Das, Mark Roberts and James Tybout, "Market Entry Costs, Producer Heterogeneity, and Export Dynamics," *Econometrica* 75:3 (2007): 837-873.
7. Andrew Bernard and J. Bradford Jensen, "Why Some Firms Export," *The Review of Economics and Statistics* 86:2 (2004): 561-569.