

# NORTH DAKOTA PRINTING INDUSTRY ECONOMIC & FISCAL CONTRIBUTION



*Demonstrating the Importance of the  
Printing Industry to the North Dakota  
State and Local Governments*

Commissioned by Printing Industry Midwest  
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*The Printing Industry in North Dakota contributes value to the state economy in many ways. The industry generates and supports many jobs, economic output, and government programs. The industry contributes over \$210 million in output, 1,206 jobs, \$44.2 million in labor income, and \$4.5 million in state and local tax revenues.*

## The U.S. Printing Industry

Call it printing. Or call it graphic arts or graphic communications. Whatever you call it, you're referring to one of the largest industries in the United States in terms of not only employees but also annual shipments.

It is very hard to overlook an industry that employs more than 460,000 people in more than 27,500 establishments with annual shipments above \$84 billion. When you include direct and indirect economic contributions the industry's effect is even more impressive with \$182 billion in shipments, employing over 1 million individuals, supporting labor income of \$44.64 billion, and adding \$85.7 U.S. Gross Domestic Product.

## Definition

What has traditionally been referred to as the printing industry encompasses many segments: general commercial printing, quick printing, digital imaging, magazine, newspaper, book and display graphics, financial and legal printing, screen printing, forms printing, label and tag printing, packaging, greeting card, and trade and finishing services.

*(These are encompassed by NAICS code group 323)*

Due to the rapid technological changes and broadening of the scope of services provided by many of the companies in the fields today, it is commonly referred to as the graphic communications industry.

Companies in the business have expanded services to include creative design, retail display design, e-commerce, webpage design and hosting, mailing, fulfillment, and a host of services that provide horizontal marketing well beyond the core printing model. This is a description that accurately represents the broad range of what printers do today.

### Why Conduct an Economic & Fiscal Contribution Study?

The aim of this study is to establish the economic importance of the printing industry to the North Dakota economy. We define importance as the total contribution to the regional economy in terms of shipments, employment, labor income, and value-add/GDP.

#### The Economic Contribution Model

Direct Contribution

+

Indirect Contribution

+

Induced Contribution

Total Economic Contribution

The results from our economic and fiscal contribution study will show the interconnectedness of the printing industry with the North Dakota economy. We will gain a clear understanding of how much economic activity is being cycled through the North Dakota economy due to printing industry. We will also calculate how much economic activity was associated with the printing industry.

North Dakota Print Industry Fiscal Contributions include Federal, State, and Local Taxes. We estimated these fiscal contributions using data from the PIA *Ratios* financial

benchmarking database, Fiscal Year 2013 Analytical Perspectives Budget of the U.S. government from the OMB, and the Tax Foundation. See Appendix for definitions.

### Economic Contributions

In 2013 the printing industry directly contributed \$133.5 million in output, 735 jobs, and \$25.9 million in labor income to the North Dakota economy. After calculating backward-linked supply chain effects or indirect economic contributions and household spending generated by labor income or induced economic contributions, these values increased significantly. Total economic contributions to the North Dakota economy amounted to \$210.3 million in output, \$93.0 million in Value-Added (GDP), 1,206 jobs, and \$44.2 million in labor income.

Backward-linked supply chain effects or indirect contributions accounted for 19.6% or \$41.2 million of total economic contribution, 18.1% of employment contribution or 218 jobs, and 22.3% of labor income contribution or \$9.9 million. Household spending generated by labor income or induced economic contributions accounted for \$35.6 million or 16.9% of total economic contribution, 20.9% of employment contribution or 252 jobs, and 19.1% of labor income contributions or \$8.5 million.

The printing industry in North Dakota generates \$93.0 million in Value-Added, or GDP, annually through its direct economic impact and indirect/induced effects or approximately 0.17% of the state’s \$56.3 billion total economic output. Compared to the overall national figures, the North Dakota printing industry drives a smaller percent of GDP than other states. The national average is 0.49% of GDP.

## PRINTING INDUSTRY ECONOMIC CONTRIBUTION IN NORTH DAKOTA

	Direct Contribution	Indirect Contribution	Induced Contribution	Total Economic Contribution
Output (\$1000s)	\$133,512.50	\$41,242.00	\$35,594.40	\$210,348.90
Employment	735	218	252	1,206
Labor Income (\$1000s)	\$25,904.50	\$9,851.50	\$8,463.00	\$44,219.00
Value-Added or GDP (\$1000s)	\$62,750.90	\$8,758.40	\$21,495.50	\$93,004.80

Source: RIMS II multipliers and Census Bureau County Business Patterns Database

Figure 1.





Induced employment contributions are based on additional household spending cycling through the economy. The sectors of the North Dakota economy that are most affected by the induced employment contribution include health care and social assistance (22.1%); retail trade (20.0%); and food services and drinking places (6.5%). Each job directly generated by the printing industry results in 0.34 being supported through induced employment contributions. The induced jobs are lower paying on average because they are in industries with lower wages on average. The average labor income for these jobs is \$33,530. The industries that are most interconnected to the printing industry through the combination of indirect and induced employment contribution include: manufacturing; health care and social assistance; retail trade; wholesale trade, and food services and drinking places (Figure 3).

### INDUSTRIES MOST INTERCONNECTED WITH THE PRINTING INDUSTRY IN NORTH DAKOTA

Percent of Indirect and Induced Employment Generated by Print Economic Activity

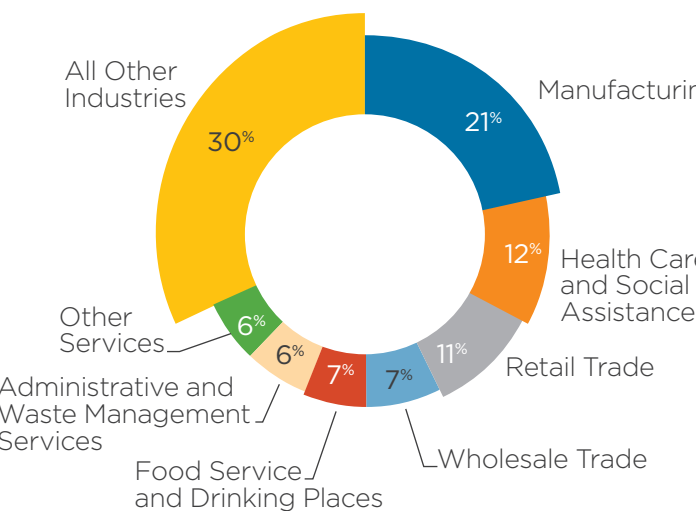


Figure 3.

The printing industry has a weaker relationship with other sectors of the economy in North Dakota compared to other states in the PIM region, leading to smaller multipliers. For every additional \$1 in output, the printing industry generates an additional \$0.58 in backward-linked, non-printing industry spending and household spending. To break that down further, every additional \$1 of output generated by the printing industry leads to an additional \$0.31 in backward-linked industries and \$0.27 in additional household spending. In North Dakota, the backward-linked industries the printing industry has the strongest relationship with include wholesale trade; manufacturing; transportation and warehousing; professional, scientific, and technical services; and finance and insurance. The industries most affected by induced household spending generated by the printing industry include: real estate, rental, and leasing; health care and social assistance; retail trade; finance and insurance; and manufacturing (Figure 2).

Every additional job in the North Dakota printing industry supports an additional 0.64 non-print jobs, inter-industry effects support 0.30 jobs and additional household spending 0.34 jobs. The printing industry has a strong inter-industry relationship with other manufactures—43.3% of print's inter-industry effect is with other manufacturing industries. Since, on average, manufacturing pays higher average salaries than the service sector, the labor income per additional job is high. For each job directly supported by the printing industry in North Dakota, the average labor income per job is \$35,244, and the indirect labor income per job is \$45,144.

### INDUSTRIES MOST INTERCONNECTED WITH THE PRINTING INDUSTRY IN NORTH DAKOTA

Percent of Indirect and Induced Output Generated by Print Economic Activity

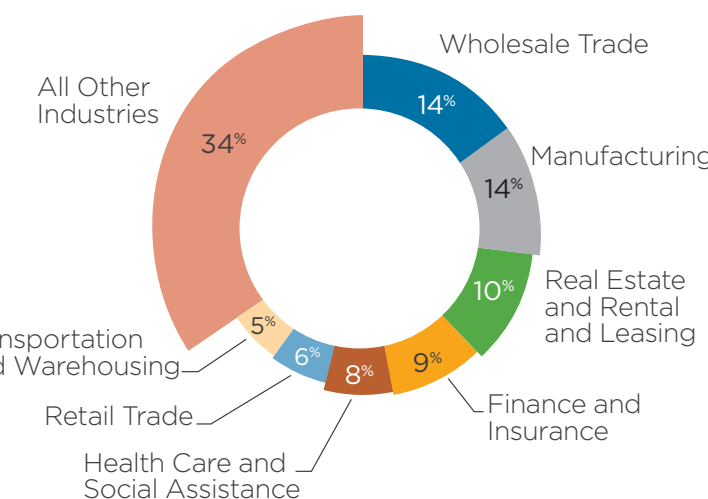


Figure 2.

The North Dakota economy generated \$56.33 billion of Gross Domestic Product (GPD) in 2013 or approximately 0.32% of total U.S. output and 8.16% of PIM total output. Output increased by 13.8% in 2013 with two sectors driving almost 60% of the growth; agriculture and mining. The largest industries in terms of percent of GDP in the North Dakota are mining (15.0%); agriculture, forestry, fishing, and hunting (12.9%); real estate and rental and leasing (9.8%); wholesale trade (8.0%); and health care and social

assistance (6.0%). We do not include government in the list above (9.6% of output) because it is considered a final use of GDP in the input-output models. As you can see in the “Share of Growth” and “Percent Contribution to Change in Output” columns in the table below, the industries that are driving the most growth in 2013 include mining (increased 31.2% adding 4.2% to total North Dakota output or 30.2% share of growth); agriculture, forestry, fishing, and hunting

## GROSS DOMESTIC PRODUCT BY INDUSTRY IN NORTH DAKOTA

(millions of current dollars)

Industry	GDP (millions of current dollars)		Percent change 2012 to 2013	Share of Growth	Contribution to Change in Output	Percent Share of State Output	
	2012	2013				2012	2013
Mining	6,417	8,476	32.1%	30.2%	4.2%	13.0%	15.0%
Agriculture, Forestry, Fishing, and Hunting	5,387	7,285	35.2%	27.8%	3.8%	10.9%	12.9%
Real Estate and Rental and Leasing	5,019	5,519	10.0%	7.3%	1.0%	10.1%	9.8%
Wolesale Trade	4,097	4,500	9.8%	5.9%	0.8%	8.3%	8.0%
Health Care and Social Assistance	3,197	3,392	6.1%	2.9%	0.4%	6.5%	6.0%
Manufacturing	3,121	3,251	4.2%	1.9%	0.3%	6.3%	5.8%
Retail Trade	2,745	2,958	7.8%	3.1%	0.4%	5.5%	5.3%
Construction	2,534	2,866	13.1%	4.9%	0.7%	5.1%	5.1%
Transportation and Warehousing	2,640	2,849	7.9%	3.1%	0.4%	5.3%	5.1%
Finance and Insurance	2,069	2,202	6.4%	2.0%	0.3%	4.2%	3.9%
Professional, Scientific, and Technical Services	1,429	1,622	13.5%	2.8%	0.4%	2.9%	2.9%
Utilities	1,191	1,319	10.7%	1.9%	0.3%	2.4%	2.3%
Accommodation and Food Services	1,090	1,177	8.0%	1.3%	0.2%	2.2%	2.1%
Information	1,102	1,100	-0.2%	0.0%	0.0%	2.2%	2.0%
Other Services, Except Government	800	847	5.9%	0.7%	0.1%	1.6%	1.5%
Administrative and Waste Management Services	700	706	0.9%	0.1%	0.0%	1.4%	1.3%
Management of Companies and Enterprises	465	527	13.3%	0.9%	0.1%	0.9%	0.9%
Arts, Entertainment, and Recreation	149	163	9.4%	0.2%	0.0%	0.3%	0.3%
Educational Services	129	137	6.2%	0.1%	0.0%	0.3%	0.2%
Government	5,228	5,432	3.9%	3.0%	0.4%	10.6%	9.6%
<b>All Industry Total</b>	<b>49,509</b>	<b>56,328</b>	<b>13.8%</b>	<b>100.0%</b>	<b>13.8%</b>	<b>100.0%</b>	<b>100.0%</b>

Figure 4.

(increased 35.2% adding 3.8% to total output or 27.8% share of growth); and real estate and rental and leasing (increased 10.0% adding 1.0% to total output or 7.3% share of growth). See table on page 4 for the complete breakdown by industry.

The size of the industry in the region has an effect on the indirect and induced impact the printing industry has on the regional economy. In other words, on average, the larger the industry the more inter-related it is with various industries within a region. This trend has held constant for Iowa, Minnesota, and Nebraska, but in North Dakota the largest industries are not as inter-related to the printing industry both in terms of backward-linked supply chain effects and additional household spending generated from printing industry labor incomes.

For example: mining accounts for 15.1% of total economic output in North Dakota or it is the largest industry. Only 2.2% of the printing industry’s indirect and induced contributions to the regional economy are circulated through the mining industry. The second largest industry, agriculture, forestry, fishing, and hunting generates 13% of the state’s output. Only 1.2% of the printing industry’s indirect and induced contributions to the regional economy are circulated through the agricultural industry. Wholesale trade and manufacturing are the two most inter-related industries with the printing industry but are the fourth and sixth largest industries in North Dakota. See the chart below for the complete list of industry output as a percent of total regional output compared to indirect and induced printing industry economic contributions by industry. (Figure 5).

SIZE OF NORTH DAKOTA INDUSTRIES COMPARED TO INDUSTRIES' INDIRECT AND INDUCED RELATIONSHIP WITH THE PRINTING INDUSTRY

Industry	Rank		Percent of	
	By Size of Industry (\$ Output)	By Interconnectedness with the Printing Industry	Total North Dakota Regional GDP	Printing Industry Indirect and Induced Output
Mining	1	15	15.05%	2.2%
Agriculture, Forestry, Fishing, and Hunting	2	17	12.93%	1.2%
Real Estate and Rental and Leasing	3	3	9.80%	10.3%
Wholesale Trade	4	1	7.99%	14.0%
Health Care and Social Assistance	5	5	6.02%	7.9%
Manufacturing	6	2	5.77%	13.9%
Retail Trade	7	6	5.25%	6.3%
Construction	8	16	5.09%	2.0%
Transportation and Warehousing	9	7	5.06%	5.4%
Finance and Insurance	10	4	3.91%	8.4%
Professional, Scientific, and Technical Services	11	8	2.88%	4.5%
Utilities	12	9	2.34%	4.4%
Accommodation and Food Services	13	10	2.09%	4.1%
Information	14	12	1.95%	3.7%
Other Services, Except Government	15	11	1.50%	3.8%
Administrative and Waste Management Services	16	13	1.25%	3.2%
Management of Companies and Enterprises	17	14	0.94%	3.0%
Arts, Entertainment, and Recreation	18	19	0.29%	0.6%
Educational Services	19	18	0.24%	1.1%

Figure 5.

Fiscal Contributions

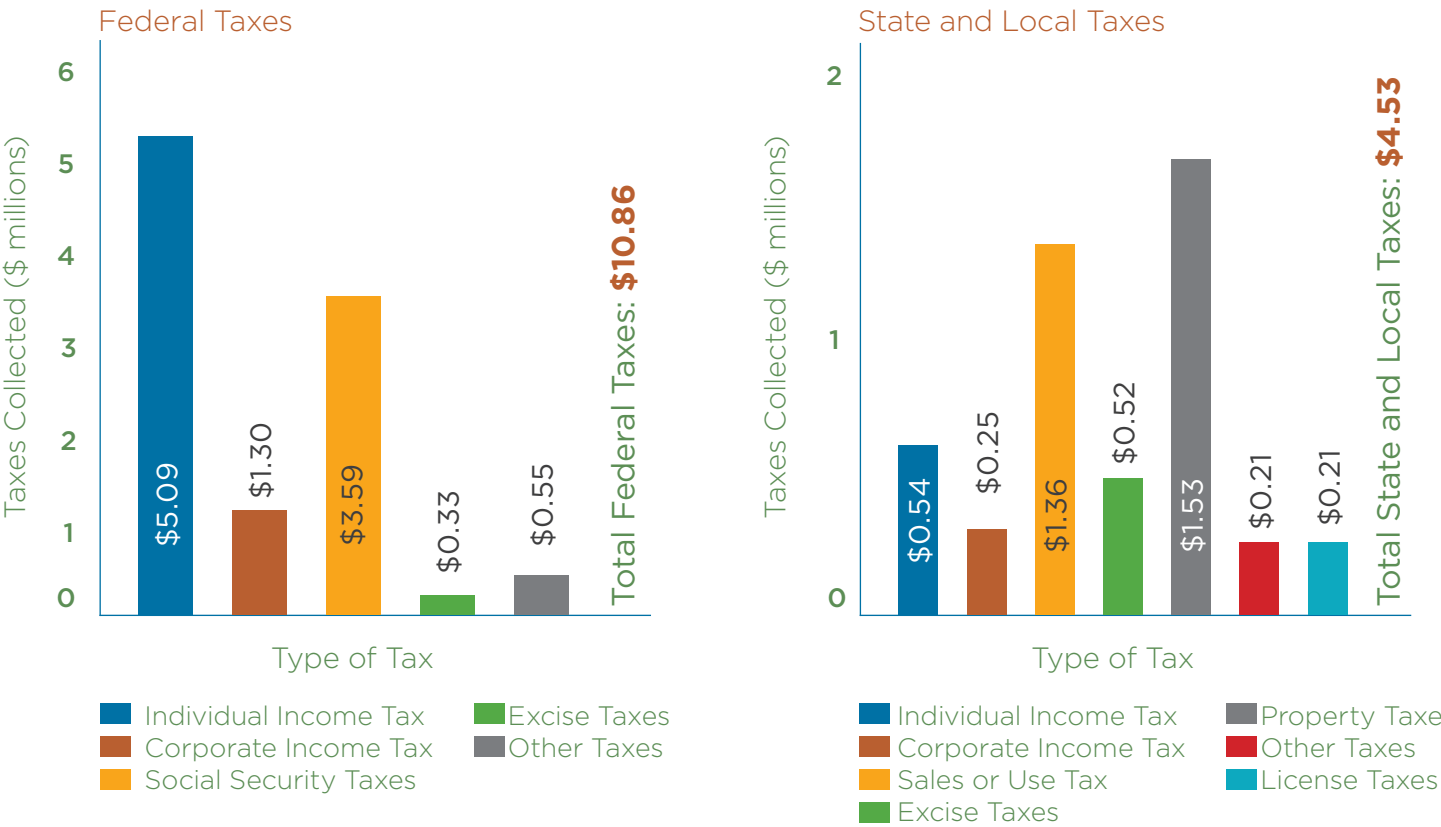
Federal, state, and local tax revenues generated by the North Dakota printing industry totaled \$15.39 million. The printing industry added \$62.75 million in direct value-added output to North Dakota’s gross domestic product and 24.5% of this output was collected by the federal, state, and local governments in taxes. The main source of federal tax revenues was individual income taxes and social security taxes. North Dakota’s printing industry revenues generated \$4.53 million in revenue for the state and local governments. Property taxes (34% of state and local collections) and general sales/use taxes (30%) were the two main sources of revenue for state and local governments (Figure 6).

Conclusions

The printing industry in North Dakota is a large and moderately interconnected industry. Each additional dollar generated by the printing industry in North Dakota leads to an additional \$0.58 spent in backward-linked

supply chain spending and additional household spending. Each print job supports 0.64 jobs in the North Dakota labor market due to spending of labor income in the backward-linked supply chain industries and household spending. Print industry output in North Dakota is most interconnected with wholesale trade; manufacturing; real estate and rental and leasing; finance and insurance; and health care and social assistance. Print industry employment in North Dakota is most interconnected with the following industries: manufacturing; health care and social assistance; and retail trade. The effects of an industry on the local economy add to total output, employment, wages, and also support of government programs. In North Dakota 7.2% of the printing industry’s \$62.75 million in value-added output went to support state and local governments. Data used in this study are based on many sources, including BEA RIMS II multipliers, The Tax Foundation, County Business Patterns Database, PIA Print Market Atlas, and the PIA Ratios Financial database for the printing industry.

2013 FEDERAL, STATE, AND LOCAL TAXES GENERATED BY THE PRINTING INDUSTRY IN NORTH DAKOTA



Sources: U.S. Census, Office of Management and Budget, and Tax Foundation

Figure 6.





## Definitions

### Direct Contribution or Final-Demand Industry:

The “Direct” contribution relates to the first round of inputs purchased from the final-demand industry or the figure we calculate in the Print Market Atlas. It is the portion of print shipments that are purchased for consumption by the final user. It includes the consumption of the goods and services that are produced and distributed in the economy. In the Input-Output accounts, final-use transactions consist of transactions that make up the final-expenditure components of GDP: Personal consumption expenditures; Private fixed investment; Change in private inventories; Exports of goods and services; Imports of goods and services; Federal, state, and local government consumption expenditures; and Gross investment.

**Indirect Contribution:** Relates to the subsequent rounds of inputs purchased by supporting industries. Some of the supporting industries include: mining, utilities, construction, manufacturing, wholesale trade, retail trade, information, educational services, healthcare, and social services; arts, entertainment, and recreation, etc. The sum of the “Direct” and “Indirect” contributions is called the inter-industry effect or inter-industry total. This takes

into account the spending the printing industry generates in other industries—the impact of local industries buying goods and services from other local industries. The cycle of spending works its way backward through the supply chain until all money leaks from the local economy, either through imports or by payments to value-added.

**Induced Contributions:** RIMS Type II multipliers not only account for the inter-industry effect, but also account for the induced economic contribution to final demand. The induced contribution relates to spending of workers whose earnings or labor income are affected by the final demand contribution. This contribution is called the household-spending contribution. We use the multipliers to measure the total contribution to the state economy.

**Total Economic Contribution:** Includes the final demand generated by the printing industry, the inter-industry contributions or indirect effects, and the induced contribution from household spending that the printing industry supports.

*For more information on how Input-Output multipliers are developed by the BEA we recommend reading the RIMS II handbook, “An essential tool for regional developers and planners.”*



*Printing Industry Midwest Economic and Fiscal Contribution Report*  
*Commissioned by Printing Industry Midwest.*

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