

The Economic Impact of Cooperatives in South Dakota



Matthew Elliott, Ph.D., SDSU Extension Agribusiness Specialist

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Acknowledgments

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Executive Summary

Cooperatives play a significant role in South Dakota's economic activity. This report estimates the economic impact of cooperatives in South Dakota in 2022. The report's estimates are based on an input-output analysis from a South Dakota State University (SDSU) survey of cooperatives operating in South Dakota conducted in June of 2023.

The SDSU survey targeted 79 cooperatives that operate in South Dakota. The cooperatives targeted in the survey primarily conducted economic activities supporting agriculture (41%), grain wholesaling (6%), and electric generation and distribution (48%). Of the 79 cooperatives contacted, 26 cooperatives (33% response rate) provided information on the amount of payroll, sales, percent of sales in South Dakota, and sources of sales by the economic activity in 2022 that could be used to estimate the total economic impact of cooperatives. While the number of firms (26) in our survey sample was relatively small compared to the total population of cooperatives (141), the cooperatives that responded were typically the larger cooperatives in

the state. For example, the survey sample reported total sales of nearly 1.5 billion dollars and over 130 million dollars in salaries in South Dakota in 2022.

The results of the input-output analysis show that the cooperatives in our survey sample are estimated to contribute to 24,831 jobs, \$919 million in worker salaries, \$1.3 billion to Gross Domestic Product (GDP), and \$2.2 billion in produced goods and services through direct, indirect, and induced economic effects (See Table 1). In addition, the economic activity of the cooperatives in our sample contributes approximately \$105 million, \$122 million, and \$334 million in county, state, and federal tax dollars, respectively (See Table 2). The survey sample of cooperative economic activity represents approximately 4.1% of the jobs, 3.6% of the salaries, 2.1% of GDP, and 1.8% of the output in South Dakota in 2022 (See Table 3).

Using the survey sample economic activities, we estimate all cooperative economic activity (141 cooperatives) in the state. The economic activity of all cooperatives in South Dakota is estimated to contribute to 78,505 jobs, \$2.8 billion in worker salaries, \$3.9 billion in GDP, and \$6.3 billion in total product output through direct, indirect, and induced effects. In addition, the economic activity of the cooperatives pays approximately \$300 million, \$388 million, and \$993 million in county, state, and federal tax dollars, respectively. Thus, cooperatives in South Dakota are estimated to contribute approximately 12.9% of the jobs, 11.3% of the salaries, 6.2% of the GDP, and 5.2% of the output in South Dakota in 2022 (See Table 2).

The economic activity of all cooperatives in South Dakota is estimated to contribute to 78,505 jobs and \$3.9 billion in Annual GDP.

Table 1. Jobs, Salaries, Value Addition, and Output by Cooperatives in South Dakota because of Direct, Indirect, and Induced Economic Effects in 2022

Population	Firms	Jobs	Salaries	GDP	Output
Survey Sample	26	24,831	\$919,417,358	\$1,298,931,239	\$2,186,767,799
Cooperatives in South Dakota	141	78,505	\$2,855,500,114	\$3,874,959,038	\$6,323,880,510
State		608,810	\$25,291,252,000	\$62,270,488,384	\$122,271,768,317

Table 2. Estimated Taxes Paid because of Cooperative Economic Activity in South Dakota

Population	Firms	County	State	Federal
Survey Sample	26	\$24,831	\$919,417,358	\$1,298,931,239
Cooperatives in South Dakota	141	\$78,505	\$2,855,500,114	\$3,874,959,038

Table 3. Percent of Jobs, Salaries, Value Addition, and Output by Cooperatives in South Dakota because of Direct, Indirect, and Induced Economic Effects in 2022.

Population	Firms	Jobs	Salaries	GDP	Output
Survey Sample	26	4.1%	3.6%	2.1%	1.8%
Cooperatives in South Dakota	141	12.9%	11.3%	6.2%	5.2%

Economic Impacts

There are three sources of economic impact of cooperatives we estimated in South Dakota. The sources of economic impact are the direct, indirect, and induced economic impacts resulting from changes in one or more contributions of economic activity in a sector or industry. Each effect can be broken into the five components of output, employment, income, GDP, and tax in which we define the effects and describe in more detail below.

Direct Economic Impact

Direct economic impact refers to the initial effect caused by a specific sector or industry change. It measures the immediate changes in output, employment, and income resulting from a final demand or production change within that sector. In this case, the change in a sector is caused by a firm that is organized as a cooperative. For example, if a new cooperative grain processing facility is established, the direct economic impact would include increased output of processed products (e.g., ethanol, dried distillers' grains, soybean oil, soybean meal) from the grain, employment (jobs) to manufacture the grains, and value addition (output value minus raw material expense) generated directly by that processing facility to convert grains into higher order goods that contributes to GDP.

Indirect Economic Impact

The indirect economic impact captures the secondary effects that occur in other sectors of the economy due to changes in the initial sector. It represents the ripple effects caused by the direct economic impact. When a sector experiences growth or decline, it affects the demand for input from other sectors, leading to changes in their output, employment, and income. For instance, the establishment of a new grain processing plant would increase the demand for raw materials (e.g., grain from farmers), transportation services, and other inputs (e.g., electricity), thereby benefiting those sectors indirectly that supply the goods and services needed for raw materials.

Induced Economic Impact

The induced economic impact refers to the changes in economic activity resulting from the spending of income generated by the direct and indirect impacts. When individuals or businesses receive income from the direct and indirect effects through dividends, salaries, patronage payments, etc., they tend to spend a portion of it on goods and services, thereby creating additional economic activity. This spending generates further rounds of economic impact, leading to a multiplier effect. For example, the employees of the new grain processing plant may spend their income on housing,

groceries, health care, and entertainment, stimulating the respective sectors in the region.

Interrelationships Between Direct, Indirect, and Induced Impacts

Direct, indirect, and induced impacts are interconnected and collectively contribute to the overall economic impact. The direct impact initiates the chain of effects, which then spreads through the economy via indirect and induced impacts. The magnitude of these impacts can be quantified using input-output models, which capture the interdependencies between sectors and estimate the multiplier effects. Multipliers can vary by region, where some inputs may not result in local economic activity and may have to be sourced from other regions. Alternatively, the sourcing of inputs may entirely rely on local supply and thus have a larger local impact. The direct, indirect, and induced impacts by region can be decomposed into 5 components.

- 1. Output is the increase or decrease in the production of goods or services in the affected sector. It is measured in terms of physical units or monetary value.
- 2. Employment: is the effect to employment levels. For example, changes in economic activity can lead to job creation or job losses, depending on the nature and magnitude of the change.
- 3. Income includes wages, salaries, and profits earned by individuals and businesses involved in the sector.

- 4. GDP refers to the additional value created by a sector during production. It represents the difference between the value of intermediate inputs used and the value of the final output that can be paid to employees, earned as income, or paid in taxes.
- 5. Tax refers to the amount tax revenue increase that is expected due to the direct, indirect, and induced activities. Expected tax effects include sales and excise taxes, customs duties, property taxes, motor vehicle licenses, severance taxes, other taxes, and special assessments.

Most of the economic impact of cooperatives in South Dakota is observed in the support for the agriculture industry. For example, in 2022, it is estimated that cooperatives provided \$1.8 billion in direct and \$606 million in induced GDP in the ag support industry (See Figure 1). In addition, cooperatives' economic activity provided approximately 61,400 jobs directly and 650 jobs induced jobs supporting the ag industry (See Figure 2). The second largest sector impacted by cooperatives was Wholesale- Non-Durable goods (\$246 million in Direct GDP), wholesale petroleum (\$230 million in Direct GDP), and Electric Transmission and Distribution (\$123 million in Direct GDP) (See Figure 1). Across all sectors, cooperatives are estimated to have provided \$2.7 billion directly to South Dakota GDP in 2022. In addition, they provided \$313 million and \$808 million in indirect and induced effects (See Table 5).

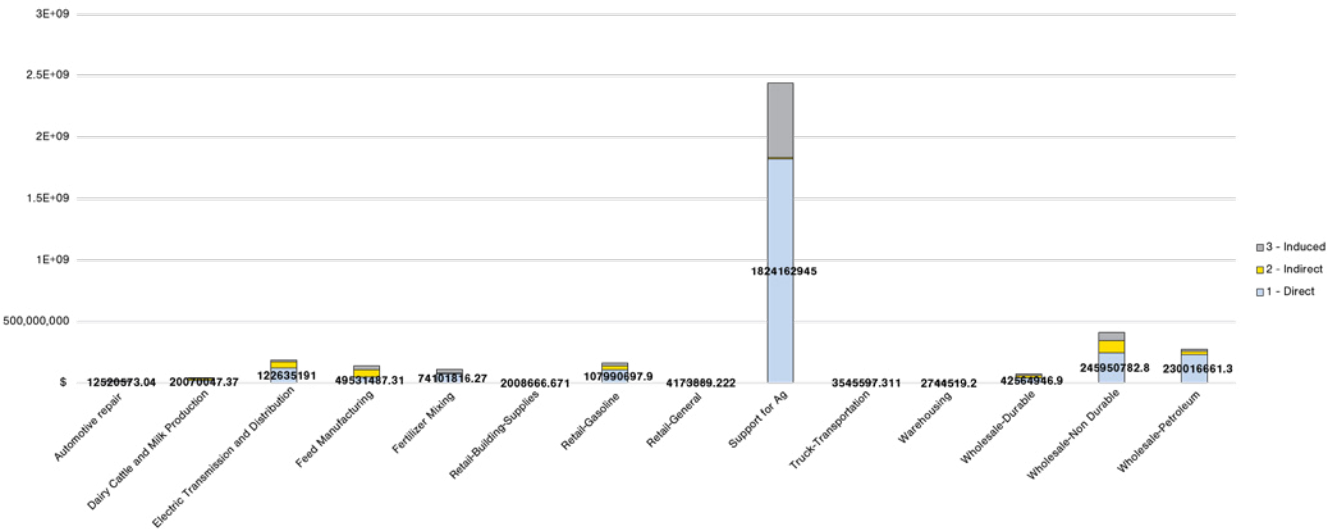


Figure 1. South Dakota GDP from Cooperative Economic Activities in Specific Industries in 2022

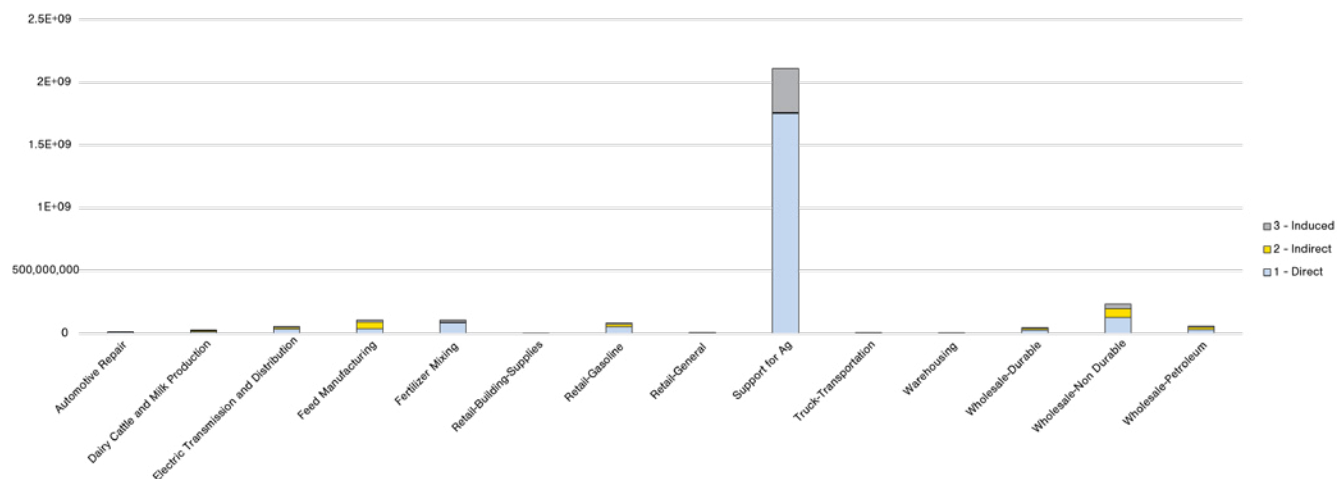


Figure 2. South Dakota Salaries by industry from Cooperative Economic Activities in 2022.

Table 4. Survey Sample Direct, Indirect, and Induced Economic Impacts in 2022 (26 Firms)

Impact	Jobs	Salaries	GDP	Output
Direct	21,005	\$696,638,106	\$914,773,186	\$1,441,634,431
Indirect	976	\$70,152,423	\$120,064,115	\$271,950,266
Induced	2,850	\$152,626,828	\$264,093,939	\$473,183,101
Grand Total	24,831	\$919,417,358	\$1,298,931,239	\$2,186,767,799

Table 5. Cooperative Direct, Indirect, and Induced Economic Impacts in 2022 (141 Firms).

Impact	Jobs	Salaries	GDP	Output
Direct	66,722	\$2,176,582,636	\$2,742,017,821	\$4,139,264,376
Indirect	2,929	\$204,845,789	\$312,636,638	\$714,842,058
Induced	8,854	\$474,071,690	\$820,304,579	\$1,469,774,076
Grand Total	78,505	\$2,855,500,114	\$3,874,959,038	\$6,323,880,510

Cooperatives in South Dakota provide \$2.7 billion directly to GDP and an additional \$1.1 billion in indirect and induced effects to GDP.

The contribution to GDP from cooperatives is made up of four sources: 1) the amount of employee compensation, 2) income for patronage or unallocated earnings from operations (proprietor income), 3) other property income, and 4) taxes. For example, of the \$3.9 billion in GDP generated from cooperatives, 64% is from employee compensation, 15% is from patronage and unallocated earnings, 11% is from taxes paid, and 10% is from other property income (See Figure 3).

50% of the 78,505 jobs created because of cooperative economic activity are expected to be as agriculture workers (22,513) and material movers (2,921) who make an average salary with benefits of \$45,000 a year. Cooperatives are also estimated to create 601 top

executive jobs that have an average salary of \$171,306 per year. Cooperative employees and economic activity are estimated to create 845 food and service and 711 healthcare jobs through induced effects.

Charitable Contributions and Community Focused
In addition to economic activity described as direct, indirect, and induced effects, cooperatives generally divert resources (employee effort and direct contributions) to local community activities. Typically, these activities are not identified or described in an input-output analysis. However, in our survey of cooperatives we asked what types of charitable activities the cooperatives contributed through donations or through labor resources with employee

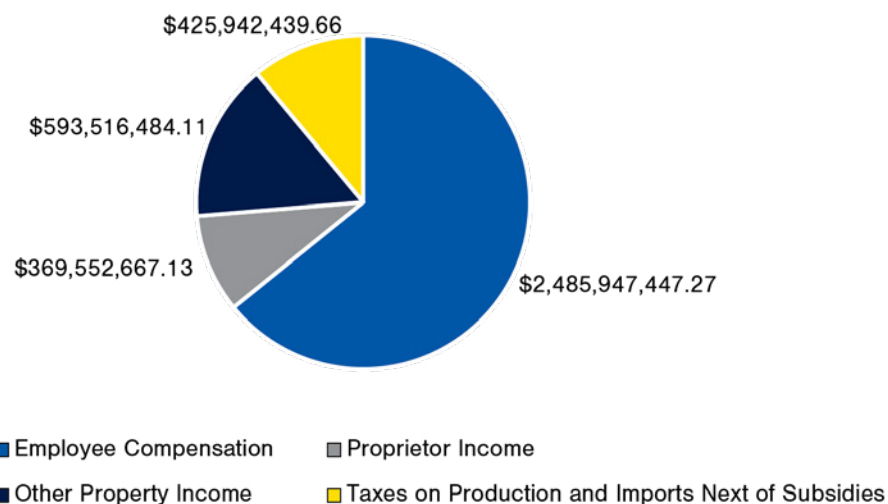


Figure 3. Sources of GDP by Cooperatives

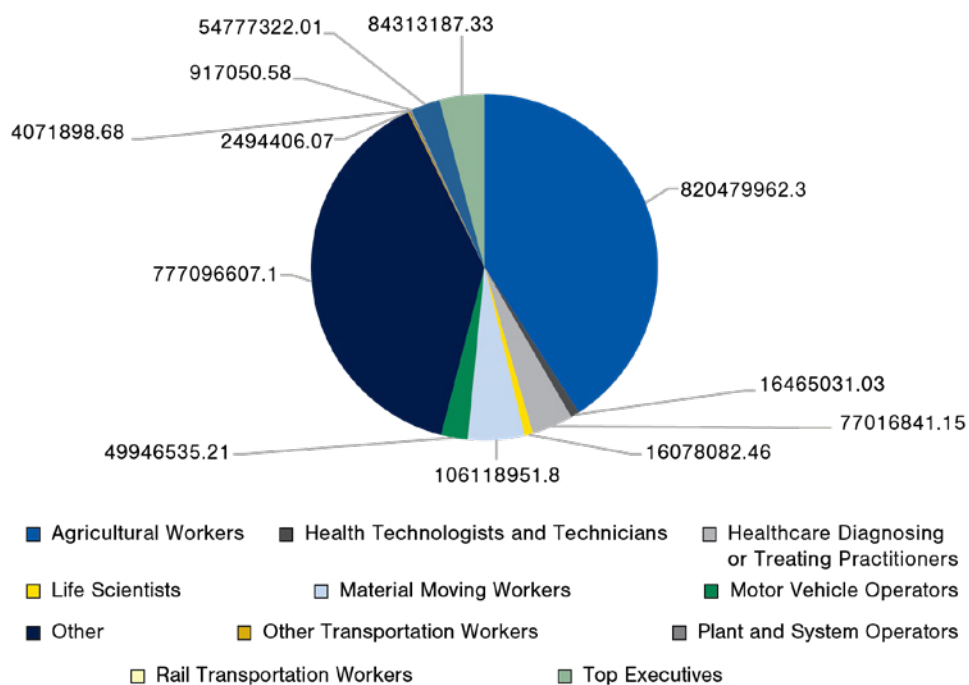
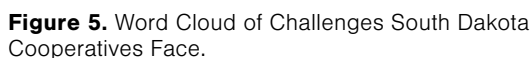


Figure 4. Job Creation from Cooperative Economic Activity

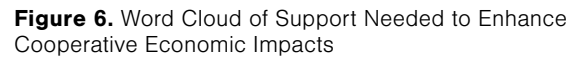
‘Many of our employees volunteer for the rural EMS and fire department and respond at a moment’s notice.’

Most respondents listed several charitable activities they were a part of. Specific beneficiaries of the charitable activities in 2022 were FFA, 4-H, Boys and Girls Club, local camps, United Way, and other related programs. Contributions were described through employee time and effort in addition to monetary contributions for sponsorships. For example, one cooperative provided 50 employees for a collective 250 hours of labor effort to conduct community cleanups. More importantly, many cooperatives exist in rural communities where employees also volunteer for their rural fire department and emergency services. Thus cooperative employees can directly contribute to additional economic activities through their voluntary efforts.

In addition to economic activities that cooperatives provide, survey respondents were asked to describe the challenges and support they need to create greater economic activity. The challenges the survey respondents primarily identified were labor shortages, an ever-changing legislative environment insurance costs, supply chain issues, inflation, and climate-related disruptions (see Figure 1).



cited the need for continued education, outreach, and training to promote a rewarding career in a cooperative.



Economic impact analysis is a tool for assessing the effects of various economic activities on a region's economy. IMPLAN software is widely used for conducting economic impact analysis due to its comprehensive features and user-friendly interface.

IMPLAN utilizes an economic modeling technique called Input-Output analysis and a Social Accounting Matrix, which is a type of applied economic analysis that tracks the interdependence among various producing and consuming industries of an economy and the spending of households. It measures the relationship between a given set of demands for final goods and services and the inputs required to satisfy those demands.

The first step in economic impact analysis is data collection. IMPLAN software requires input data on various economic variables, including industry output, employment, wages, and other relevant factors. This data can be obtained from government sources, industry associations, surveys, or other reliable sources. For the purposes of this study, the data needed for the IMPLAN software on cooperatives was collected using a survey method.

Survey respondents were asked to provide the number of sales, payroll, and primary industry they were actively engaged in during 2022. Respondents were then asked to allocate the sales in percent to more detailed economic activities that are included in the IMPLAN Social Accounting Matrix. The dollar values from the detailed economic activities were then used as inputs to calculate total economic impact using the IMPLAN software for the South Dakota Region

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report on employment and payroll by legal form of organization and industry type to determine the total population size. For example, South Dakota had 52 firms in the Utilities industry that were listed as a Non-profit or other organization according to the 2020 County Business Pattern Report. These firms reported an annual payroll of \$90,096,000. The data compares the 13 Utilities cooperatives in our survey sample that reported an annual payroll of \$69,532,050. Thus, we expanded our survey sample of cooperatives in the Utilities industry economic activities by a factor of 1.3 (\$90 billion divided by \$69 billion) to represent the economic impact of all cooperatives in the utilities industry.

We cross checked the number of businesses by industry in the other and non-profit categories that were reported in the 2020 County Business Pattern report with the number of firms that were actively registered as a cooperative with the South Dakota Secretary of State. The total number of active cooperatives with the South Dakota Secretary of State includes 177 cooperatives. In addition, we found the composition by industry type in the Secretary of State's business registrations to be close to the U.S. County Business Pattern report of 141 that are listed as other or non-profit. Thus, we determined an appropriate expansion factor to capture the whole cooperative population in the state would be to utilize the 141 Firms and their respective payrolls in the County Business Pattern report to expand our sample by industry.

IMPLAN software utilizes an input-output model to estimate the direct, indirect, and induced effects of an economic activity. The input-output model represents the interdependencies between different sectors of the economy. It quantifies the relationships between industries, households, and government sectors, allowing for a comprehensive analysis of economic impacts.

IMPLAN software provides regional data that represents the economic structure of a specific region. This data includes regional industry output, employment, wages, and other relevant variables. The software allows users to select the appropriate regional data based on the location of the economic activity being analyzed.

IMPLAN software calculates multipliers to estimate the indirect and induced effects of an economic activity. Multipliers represent the ripple effects of changes in one sector of the economy on other sectors. IMPLAN software generates multipliers based on the regional data and input-output model, providing a

comprehensive analysis of the economic impact in a local region

It is important to acknowledge the limitations of economic impact analysis using IMPLAN software. The accuracy of the results depends on the quality of the input data and the assumptions made during the analysis. Additionally, the software assumes a static economic environment, which may not capture dynamic changes or long-term effects accurately. Specific assumptions in the model include:

Assumptions

Studies, results, and reports that rely on IMPLAN are limited by the researcher's assumptions concerning the subject or event being modeled. IMPLAN provides the estimated Indirect and Induced Effects that stem from the given economic activity as defined by the inputs. The fundamental assumptions that all input-output analyses make are:

- **Constant Returns to Scale:** The same quantity of inputs is needed per unit of Output, regardless of the level of production (Adams & Stewart, 1956; Christ, 1955; Miller & Blair, 2009).
- **Fixed Input Structure/No Substitution Effects:** There is no input substitution in the production of any one Commodity (Adams & Stewart, 1956; Bess & Ambargis, 2011; Christ, 1955; Miller & Blair, 2009).
- **Industry Homogeneity:** All firms within an Industry are characterized by a common production process. If the production structure of the initially affected local firm is not consistent with the average relationships of the firms that make up the industry in the I-O accounts, then the impact of the change on the local economy will differ from that implied by a regional multiplier (Bess & Ambargis, 2011).
- **No Supply Constraints:** There are no restrictions to inputs, raw materials, and employment (Christ, 1955). The assumption is that there are sufficient inputs to produce an unlimited amount of product.
- **Technology Assumption:** An Industry, and the production of Commodities, uses the same technology to produce each of its products (Guo, Lawson, & Planting, 2002).
- **Constant Byproduct Coefficients:** As a requirement of the technology assumption, Industry byproduct coefficients are constant. An Industry will always produce the same mix of Commodities regardless of the level of production.

- **The Model is Static:** No price changes are built in IMPLAN and the underlying data and relationships are not affected by impact runs (Bess & Ambargis, 2011). Input-Output models do not account for general equilibrium effects such as offsetting gains or losses in other Industries or geographies nor the diversion of funds from other projects.
- **Backward Linked:** Type I multipliers measure only the backward linkages, also known as upstream effects (Bess & Ambargis, 2011). Input-Output analysis does not look at forward linkages in terms of how an Industry's production is used as an input for other production or for final use, also known as downstream effects.
- **Time Delineated:** The length of time that it takes for the economy to settle at its new equilibrium after an initial change in economic activity is unclear because time is not explicitly included. One can assume the adjustment will be completed in one year because the flows in the underlying Industry data are measured over the same length of time. However, the actual adjustment period varies and is dependent on the change in final demand and the related industry structure that is unique to each study (Bess & Ambargis, 2011).

For this study we used the 2021 South Dakota IMPLAN model.

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IMPLAN® model, 2021 Data, using inputs provided by the user and IMPLAN Group LLC, IMPLAN System 16905 Northcross Dr., Suite 120, Huntersville, NC 28078 www.IMPLAN.com

2020 County Business Patterns. The Number of Firms and Establishments, Employment, and Annual Payroll by State, LFO, Industry, and Enterprise Employment Size: 2020. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see <http://www.census.gov/programs-surveys/susb/technical-documentation/methodology.html> and <http://www.census.gov/programs-surveys/susb/about/glossary.html>.



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