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Gary Taylor

South Dakota State University, Gary.Taylor@sdstate.edu

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# ECONOMICS COMMENTATOR

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## ECONOMIC IMPACT OF THE DAIRY INDUSTRY IN SOUTH DAKOTA

by

Dr. Gary Taylor\*  
Associate Professor  
of Economics

The dairy industry in South Dakota makes a significant contribution to economic output and development in the state. As of January 1, 2012 there were 92,000 dairy cows in South Dakota. These cows produced 1.96 billion pounds of milk that was marketed for \$19.70 per hundredweight. This resulted in \$388,090,000 in revenue from milk sales in 2012. In addition approximately 30,360 cull cows and 41,400 calves were sold for \$38,546,988 in revenue. These numbers assume a 33% cull rate, 1,400 lb. sales weight, and a price of \$.81 per pound. Calves were valued at \$100 /hd. The dairy industry in the state produced an estimated gross income of \$426,644,988 in 2012 (South Dakota Agriculture 2013).

### Analysis of the Dairy Sector

The IMPLAN Pro3 model is used to estimate the impact of the dairy industry on the South Dakota economy. In the model each industry is represented by an internal production function. Each of these functions provides an estimate of an industry's economic contribution to the State's economy. Each industry's economic contribution is broken down into three different categories: the direct, indirect, and induced. The direct effect is the \$426.64 million of gross revenue generated by the dairy sector in 2012. The indirect effect consists of the business-to-business activity,--the impact of the businesses supplying inputs into the dairy industry. The induced effect comprises

household spending as a result of the economic activity in the dairy industry. These three effects are added together to provide an estimate of the total impact of the dairy industry on the State's economy. The output impacts are detailed in Table 1.

**Table 1. Dairy Industry Output Impact**

Direct	\$426,644,988
Indirect	\$145,702,854
Induced	\$ 75,088,748
<b>TOTAL</b>	<b>\$647,436,590</b>

In nominal 2012 dollars

The direct impact, or the gross income in 2012, is approximately \$64.72 million greater than the most recent previous analysis of the industry, based on 2008 data. This increase is the result of higher output prices, \$19.70 /cwt in 2012 versus \$19.10/cwt in 2008 for milk and a doubling of cull cow prices, from \$40/cwt in 2008 to almost \$81/cwt in 2012. Producers in the state also marketed 172 million more pounds of milk than in 2008 (South Dakota Agriculture 2013).

The multiplier for the dairy industry is 1.52. This means that for every dollar of economic activity generated in the dairy industry \$.52 of economic activity is created in the rest of the South Dakota economy.

The total impact of the dairy industry may be broken down in order to make it more understandable or relevant to stakeholders in the dairy industry. If we divide the total output, \$647,436,590, by the total number of dairy cows in 2012 we come up with an economic impact of \$7,037.35 per cow.

\*Contact the author at [Gary.Taylor@sdstate.edu](mailto:Gary.Taylor@sdstate.edu) or 605-688-4141.

## Employment

The employment effects are very similar to the output effects. The direct effect is the number of people employed in the dairy production industry. The indirect effect is the number of people employed in the industries that supply inputs to the dairy industry and the induced effect is the employment resulting from the general economic activity in the state that the dairy industry generates. The employment numbers are calculated internally by the production functions within the IMPLANPro3 program and are expressed as full-time equivalents (FTEs). These numbers may be different than those that can be observed in the industry. The employment effects are shown in Table 2.

**Table 2. Employment and Taxes on Production and Imports**

	Employment (#FTEs)	Taxes on Production and Imports (Nominal \$)
Direct	746.73	(\$2,800,881)
Indirect	527.19	\$3,956,232
Induced	666.75	\$4,365,733
<b>Total</b>	<b>1,940.67</b>	<b>\$5,521,085</b>

In nominal 2012 dollars

The output and employment impacts are directly comparable to previous estimates. However, due to a methodology change in the IMPLAN system, the impact on taxes is not directly comparable. In particular, in the most recent version of the IMPLAN software, taxes on production and imports replace indirect business taxes. The taxes included are sales and excise taxes, customs duties, property taxes, motor vehicle licenses, severance taxes, other taxes and special assessments. The net tax results are shown in Table 2. Non-tax payments are excluded. The major change in this calculation is that subsidies are netted out of the numbers (IMPLAN Glossary). That is, IMPLAN only lists the net of taxes and subsidies. Due to the high rate of government subsidies received by the agricultural sector in South Dakota for 2012 --\$565,925,721, as reported by the Environmental Working Group website-- the dairy industry has a positive net tax impact of \$5,521,085 in 2012. This high subsidy receipt rate was in part due to the severe drought that occurred in 2012. These results differ greatly from previous analyses and make it difficult to compare the current tax

impacts to past results. The tax results are also shown in Table 2.

The distribution of the impact of the dairy industry shows that the largest impact is in the other animal food manufacturing at 40%. The next largest sector is wholesale trade at 10.5%. The industries that comprise the top ten in rank order, except for the Other category, are in Table 3 (see next page).

## The Dairy Processing Sector

The dairy industry in South Dakota is more than just milk production. There is also a very large manufacturing/processing industry in the state. These sectors and their individual impacts are detailed in Tables 4 and 5.

**Table 4. Output of Dairy Processing/Manufacturing Sectors**

Fluid milk and butter manufacturing	\$201,198,740
Dry, Condensed, & Evaporated manufacturing	\$60,365,487
Cheese manufacturing	\$661,110,153
<b>TOTAL</b>	<b>\$922,674,380</b>

**Table 5. Dairy Processing Industry Impacts**

	Output	Employment	Taxes on Production and Imports
Direct	\$922,674,380	895	\$253,519
Indirect	\$713,388,038	2,271	\$14,928.21
Induced	\$135,526,721	1,123	\$7,856,058
<b>TOTAL</b>	<b>\$1,717,589,139</b>	<b>4,289</b>	<b>\$23,037,788</b>

A weighted output multiplier of the dairy industry is supplying a local market for the corn, soybeans, and forages produced in the state. A typical lactating cow ration will contain 5.4 lbs. of alfalfa hay, 19.6 lbs. of haylage, 40 lbs. of corn silage, 18.2 lbs. of corn, 5.4 lbs. of DDG's and 2.25 lbs. of soybean meal (Extension Extra 4035). If we use a 300 day lactation period for the 92,000 cows in the state, the dairy industry would account for the consumption of 74,520 tons of hay, 262,200 tons of haylage, 552,000 tons of silage, 8,970,000 bushels of corn, 74,520 tons of DDG's and 31,050 tons of soybean meal. Dry cows consume approximately 14 lbs. of forage and approximately 7 lbs. of grain daily. This

**Table 3. Distribution of the Indirect Economic Impact of the Dairy Industry in South Dakota**

	Million	% of Total
Other animal food manufacturing	\$58.3	40.0
Wholesale trade	\$15.3	10.5
Cattle ranching	\$14.0	9.6
Monetary authorities and depository credit intermediation activities	\$11.0	7.6
Electric power generation, transmission, and distribution	\$6.4	4.4
Real estate establishments	\$6.0	4.1
Grain farming	\$5.4	3.7
Truck transport	\$3.8	2.6
Maintenance and repair of non-residential structures	\$2.7	1.8
All other crop farming	\$1.6	1.1
Other	\$21.2	14.6
	<b>\$145.7</b>	<b>100.0</b>

Total Indirect Impacts in million nominal 2012 dollars

would add another 38,640 tons of forage, corn or hay based, and an additional 690,000 bushels of corn to the consumption numbers (High Priced Corn and Dairy Rations). If we assume the same 1% of bodyweight of forage consumption and .5% bodyweight of grain daily, the 33,000 replacement heifers would consume another 42,157 tons of forage and 752,812 bushels of corn annually.

**Concluding Remarks**

The dairy industry in South Dakota is a major contributor to economic activity in the state. The direct impact of the dairy production sector is \$426,644,988 and it produces a total impact of \$647,436,590. In addition, the production sector accounts for 1,941 jobs and \$5,521,085 in taxes on production and imports. If the total impact of the dairy processing/manufacturing sector is added the total economic impact of the dairy industry rises to \$2,419,025,729, the employment number increases to 6,230, and the tax revenue increases to \$28,558,873. The data comes from the IMPLAN Pro3 data base and does not include any adjustments from the 2012 Census of Agriculture.

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Department of Economics  
 South Dakota State University  
 Box 504 Scobey Hall  
 Brookings, SD 57007-0895  
 Phone: 605-688-4855  
 Fax: 605-688-6386  
 E-Mail: Penny\_Stover@sdstate.edu  
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