

The role of the dairy industry in Idaho's economy

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Idaho has more dairy cows than all but two western states California and Washington (Gray 1992). From a milk production standpoint, Idaho's milk cow population stood at 178,000 in 1991. This represented an increase of 34,000 cows from 1970, a 24 percent increase — just the opposite from what occurred nationally, with cow numbers decreasing 25 percent over the same period. However, due to significant increases in production per cow, total milk production increased by 98 percent over the same period (Idaho Agricultural Statistics 1991). Cash receipts from milk accounted for 12 percent of all cash proceeds from farm marketings in 1991 (Idaho Agricultural Statistics 1991). Milk receipts surpassed those of wheat in 1984, and milk presently ranks third in the state in terms of income received by farmers.

Because of Idaho's distance from U.S. population centers, more than 80 percent of the state's milk goes into processed products. By far the largest share of this production goes into cheese. Idaho now ranks fourth among all states in the manufacture of American cheese (Gray 1992). In 1987, 12 Idaho cheese plants employed 904 people and had \$384.1 million in shipments (U.S. Department of Commerce 1990).



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Decisions affecting Idaho's dairy industry are routinely made in Boise and Washington, D.C. Wise decision-making demands a rather specific understanding of the dairy industry's contribution to the state's overall economic health. Also, a model of Idaho's dairy industry can be used as a planning tool for members of this agribusiness sector as they put together competitive strategies relative to other regions of the U.S. Thus, the purposes of our research are to quantify the economic role of the dairy industry in the state of Idaho and to provide a tool for assessing the economic impact of actions affecting the dairy industry.

Measuring the economic role of the dairy industry requires a model of the state's economy. In 1991 a team of economists in the University of Idaho's College of Agriculture completed the IDAHO Economic Modeling Project (IDAEMP). IDAEMP tracks economic activity in the state, capturing interindustry trade, and shows how income creation in one industry is related to income creation in other industries. (See page 3 for more information about IDAEMP.)

A summary of our findings follows. When all supply and income multiplier effects are considered, dairy farming, cheese manufacturing, milk processing, and other dairy product processing industries generated \$984 million, or 6 percent, of Idaho's gross income in 1989. The percentage is higher in eastern Idaho and Magic Valley, however (fig. 1).

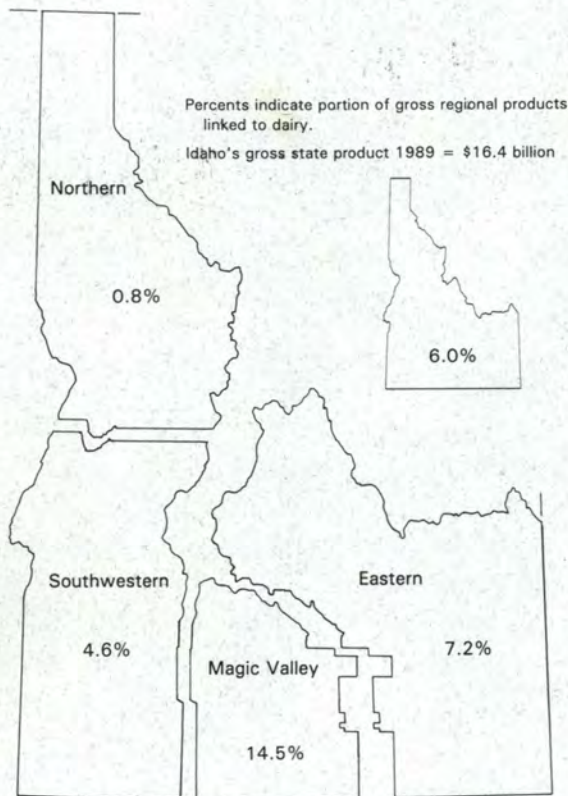


Fig. 1. Gross state product linked to dairy in Idaho's four regions, 1989.

Table 1. Consolidated revenue-expenditure account for Idaho dairy farmers in 1989.

	Revenue		Expenditures	
	(\$1,000s)		(\$1,000s)	(%)
Sales	446,718			
		Operating costs	304,922	68.26
		Ownership costs	28,746	6.43
		Direct income	113,050	25.31
TOTAL	446,718	TOTAL	446,718	100.00

While our aim in this report is to inform, we expect our analytic framework to prove useful in future resource management decisions. The dairy industry is a significant part of Idaho's economy, and policy actions that impact the dairy industry can significantly affect the rest of the economy. An important spinoff of our research is a framework in place to address future issues of importance for Idaho.

For the analysis reported here, we break Idaho's dairy industry into four parts: dairy farming, cheese manufacturing, fluid milk, and other dairy products, principally condensed and evaporated milk, and ice cream. Our analysis begins with the economic role of dairy farming.

Direct impacts of dairy farming

Table 1 shows sales and expenditures for Idaho dairy farmers in 1989. We chose 1989 due to the availability of complete data for that year. We constructed table 1 from price and production information for 1989, and with the help of representative enterprise budgets for dairy farmers (Fiez et al. 1989).

In 1989, Idaho dairy farmers had gross sales of \$447 million. Dairy farm revenues are used by dairy farmers to meet operating and ownership costs and to provide income for themselves and their employees. In our analysis, all income, including wage, proprietary, and property income, is counted in our "direct income" category.

Dairy farming is both capital and produced input intensive. Dairying requires significant purchased inputs. Operating costs, including feeds and supplements, veterinary expenses, utilities, fuels, professional services, bedding, and other miscellaneous farm supplies use 68 percent of farm revenues, while ownership costs, chiefly building and equipment maintenance and replacement, consume another 6 percent. Only 25 percent of all dairy farm revenues resolve into direct income payments (i.e., to the dairy farmer or his/her employees). We will see that the large portion of dairy farm revenues devoted to input expenses has a profound effect on the role dairy farming has in the state's economy.

Indirect impacts of dairy farming

Table 1 shows a dairy farm income of \$113 million. This is part of Idaho's \$16.4 billion in overall income, or gross state product. Table 1's other expense items generate income as well. Expenditures associated with both operating and ownership costs create income in the industries that provide these inputs to the dairy industry. This income is indirectly linked to dairy farming.

Of course, input suppliers purchase inputs, and these lead to still more income (indirect income). And the recipients of dairy-linked income purchase consumer goods, and further income is generated. This is what is commonly known as a "multiplier

IDAEMP

Idaho Economic Modeling Project

IDAEMP uses "value added" as the key measure of an industry's economic output. Value added is defined as the sum of all before-tax profits and proprietary income, allowances for depreciation, and wages paid to labor, including contributions for social insurance. Value added is roughly equivalent to the business person's notion of revenues less cost of goods sold, or net cash flow, plus wages paid to labor.

The sum of all value added in Idaho equals the gross state product: the value of all goods and services produced in the state during a given year or roughly the state equivalent of gross domestic product. The research reported here refers to Idaho's economy in 1989. Idaho had a gross income (or gross state product) of \$16.4 billion in 1989 (U.S. Department of Commerce 1992).

IDAEMP takes into account the many interconnections that characterize the Idaho economy. It identifies the value added of a particular industry, such as agriculture, and links to it the value added of all the industries and activities it supports. For example, agricultural production generates value added in the agricultural sector. In the process of production, agricultural producers purchase inputs, and value added is generated in these agriculturally linked industries. In turn, agricultural suppliers buy inputs, and their suppliers buy inputs, etc. At each step, value added is generated. The model tracks this chain of value added and links it to agriculture.

However, the chain of value added generation goes even further than supply linkages. Ag wage earners spend their incomes on consumer goods, generating more value added. Ag producers, wage earners, and suppliers also pay state and local taxes to fund government payrolls, which are part of the state's value added. The model thus also tracks agriculturally related value added in consumer industries and government and links it to agriculture.

effect" — increased activity/income in one industry positively affects other sectors of the economy. IDAEMP tracks these many indirect income effects of dairy farming.

Tables 2 to 5 show the results of our IDAEMP analysis. The tables refer to Idaho's four principal trade regions — northern, eastern, southcentral (Magic Valley), and southwestern Idaho.

Total dairy farm income by region

Total income attributable to dairy farming is shown in tables 2 through 5 with two components: "direct income" is the same as in table 1, except here it is distributed by region; "indirect income" is defined as above and is the result of our IDAEMP analysis. Total income is simply direct plus indirect income. Of Idaho's four regions, dairy farming in Magic Valley contributes most to overall Idaho income formation, \$264 million (table 2). Dairy farming accounts for nearly 11 percent of all income in Magic Valley. The "multiplier" for Magic Valley dairy farming, 5.22, is simply the total income divided by the direct income. The total of direct and indirect income equals the multiplier of 5.22. Thus, associated with every dollar of income generated by Magic Valley dairy farmers is \$5.22 in total regional income.

Table 3 shows income generated by dairy farms in eastern Idaho: direct dairy farm income is \$31 million, indirect is another \$133 million. Total income linked to dairy farming in eastern Idaho is therefore \$164 million¹, or approximately 4 percent of all income in that region.

Table 3 shows another element under dairy farming, income "from Magic Valley." Income formation in eastern Idaho is magnified by the presence of a significant regional trade center, an emerging urban-suburban complex consisting of Rexburg, Rigby, Idaho Falls, Blackfoot, and Pocatello. The market reach of the eastern Idaho trade center extends to Magic Valley². Reflecting this market reach, or "trade dominance," income formation in Magic Valley has a spillover effect on eastern Idaho income. Table 3's \$34 million "from Magic Valley" indicates the dairy farming portion of this

¹The slightly larger multiplier for eastern Idaho as compared to Magic Valley, 5.2720 vs. 5.2189, reflects Magic Valley's somewhat less commercially developed economy. With less development there are fewer industries, and fewer industries mean fewer interindustry linkages. The size of the multiplier depends on the depth of interindustry linkages.

²The U.S. Department of Commerce has mapped the "trade structure of the U.S. economy." In its analysis, the Commerce Department included Magic Valley entirely within the eastern Idaho market area. In contrast, our research suggests a shared dominance between eastern and southwestern Idaho. For a further discussion of market dominance and its impact on diffusion of income in Idaho see "The Role of Rural Industry in Idaho's Urban Places," CIS 971, a 1992 publication by the University of Idaho College of Agriculture.

Table 2. Magic Valley: Role of dairy farming in 1989 economy.

	\$1,000s	% GRP
Dairy farmers		
Direct income	50,548	
Indirect income	<u>213,243</u>	
TOTAL	263,791	10.9
(Multiplier: 5.21858)		
Cheese manufacturing		
Direct income	17,690	
Indirect income	<u>42,162</u>	
TOTAL	59,852	2.5
(Multiplier: 3.38334)		
Fluid milk processing		
Direct income	4,903	
Indirect income	<u>3,159</u>	
TOTAL	8,062	0.3
(Multiplier: 1.64427)		
Other dairy products manufacturing¹		
Direct income	9,344	
Indirect income	<u>10,093</u>	
TOTAL	19,437	0.8
(Multiplier: 2.08021)		
Total dairy related	351,142	14.5
Gross regional product	2,422,800	100.0

¹Condensed and evaporated milk, and ice cream.

Table 3. Eastern Idaho: Role of dairy farming in 1989 economy.

	\$1,000s	% GRP
Dairy farmers		
Direct income	31,115	
Indirect income	<u>132,922</u>	
TOTAL	164,037	3.8
(Multiplier: 5.27195)		
From Magic Valley	34,196	0.8
Cheese manufacturing		
Direct income	24,414	
Indirect income	<u>62,872</u>	
TOTAL	87,286	2.0
(Multiplier: 3.57527)		
From Magic Valley	12,030	0.3
Fluid milk processing		
Direct income	2,356	
Indirect income	<u>2,223</u>	
TOTAL	4,579	0.1
(Multiplier: 1.943460)		
From Magic Valley	1,262	<.05
Other dairy products manufacturing¹		
Direct income	360	
Indirect income	<u>552</u>	
TOTAL	912	<.05
(Multiplier: 2.53198)		
From Magic Valley	2,510	0.1
Total dairy related	306,812	7.2
Gross regional product	4,268,400	100.0

¹Condensed and evaporated milk, and ice cream.

spillover income. Altogether then, dairy farming explained 4.6 percent of all eastern Idaho income in 1989, 3.8 percent attributable to dairy farming in eastern Idaho itself and another 0.8 percent attributable to dairy farming in Magic Valley.

Table 4 presents the dairy farm picture for southwestern Idaho — \$184 million in total income, consisting of \$30 million in direct and \$154 million in indirect income. Despite the fact that the figures for the region are not as large as those for the areas previously discussed, multiplier effects are greatest here. This largely reflects the deeper interindustry linkages of Boise, Idaho's largest urban center. Southwestern Idaho also experiences income effects as a result of Magic Valley dairy farming. Boise's economic dominance extends to Magic Valley similarly to that of eastern Idaho's urban area. Table 5 indicates a more modest role for dairy farms in northern Idaho, accounting for \$11 million or approximately 0.3 percent of all income generated there.

Income generated by dairy processing

Idaho is emerging as one of the nation's leading states in terms of dairy products manufacturing. Idaho's dairy farming and processing industries complement each other, both enjoying growth as they share a mix of production advantages. As indicated in tables 2 through 5, we analyzed Idaho's dairy processing industry in some detail, reporting direct and indirect income for cheese manufacturing, fluid milk processing, condensed and evaporated milk processing, and ice cream manufacturing.

Dairy products manufacturing, particularly cheese, is an important part of the Magic Valley economy, accounting for roughly one third of all dairy-related income there. In eastern Idaho, dairy products manufacturing accounts for roughly \$3 of every \$7 of dairy-linked income. Fluid milk processing is notably large in southwestern Idaho, feeding the significant local market for milk provided by the populations of Boise, Nampa, and Caldwell.

Conclusion

Our analysis indicates dairy farming and dairy products processing are significant parts of Idaho's economy. Decisions affecting Idaho's dairy industry have ripple effects that touch many other parts of the economy. With our economic model and analytic framework in place, decision makers can be made aware of these impacts. The continued growth and vitality of Idaho's economy depends on informed decisions.

Table 4. Southwestern Idaho: Role of dairy farming in 1989 economy.

	\$1,000s	% GRP
Dairy farmers		
Direct income	29,513	
Indirect income	154,973	
TOTAL	184,486	2.8
(Multiplier: 6.25095)		
From Magic Valley	11,313	0.2
Cheese manufacturing		
Direct income	3,170	
Indirect income	10,314	
TOTAL	3,484	0.2
(Multiplier: 4.25392)		
From Magic Valley	2,635	<.05
Fluid milk processing		
Direct income	32,784	
Indirect income	44,293	
TOTAL	77,077	1.2
(Multiplier: 2.35106)		
From Magic Valley	362	<.05
Other dairy products manufacturing¹		
Direct income	2,594	
Indirect income	5,960	
TOTAL	8,554	0.1
(Multiplier: 3.29764)		
From Magic Valley	625	<.05
Total dairy related	298,537	4.6
Gross regional product	6,462,000	100.0

¹Condensed and evaporated milk, and ice cream.

Table 5. Northern Idaho: Role of dairy farming in 1989 economy.

	\$1,000s	% GRP
Dairy farmers		
Direct income	1,874	
Indirect income	8,779	
TOTAL	10,653	0.3
(Multiplier: 5.68540)		
Cheese manufacturing		
Direct income	542	
Indirect income	1,471	
TOTAL	2,013	0.1
(Multiplier: 3.71382)		
Fluid milk processing		
Direct income	6,503	
Indirect income	7,015	
TOTAL	13,518	0.4
(Multiplier: 2.07875)		
Total dairy related	26,183	0.8
Gross regional product	3,228,000	100.0

No significant condensed and evaporated milk, or ice cream manufacturing was identified for northern Idaho.

For further reading

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