BUL 872

Uncovering Hidden Linkages in Idaho's 2006 Teton Regional Economy

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EDITOR'S NOTE: Idaho's tri-county Teton regional economy discussed in this bulletin is that of the growing economy in 2006. The present recession, which started in 2008, is a contrasting scenario. However, the economic base analysis is still suitable to identify the area's economic drivers—or, in terms of the current recession—the more resilient sectors in the region's economy.

EXECUTIVE SUMMARY

Idaho's Teton region is one of the crown jewels of the West—an outdoor recreation area with the spectacular backdrop of the Teton Range and the gateway to Grand Teton and Yellowstone national parks. However, the beauty of the region and the tourist crowds mask the economic drivers of the regional economy.

What is the foundation of the Teton region's economy? This study seeks to answer by explaining the workings of the economy and by measuring the contributions of different industries to it, including the contributions of tourism and natural amenities.

The economic structure of the region was analyzed using two measures of contributions: gross and economic base. The **gross contribution**—looking only at the direct economic activity of a particular sector—shows that the trade, government, and service businesses dominate the economy.

In contrast, the economic **base contribution**—the economic activity of an exporting sector plus its supporting nonexporting sectors—shows that the Teton region's economy is based on agribusinesses and on a cluster of call centers plus higher education (Brigham Young University–Idaho, or BYU–I), and construction.[1]

Tourism and other amenity-based industries are a minor part of the economic base of the region.

Key findings

- In 2006, about two-thirds of the base sales ($2.6 billion), of the base jobs (27,000), and of base value added ($1.2 billion) in the regional economy were contributed by the call centers + education cluster, agribusinesses, and construction. These are the drivers of the base economy.
- Businesses with the largest exports are the call centers (30%), higher education (16%), and fresh-pack potatoes (13%).
- Tourism (including all variations of business travel, BYU–I events, gateway to the national parks, or destination to Island Park) at most contributed $178 million of base sales, or 7% of total base sales, in 2006.
- Natural-amenity-related contributions are estimated at $146 million of base sales, or 6% of total base sales.

THE TETON REGIONAL (THREE COUNTIES) ECONOMY AND GROWTH

The Teton region—Fremont, Madison, and Teton counties—in the northern part of eastern Idaho covers some 2,800 square miles. The Teton peaks are a crown jewel of the West, an outdoor recreation area visible throughout most of the region. The region is both a tourist destination and a high-traffic route as a gateway to Yellowstone and Grand Teton national parks.

The region is a year-round tourist destination with world-class fishing, hunting, wildlife viewing, and rafting in the summer and, in winter, snowmobiling and skiing. Natural amenities tourists enjoy also attract second-home buyers, retirees, and certain types of entrepreneurs, all wanting to live with a view of the Tetons. Rexburg, in Madison County, is the trade center of the region and is the home to the region's largest employer after government, Brigham Young University–Idaho (BYU–I). The region also is a major contributor to Idaho's "Famous Potato" brand, as area potato farmers supply major fresh-pack processors.

The region's population grew from 24,500 in 1970 to 56,500 in 2006; the regional annual growth rate of 3.1% in that 36-year period was well above the 2.9% annual growth rate of Idaho during the same period. With a 4.1% annual growth rate between 2000 and 2007, Madison County ranked fourteenth in growth among midsize counties in the United States. Businesses in the region provided 27,000 part- and full-time jobs. Employment in both the region and in Idaho increased by 5% annually between 1970 and 2006.

[1] Mining is included in this sector, but it constitutes less than 1% of gross output sales, jobs, or value added. Henceforth, and for the sake of brevity, we refer only to construction.

Regional real per-capita income increased by 0.8% annually, from $14,400 in 1970 to $18,600 in 2006. In contrast, statewide real per capita income grew at twice that rate—1.8% annually, from $18,800 in 1970 to $30,800 in 2006. The gap between the regional and state real personal income increased from 24% below the state level in 1970 to 39% below state level in 2006. The population increase and the increasing gap between 2000 and 2007 coincide with the expansion of BYU–I from 15,400 students in 2000 to 21,000 in 2006.

To provide policy makers, public officials, and researchers, relevant information about diverse county conditions, the USDA Economic Research Service has developed a set of county-level typology codes that capture differences in economic and social characteristics. Fremont and Teton are categorized as recreation counties (USDA-ERS, 2004) and Fremont County with potential for more tourism development (Gardner and Martin, 2006).

Businesses in a region can be divided into industries that meet local or internal demand (**nonbasic** industries) and industries that meet nonlocal or export demand (**basic** industries). Nonbasic industries serve other industries in the region and circulate economic activity within the region. In contrast, basic industries are driven by export demand and correspondingly drive regional output or jobs. Economic base multipliers show that exports spur new output from basic industries and drive new output in nonbasic industries by increasing demand for goods and services.

There are two complementary ways to assess economic contributions:

Gross measure quantifies sales, employment, wages, and value added generated by each sector. Gross measures are reports on economic activity compiled by government agencies and published as economic statistics.

Economic base measure quantifies economic activity by giving credit to the industry that brings new dollars into the region through its exports. The base measure encompasses all the exports of a sector plus inputs produced by others. The base measure reveals linkages among all sectors of the economy needed to produce export sales—linkages that are not evident in the gross measure.

An example clarifies the difference between these two measures. In gross analysis, if a tire merchant sells a tire to a local farmer, the value of the transaction (and associated employment, wages, and value added) would be attributed to the "tire store" industry. But, the farmer needs the new tire to produce potatoes to be exported outside the region. The tire sale is possible only because the farmer brings the new dollars (exports) into the region; and so the base analysis gives credit for the economic contribution to the potato farming industry.

Data and procedures

Survey-based input–output (I–O) models are prohibitively expensive. As an alternative, the secondary database (2006 IMPLAN) was used to construct a social accounting matrix (SAM) model for the three counties (see *Social Accounting Matrix (SAM) models*, page 14). The 179 industries in the region are aggregated into 14 sectors. (Note that sectors 1 through 4 are subsets of agribusiness):

Agribusiness includes the following 1 to 4:

1. (Other agriculture)
2. (Potato farming)
3. (Agricultural products processing - Ag processing)
4. (Fresh-pack potato)
5. Construction and mining (see footnote 1)
6. Transportation and utilities
7. Manufacturing
8. Trade (wholesale and retail)
9. Services
10. FIRE (finance, insurance, and real estate)
11. Call centers (IMPLAN sector 450 is Miscellaneous Services, which we identified to be the call centers.)
12. Higher Education (BYU–I)
13. Lodging and food (accommodation, food and drink, parks, zoos, travel agents, and guides), and
14. Government as a sector and miscellaneous (IMPLAN sectors 496–509. In contrast to government as a sector, state and local governments, as institutions, do not contribute directly to sales, employment, or value added; see Definitions, page 15)

Primary-data modifications were made to the three-county 2006 IMPLAN secondary database to include potato farming and the fresh packing of potatoes in 2006. The region produced nearly 20 million cwt ($117 million) of potatoes in 2006, of which 50% were sold as seed, 15% as frozen, and 35% as fresh pack. The large fresh-pack business exported $148 million and created 755 jobs in 2006. IMPLAN's "Miscellaneous Services" (these types of services are different from those services aggregated in 10 above) are call centers in Rexburg, employing largely university students. Call centers' services are exported; thus the regional purchase coefficient (RPC) was set to zero (see Definitions, page 15). Likewise, the RPCs for lodging and food and for trade are adjusted to reflect greater exports.

ECONOMIC CONTRIBUTIONS

Gross and base measures are used to contrast output, employment, and value added for different sectors. The gross and base analysis can be contrasted and compared on three points:

(1) Gross and base analysis totals are equal. Each analysis simply slices the pie differently.

(2) Base analysis reveals the industries driven by exports and thus discerns which industries are base (i.e., exporting) industries and which are nonbase (i.e., service or support) industries.

(3) Base analysis reveals outside contributions to the economy through retirement income, transfer payments, and dividends.

Gross and base outputs[2]

Total output or sales of the region in 2006 was $2.6 billion or about 2% of the state's output (Table 1). In terms of gross output, agribusiness contributed 20.3%[3], followed by call centers and services with about 13% each, and construction and government with about 10% each. In terms of base output, agribusiness contributed 24.5%, followed by call centers with 22.6%, construction with 11.8%, and higher education with 11.3%.

For predominantly exporting sectors, such as agribusiness and higher education, the base output is larger than the gross output because other supporting sectors supply inputs that enable agribusiness or education to realize their exports. For example, the gross output of agribusiness is 20.3% while its base output is 24.5%; the gross output of higher education is 7.1%, but its base output is 11.3%.

In contrast, the predominantly nonexporting sectors supply goods and services to the exporting sectors, and the value of these domestic sales accrues to the exporting sectors. For example, services contributed 13.3% in gross output but only 0.5% in base output. Similarly, contributions of government and trade to gross output were about 10% and 7%, respectively, but only about 3% and 1% to base output.

Households and state and local government operate only in the base economy. As institutions, they contribute indirectly: households through transfer payments (retirement, disability, and insurance benefit payments, medical benefits, and Social Security, among others, totaling 6.2%); state and local governments contributed 4.5% through purchases of goods and services.

Call centers provide telemarketing, consulting, and security services in the regional trade center. We cluster them with higher education because BYU–I supplies essential labor to the call centers.[4] The contribution of call centers + higher education to the total base output was nearly 34%. If the 25% contribution of agribusiness is added, these sectors' share in the regional base output was about 59%. Out of $100 in base output from the economy, $34 was contributed by call centers + higher education, $25 by agribusiness, and $11 by households and state and local governments. The gross and base outputs of the top five contributors and the rest of the sectors in the economy are shown in Figure 1. Note that when contrasting base with the gross measures, nonexporting sectors contract and exporting sectors expand.

[2] "Output and "sales" are used interchangeably; see Definitions, page 15.

[3] Henceforth, for the sake of brevity, other agriculture and farming, agricultural processing, and fresh-pack potato are referred to as "agribusiness"; the rationale for linking them together is discussed on page 10.

[4] The rationale for this cluster is discussed on page 10.

Table 1. Gross and base output in Fremont, Madison, and Teton counties, Idaho, 2006.

	Gross Output			Base Output				
				$M				
Sector/Institution	$M	%	Rank	Total	Direct	Indirect	%	Rank
Agribusiness (4 combined)	531	20.3	1	644	338	306	24.5	1
(Other ag production)	155	5.9		192	110	82	7.3	
(Potato farming)	117	4.5		16	10	6	0.6	
(Ag processing)	107	4.1		131	70	61	5.0	
(Fresh-pack potato)	152	5.8		305	148	157	11.6	
Construction	264	10.0	4	311	197	115	11.8	3
Transportation & utilities	109	4.1	10	50	31	19	1.9	10
Manufacturing	165	6.3	8	182	121	61	6.9	5
Trade	182	6.9	7	33	20	13	1.2	11
Services	350	13.3	3	14	9	6	0.5	12
FIRE*	139	5.3	9	7	4	2	0.3	13
Call centers	352	13.4	2	594	352	242	22.6	2
Lodging & food	98	3.7	11	145	88	57	5.5	7
Higher Education (BYU–I)	186	7.1	6	298	183	115	11.3	4
Government (sector) & misc.	254	9.7	5	68	44	24	2.6	9
Households				163	0	163	6.2	6
State & local government				119	0	119	4.5	8
TOTAL**	**2,629**	**100**		**2,629**	**1,388**	**1,241**	**100**	

Source: IMPLAN
Note: Because of rounding, direct and indirect figures may not add exactly to sector totals
$M = million dollars
*FIRE = Finance, insurance, real estate
*Excludes Agribusiness figures (row 1) that are already listed in the four ag subsets

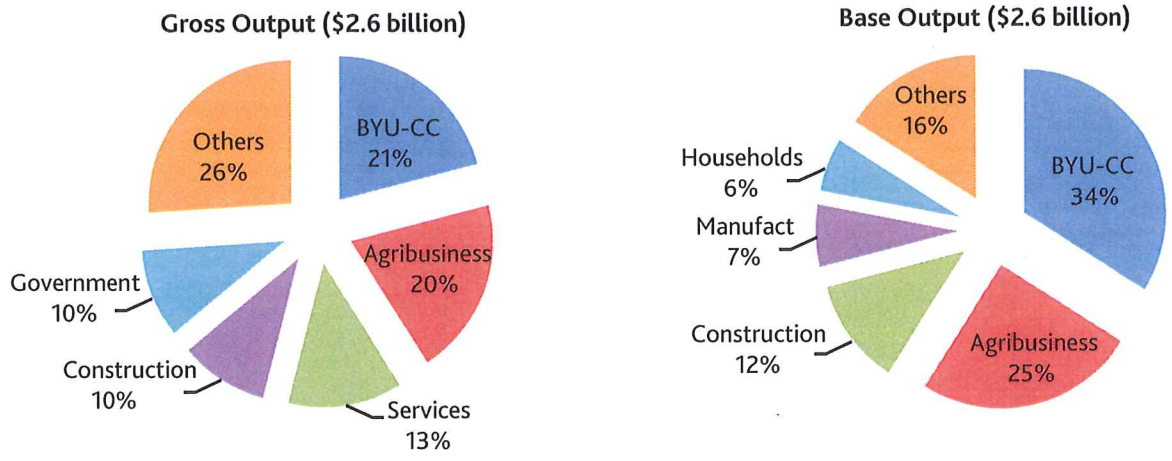

Figure 1. Total numbers for gross and base output in the Teton region remain the same—$2.6 billion during 2006. Typically exporting sectors—for example BYU-call center and agribusiness—enlarge in the base economy while non-exporting sectors, like government and services contract so much they blend into "others."

Gross and base employment

Businesses in the region in 2006 employed 26,849 part- and full-time workers (Table 2). The largest share of gross employment was in services (17.2%), followed by agribusiness (14.3%), government (13.2%), higher education (11.9%), and trade (11.4%).

In contrast, the largest share of base employment was in agribusiness (20.8%), followed by higher education (16.8%), call centers (15.4%), construction (12%), and lodging and food (9.5%).

When exports are accounted for, the shares of gross employment of nonexporting sectors decrease, while the shares of the exporting sectors increase. Agribusiness, call centers, and higher education were prominent contributors to base jobs (53%) while services, government as a sector, and trade contributed few base jobs (6%). Households and state and local governments do not bring direct jobs to the economy but in 2006 created 3,538 indirect base jobs through their demand for goods and services (more than 13% of total base jobs). As a comparison, lodging and food base jobs amounted to 72% of the 3,538 base jobs generated by these three institutions. Out of 100 base jobs, 32 were contributed by the call centers + education cluster, almost 21 by agribusiness, and more than 13 by institutions. The gross and base jobs of the top five contributors and the other sectors in the economy are depicted in Figure 2.

Note that shares of gross jobs in the service and trade sectors decrease in the base measure, but the shares of base jobs in the call centers+education cluster, agribusiness, and construction increase.

Table 2. Gross and base employment in Fremont, Madison, and Teton counties, Idaho, 2006.

				Base Employment				
	Gross Employment			Jobs (No.)				
Sector/Institution	Jobs (No.)	%	Rank	Total	Direct	Indirect	%	Rank
Agribusiness (4 combined)	3,833	14.3	2	5,568	2,699	2,869	20.8	1
(Other ag production)	2,074	7.7		2,439	1,483	956	9.1	
(Potato farming)	472	1.8		108	42	66	0.4	
(Ag processing)	252	0.9		749	165	585	2.8	
(Fresh-pack potato)	1,035	3.9		2,272	1,009	1,263	8.5	
Construction	2,453	9.1	6	3,210	1,829	1,381	12.0	4
Transportation & utilities	775	2.9	10	443	223	220	1.7	11
Manufacturing	755	2.8	11	1,245	554	691	4.6	8
Trade	3,068	11.4	5	489	331	158	1.8	10
Services	4,630	17.2	1	185	118	68	0.7	12
FIRE*	1,255	4.7	8	69	39	29	0.3	13
Call centers	1,209	4.5	9	4,129	1,209	2,920	15.4	3
Lodging & food	2,136	8.0	7	2,541	1,918	624	9.5	5
Education (BYU–I)	3,198	11.9	4	4,515	3,150	1,365	16.8	2
Government (sector) & misc.	3,538	13.2	3	915	615	300	3.4	9
Households				2,039	0	2,039	7.6	6
State & local government				1,499	0	1,499	5.6	7
TOTAL**	**26,849**	**100**		**26,849**	**12,684**	**14,165**	**100**	

Source: IMPLAN
Note: Because of rounding, direct and indirect figures may not add exactly to sector totals
*FIRE = Finance, insurance, real estate
**Excludes Agribusiness figures (row 1) that are already listed in the four ag subsets

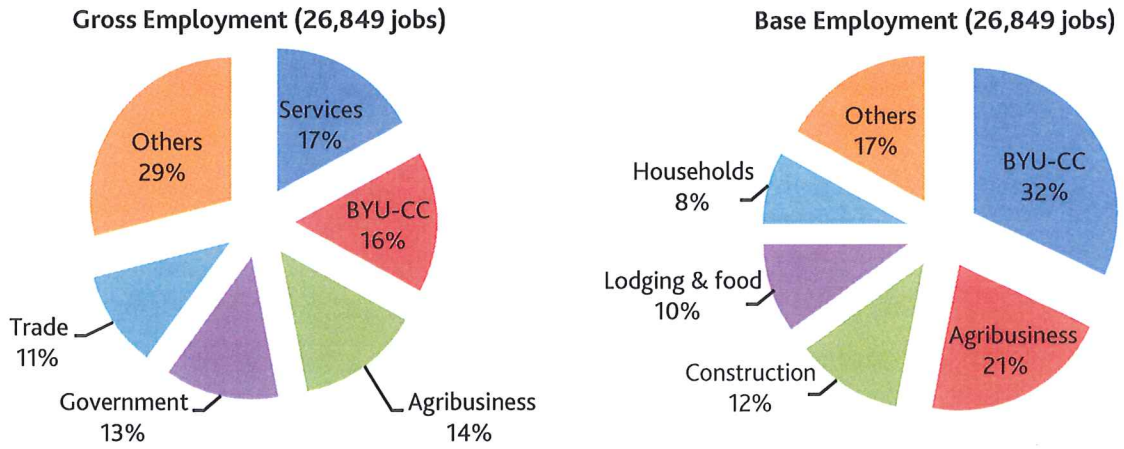

Figure 2. While gross and base employment totals remain the same in the Teton region during 2006—26,849 jobs—biggest exporting sectors such as BYU, agribusiness, and construction play a bigger role in providing jobs. When considering base employment jobs in non-exporting sectors such as government and trade ow shrink into "others." Also, lodging and food doesn't appear when gross employment is the lens, yet that sector provides 10% of base jobs.

Gross and base value added

Total gross and base value added in the region was more than $1.2 billion in 2006 (Table 3). The largest share of gross value added was by government and miscellaneous (18.8%), followed by agribusiness, services, and trade. In contrast, agribusiness had the largest share of base value added (23.3%; out of this, fresh-pack potato was almost 50%), followed by the call centers, higher education, and construction.

Contributions to base value added by households and state and local governments is only through indirect effects; they add up to nearly 15%. The combined figure of the call centers + education cluster[5] (almost 29%), agriculture, households, and state and local governments was more than 67% of the regional base value added.

Clearly, the rural regional economy is concentrated in a few sectors, and institutions make significant indirect contributions, which are invisible in gross measures of the economy.

[5] The rationale for this cluster is discussed on page 10

The shares of gross and base value added of the top five contributors and the rest of the sectors in the economy are shown in Figure 3. Government as a sector, services, and trade are among the top five contributors to gross value added; however, all of them are among "other" sectors in terms of base value added. These sectors export very little. Thus, they do not contribute significantly to the base value added.

The call centers + education cluster and combined agribusiness sectors were among top contributors to gross value added (a total of 29%), and their contribution to base value added increased to 52%.

Comparisons of gross and base measures for the three economic indicators (output, jobs, and value added) reveals that:

- The gross measure—most frequently used by regional and local decision makers—indicates that the economy comprises mainly the call centers + education cluster, services, agribusiness, and government as a sector.
- The base measure indicates that the economy is driven by the call centers + education cluster, agribusiness, construction, and households.

Table 3. Gross and base value added in Fremont, Madison, and Teton counties, Idaho, 2006.

	Gross value added			Base value added				
				$M				
Sector/Institution	**$M**	**%**	**Rank**	**Total**	**Direct**	**Indirect**	**%**	**Rank**
Agribusiness (4 combined)	205	16.6	2	287	107	181	23.3	1
(Other ag production)	61	5.0		87	44	43	7.0	
(Potato farming)	81	6.5		10	7	3	0.8	
(Ag processing)	18	1.5		48	12	36	3.9	
(Fresh-pack potato)	45	3.6		143	44	99	11.6	
Construction	97	7.9	6	138	72	66	11.2	4
Transportation & utilities	66	5.4	8	30	19	11	2.5	10
Manufacturing	65	5.3	9	82	48	34	6.6	7
Trade	116	9.4	4	20	13	8	1.7	11
Services	175	14.2	3	8	4	3	0.6	12
FIRE*	81	6.6	7	4	3	2	0.3	13
Call centers	51	4.1	10	187	51	136	15.2	2
Lodging & food	43	3.5	11	70	38	32	5.7	8
Education (BYU–I)	102	8.3	5	168	100	67	13.6	3
Government (sector) & misc.	231	18.8	1	55	40	15	4.5	9
Households				100	0	100	8.1	5
State & local government				84	0	84	6.8	6
TOTAL**	**1,233**	**100**		**1,233**	**496**	**737**	**100**	

Source: IMPLAN
Note: Because of rounding, direct and indirect figures may not add exactly to sector totals
$M = million dollars
*FIRE = Finance, insurance, real estate
**Excludes Agribusiness figures (row 1) that are already listed in the four ag subsets

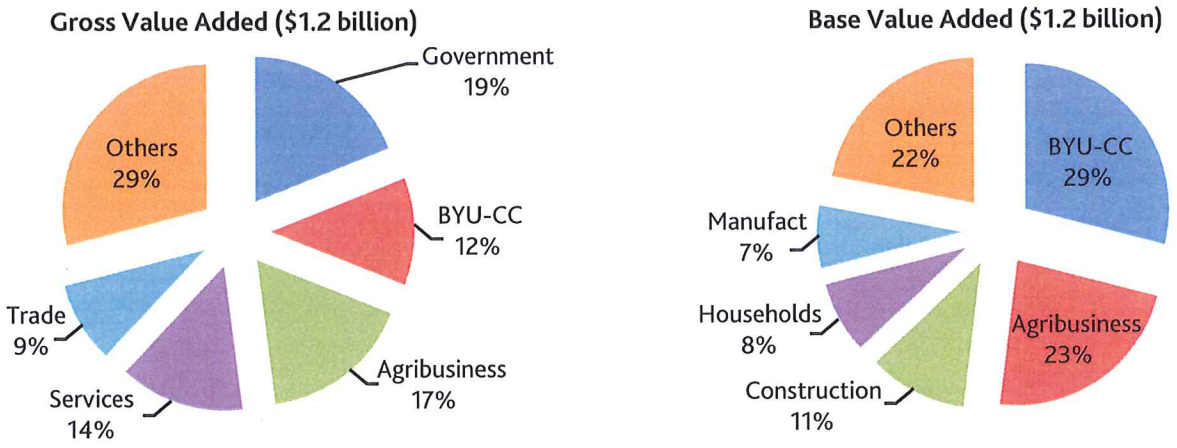

Figure 3. Value added—the total of salaries, wages, proprietor's income, indirect business taxes, plus dividends, interest, and rents—totaled $1.2 billion in the Teton region in 2006. Government is the No. 1 contributor to gross value added, but when exports are considered, government is no longer even among the top 5 contributors. But BYU, agribusiness, and construction loom much more important.

EXPORTS BRING NEW MONEY TO THE REGION: FINAL DEMAND, EXPORTS, AND MULTIPLIER EFFECTS

Exports bring new money to the region, and this money is circulated among the nonexporting sectors, creating a multiplier effect. Higher multipliers reflect higher self-sufficiency in the regional economy, and lower multipliers denote larger "leakages" due to imports, savings, and taxes.

Final demand (exports, capital formation, inventory purchases, and federal government purchases) for the region totaled nearly $1.4 billion in 2006 (Table 4). Final demand for construction was predominantly capital required to finance new residential and commercial buildings as well as to maintain existing structures. Call centers had the largest share of final demand (25.4%), followed by agribusiness (24.4%) and construction (about 14%). By contrast, the lodging and food sector—the most indicative sector for "tourism"—contributes just 7% to final demand.

Regional exports totaled almost $1.2 billion in 2006 (Table 4). The difference between total regional exports and total final demand (about $220 million) is due mostly to the $175 million difference in construction. Call centers were the largest exporters with more than 30%, closely followed by agribusiness 28.5% and by education with nearly 16%. Lodging and food contributed 7.5% of regional exports.

Multipliers represent the intensity of the rippling effect of sales on final demand. This means that for each dollar of additional sales to final demand by a given industry, a certain additional amount is contributed by other industries or induced by household demand.

For example, fresh-pack potato, relying on local labor and raw potatoes, has the largest output multiplier, 2.07 (Table 5), generating for each dollar of exported fresh-pack potatoes an additional $1.07 from other industries or induced by household demand. The multipliers of potato farming, other agriculture, fresh-pack potato, and potato processing are estimated separately.

Table 4. Exports and final demand in Fremont, Madison, and Teton counties, Idaho, 2006.

	Exports			Final demand		
Sector/Institution	**$M**	**%**	**Rank**	**$M**	**%**	**Rank**
Agribusiness (4 combined)	324	28.5	2	338	24.4	2
(Other ag production)	108	9.2		110	8.0	
(Potato farming)	10	0.9		10	0.7	
(Ag processing)	68	5.8		70	5.0	
(Fresh-pack potato)	148	12.6		148	10.7	
Construction	22	1.9	8	197	14.2	3
Transportation & utilities	30	2.6	6	31	2.3	8
Manufacturing	115	9.8	4	121	8.7	5
Trade	13	1.1	9	20	1.4	9
Services	3	0.3	10	9	0.6	10
FIRE*	3	0.3	11	4	0.3	11
Call centers	352	30.1	1	352	25.4	1
Lodging & food	88	7.5	5	88	6.3	6
Education (BYU–I)	183	15.7	3	183	13.2	4
Government (sector) & misc.	26	2.2	7	44	3.2	7
TOTAL**	**1,168**	**100**		**1,388**	**100**	

Source: IMPLAN
$M = million dollars
*FIRE = Finance, insurance, real estate
**Excludes Agribusiness figures (row 1) that are already listed in the four ag subsets

As shown below, differences among these multipliers are based on their dependence on imports. Other agriculture and other ag processing have relatively high multipliers, ranging from 1.81 to 1.87. Education and the call centers have similar output multipliers: 1.67 and 1.65, respectively.

Interpreting multipliers. Predominantly nonexporting sectors such as government, trade, and services have lower output multipliers (here, 1.64, 1.66, and 1.73, respectively). FIRE has the lowest multiplier (1.52) because of its dependence on a high proportion of imports. Potato farming has a low multiplier (1.60) because it depends on imported fuel and fertilizers; in contrast, fresh-pack potato has a high multiplier because it uses locally purchased potatoes.

A change in final demand (driven mostly by exports) times the output multiplier results in a change of output. The size of the multiplier and final demand determine the impact in the economy; that is, the sum of direct and indirect effects.

Table 5. Output multiplier and jobs in Fremont, Madison, and Teton counties, Idaho, 2006.

Sector/Institution	Output Multiplier	Jobs per $1,000,000
Agribusiness	—	—
(Other ag production)	1.81	18.4
(Potato farming)	1.60	7.0
(Ag processing)	1.87	7.9
(Fresh-pack potato)	2.07	11.7
Construction	1.67	13.5
Transportation & utilities	1.60	10.4
Manufacturing	1.58	7.9
Trade	1.66	20.4
Services	1.73	17.3
FIRE*	1.52	12.2
Call centers	1.65	9.5
Lodging & food	1.44	26.7
Education (BYU–I)	1.67	20.8
Government (sector) & misc.	1.64	16.6

Source: IMPLAN
*FIRE = Finance, insurance, real estate

LINKED AND CLUSTERED INDUSTRIES

The entire chain of industries forms an industrial complex of linked buyers and sellers. From any link in the chain, industries that supply inputs are backward-linked, and industries to which the processed goods are sold are forward-linked industries.

For example, the potato industry in the Teton region is an industrial agribusiness complex. At the industry's center is the potato grower. Backward-linked to the growers are industries that supply inputs: fertilizer, equipment, trade, workers, etc. Forward-linked from potato growers are the fresh-pack and potato-processing businesses that use potatoes as inputs in their production process. Thus, potato farming, other agriculture, fresh-pack potato, and potato processing are all referred to as the linked industry of agribusiness.

We also aggregated the minor amount of "other agriculture" under the agribusiness label. The agribusiness-linked industries in the gross measure in 2006 created $531 million in sales (output), 3,833 jobs, and $205 million in value added (Tables 1, 2 and 3, respectively). In base analysis, these linked industries created $644 million in sales, 5,568 jobs, and $287 million in value added (Tables 1, 2, and 3, respectively). Figures 1, 2, and 3 show the corresponding percentages of agribusiness-linked industries.

Agribusiness is an economic driver, contributing one-fifth to one-fourth of the export sales and value added or jobs. This is due to well-integrated export potato and nonpotato agriculture and processing industries that use local inputs. Fresh-pack potato exports constitute 44.3% of all agribusiness exports.

Spin-offs/external economies. In contrast to purchase or sales linkages, some industries cluster to take advantage of spin-offs or external economies created by other industries. For example, call centers have clustered around BYU–I, whose students provide a low-cost, flexible-hours, multilingual labor force.

Call centers and BYU–I-clustered industries in 2006's gross measure created $538 million in sales (output) as well as 4,407 jobs and $153 million in value

added (Tables 1, 2, and 3, respectively). In the 2006 base analysis, this cluster created $892 million, 8,644 jobs, and $355 million in value added. Figures 1, 2, and 3 show corresponding percentages of clustered industries.

The call centers + education cluster and agribusiness dominated the base measures, generating nearly 75% of regional exports (Table 4). The call centers + education cluster contributed 34 cents per dollar of export sales, 33% of the export jobs, and 29 cents per dollar of export value added. In turn, agribusiness contributed 25 cents per dollar of export sales, 20% of export jobs, and 23 cents per dollar of export value added.

Role of tourism, a category of exports

Tourism is not an industry but rather a category of exports; as an export, it can be analyzed for economic base. To produce and export tourism or travel dollars requires the direct production from the tourist business itself (e.g., a fishing guide service) and all the backward linkages. In addition to tourist business, an additional set of inputs is necessary to produce tourism and travel. Those inputs are the tourism-related industries of motels, restaurants, gas stations, etc. Trade and food and lodging are base industries for tourism as well as travel exports. Trade and food and lodging also are non-base industries for other industries.

The economic base analysis helps us determine what proportion of tourism and trade is base versus nonbase. We aggregated into the food and lodging sector all tourism- and travel-related services such as zoos, travel agents, and guides. Lacking a detailed expenditure survey of every category of tourist, we assume the upper limit of the tourism contribution to the base economy would be *all* $145 million in export sales from lodging and food and *all* $33 million in trade (Table 1). Notice that the data in the direct base output column in Table 1 are the same as in the final demand column in Table 4. Thus, the contribution of tourism to the regional base economy was $178 million in 2006, or about 7%.

Natural amenities and their economic activities

Natural amenities attract or retain three categories of economic activity in the Teton region. These can be measured by the economic base analysis.

The first category comprises mobile entrepreneurs who are attracted to high-value natural amenity areas. They are mainly professional-service businesses—consultants, financial brokers, engineers, architects, artists, and writers, among others, who connect to the world through the Internet and airports. These entrepreneurs are small businesses or sole proprietors who export their services outside the Teton region, as opposed to nonbase businesses that service local businesses.

Call centers qualify as mobile entrepreneurs that export all their services. However, they are attracted by the labor force BYU–I provides rather than by natural amenities. The sales contribution (final demand) of all base service businesses (other than call centers) was $9 million (Table 4), which became $14 million after including indirect effect (Table 1).

The second category comprises retirees and financially independent individuals. The adjoining area of Jackson, Wyoming, is renowned for the rich and famous, some of whose wealth spills over into Teton County, Idaho. Retirees and the footloose affluent, attracted by natural amenities, bring new money to the region through transfer payments, dividends, interest, and property rents.

These wealth transfers are reflected in the base analysis. In 2006, a total of $100 million in transfer payments were made to households (Table 3). Notice that this $100 million was indirect only—no direct economic activity was measured because no direct inputs or purchases from local businesses and labor were required to produce the economic activity.

In addition to the transfers to households, transfers from the federal government to state and local governments (noneducation and education purchases, as well as noneducation investments by the state and local governments) totaled $84 million (Table 3).

Age-related transfer payments to households (3,620 individual retirees) during 2006 amounted to $95 million. At most, 10% of these retirees migrated to the region because they were attracted by natural amenities (ERS, 2004 county typology). Thus, $9.5 million in transfer payments were brought to the region by

migrant retirees. Also, these migrant retirees brought $20.7 million in the form of interest, dividends, and property rental income. The combined figure for nonlabor income brought by migrant retirees was more than $30 million in 2006.

The third category comprises affluent part-time residents who vacation in the Teton region.[6] In addition to the $30 million in nonlabor income from migrant retirees induced by natural amenity values in 2006, there was construction capital to support housing for migrant retirees and second-home owners. Based on available construction data for Fremont County[7], and assuming that all new construction was either for second homes or for migrant retirees, $22 million in new residential construction was related to the amenity value perceived by home owners.

The $22 million becomes almost $37 million after including the indirect effect (construction multiplier in Table 5). Lacking information on construction in Teton County, we estimated the upper limit for this third category of economic activity.

The IMPLAN database shows the regional share of capital construction in Teton County is about 77% higher than in Fremont County. Thus, we estimated that $65 million was the new residential construction in Teton County, including the indirect effect. This yields $102 million for the two counties (Madison was not included as it is not classified as a recreation county).

We estimated the contribution to the economy induced by high-value natural amenities at $146 million ($14 million in services sales, $30 million through nonlabor income of migrant retirees, and $102 million in construction of second homes or principal homes for migrant retirees)—in all, 6% of the base economy.

[6] Retirees live in the region most of the time, but for purposes of this typoloy of categories we include them with second-home owners.

[7] Ronda Burrel, Office of the Vice-president of Economics and Government Relations, Wells Fargo Bank, Salt Lake City, 2008: personal communication.

CONCLUDING REMARKS

Using gross and economic base measures, two different stories emerge about the Teton region's economy. The gross measure, used by regional and local decision makers, shows the economy dominated by the call centers, BYU–I, services, trade, and government. However, the base measure sees the economy driven by the call centers + education cluster, agribusiness, construction, and households.

The social accounting matrix (SAM) includes institutions, such as households and state and local governments, which indirectly contribute more than 10 cents per dollar of base sales (Table 1), more than 13% of the base jobs (Table 2), and nearly 15 cents per dollar of base value added (Table 3). These outside contributions to the base economy in the form of retirement income, transfer payments, and dividends need to be considered when making policy.

A paradox. The call centers + education cluster unquestionably drives the regional economy. The export sales of the call centers are twice those of BYU–I (Table 1). The rapid population growth in Madison County between 2000 and 2007 was related to the cluster's expansion.

A low per-capita income in the region, and especially in Madison County, likely reflects the low income declared by college students who work in call centers. Thus the paradox: the highest contributing sector, the cluster, also affects the income gap between the region and the state of Idaho.

Agribusiness as second economic driver. After the call centers + education cluster, the agribusiness-linked industries are the second driver of the base economy. Aggregated exports of the cluster and agribusiness-linked industries were 75% of the region's total, the aggregated base sales were nearly 59%, the aggregated base jobs were almost 53%, and the aggregated base value added was 52%. This information needs to be considered when identifying growth strategies, targeting aid, and developing or modifying other policies.

Tourism. The contribution of tourism and other possibly related services to the 2006 base economy is estimated at no more than $181 million or 7% of the base economy. This assumes that all the export sales from lodging and food ($145 million) and trade ($33 million) were to tourists and travelers.

Natural amenity value. The natural amenity value of the region is estimated at $146 million, or 6% of the 2006 base economy. Migrant retirees, attracted by the natural amenity value in the region, in 2006 brought $30 million in nonlabor income. New residential construction in Fremont and Teton counties, also related to natural amenities, was $102 million, and service sales related to mobile entrepreneurs were $14 million.

Base analysis highlights sector linkages. The economic base analysis brings to the surface the linkages among the sectors in the regional economy and takes into account the effect of export sales on typically nonexporting sectors. Sales and jobs, for example, are attributed to the exporting sector rather than given in equal weight to all sectors. In this sense, economic base is a suitable approach to identify economic drivers in a region.

APPENDIX 1 - SOCIAL ACCOUNTING MATRIX (SAM) MODELS

Historically, economic base analysis required that all industries of an economy were entirely either basic or nonbasic. The nonbase industries serve other industries in the region but do not cause the region to grow. The base industries are driven by export demand, which causes the region to grow. Total regional output (T) is the sum of nonbase output (NB) and base output (B): $T = NB + B$. The relationship between the nonbasic sector and total output is: $NB = \beta T$, where β is the coefficient relating nonbasic output to total output. Total regional output can thus be expressed as driven by changes in the base industries: $T = (1 - \beta)^{-1}$. The SAM is no longer restricted to the base analysis for the aggregate economy; rather, it allows base analysis for each industry, and each industry can be apportioned into base or nonbase components of the economy.

The SAM general equilibrium models a demand-driven economy with sectors or industries described by fixed linear expenditure functions, leaving exogenous demands to determine the level of regional output:

$$(1) \begin{bmatrix} X \\ V \\ Y \end{bmatrix} = (I - S)^{-1} \begin{bmatrix} ex \\ ev \\ ey \end{bmatrix}$$

where X is a vector of sector supply of good and services, V is a vector of value-added by categories, Y is a vector of household incomes, ex is a vector of exogenous commodity demand, ev is a vector of exogenous value-added, and ey is a vector of exogenous household incomes. I is the identity matrix, and S is a matrix with SAM direct coefficients as described below:

$$(2)\ S = \begin{bmatrix} A & 0 & C \\ V & 0 & 0 \\ 0 & Y & H \end{bmatrix}$$

where the first section (A, 0, and C) are the activity accounts, the second section (V, 0, and 0) are the value-added accounts, and the third section (0, Y, and H) are the accounts of endogenous institutions. The exogenous columns and rows are excluded in (2), federal government, inventory, capital, and exports. A is an (nxn) transaction matrix that represents the linkages between buying (inputs) and selling (outputs) sectors, C is a matrix with expenditure coefficients, V is a matrix with value-added coefficients, Y is a matrix with value-added distribution coefficients, and H is a matrix with institutional and household distribution coefficients.

The $(I - S)^{-1}$ is the Leontief inverse in (1), or a final-demand-to-output multiplier matrix, which allows the estimation of X, V, and Y for a given set of values ex, ev, and ey. The SAM tracks the use of factor inputs owned by households. Data from IMPLAN were used to build a SAM.

APPENDIX 2 - DEFINITIONS

Agribusiness Business associated with the production, processing, and distribution of agricultural products.

Base contribution (output) It measures the economic activity a sector generates as it creates products for export. The base output of agriculture or any other sector is the sum of its exports and the associated indirect stimulation of the output of other sectors in the process.

Direct effect Economic activity generated by exports of any industrial sector.

Exports sales (both domestic and international) of goods and services outside the Teton region.

Final demand Exports outside the region, capital, inventory purchases, and federal and government purchases that drive the Social Accounting Matrix (SAM). Industries respond to meet demands directly or indirectly by supplying goods and services to industries responding directly.

Government transfers to households Payments received by households from the Social Security Administration for retirement, disability, survivorship, etc.

Gross contribution (output) Jobs, sales, wages, and value added generated as a sector meets local and external demands. Gross output of any sector is the sum of exports and the domestic output needed by other sectors in their export production.

Household consumption The largest component of final demand; it consists of payments by individuals/households to industries for goods and services used for personal consumption.

IMPLAN database IMPLAN (IMpact analysis for PLANning) can be used to measure the effect on a region or local economy of a given change or event in the economy's activity. It also allows users to build economic models estimating effects of a proposed change in a specific economic region. The IMPLAN database contains county, state, zip code, and federal economic statistics, which are specialized by region, not estimated from national averages. Using classic input-output analysis in combination with regional specific Social Accounting Matrices and Multiplier Models, IMPLAN provides a highly accurate and adaptable model for its users.

Indirect effects Effects generated by industries purchasing inputs from other local businesses that support the sales of exports and generated by industries paying wages to employees who are involved in export activities. (The wages are used to purchase goods and services from other local businesses).

Jobs Full- and part-time employment as specified by the U.S. Department of Commerce.

Jobs or employment multiplier Sum of direct and indirect jobs required to sustain an additional $1 million of sales to exports from a given industry.

Regional purchase coefficients (RPCs) Proportion of how much of each commodity purchasing industries and institutions buy within the region. RPCs can range from zero to 1: zero when all production is exported, and 1 when all production is consumed regionally.

Sales or output multiplier Sum of the direct and indirect output required from all sectors of the local economy needed to sustain $1 of sales to exports from a given industry.

Social Accounting Matrix (SAM) model A numerical representation of transactions among the sectors in the regional economy that can be used to determine changes in the economic impact of economic agents. The four components in a SAM are: (1) production; (2) household consumption that is supported by provision of factor inputs (labor and wages); (3) accumulation in institutions (resident households and state and local government); and (4) final demand. The SAM allows the estimation of direct and indirect effects.

State and local government State and local government purchases are divided among public education, noneducation, and investment. Purchases are for elementary, high school, and postsecondary education. Noneducation purchases are for all other government activities. State and local investment are expenditures for capital goods and construction.

Value added (VA) The sum of (1) wages and salaries, (2) proprietor's income, (3) indirect business taxes, and (4) dividends, interest, and rents. The sum of VA across all sectors of the economy equals the state gross regional product.

Wages and salaries Paychecks of full- and part-time workers in Idaho businesses.

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PHOTO CREDIT

Cover photo is courtesy of Dale Taylor, Maricopa, Arizona (soarwest.com).

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Issued in furtherance of cooperative extension work in agriculture and home economics, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Charlotte V. Eberlein, Director of University of Idaho Extension, University of Idaho, Moscow, Idaho 83844. The University of Idaho provides equal opportunity in education and employment on the basis of race, color, national origin, religion, sex, sexual orientation, age, disability, or status as a disabled veteran or Vietnam-era veteran, as required by state and federal laws.

Published February 2010

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