

# Economic Impact of Skidmore College on Saratoga County



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**Capital District Regional Planning Commission  
One Park Place, Suite 102, Albany, New York 12205**

518/453-0850 Fax: 518/453-0856 e-mail: [cdrpc@cdrpc.org](mailto:cdrpc@cdrpc.org)

Web Site: <http://.cdrpc.org>

## Economic Impact of Skidmore College on Saratoga County

### INTRODUCTION TO THE RIMS II MODEL

Effective planning for public- and private-sector projects and programs at the State and local level requires a systematic analysis of the economic impacts of projects and programs on the affected regions. In turn, systematic analysis of economic impacts must take into account inter-industry relationships within regions because these relationships largely determine how regional economies are likely to respond to project and program changes. Thus, regional input-output (I-O) multipliers which account for inter-industry relationships within regions are useful tools for regional economic impact analysis.

In the mid-1970's, the U.S. Department of Commerce, Economic and Statistics Administration, Bureau of Economic Analysis (BEA) developed a method for estimating regional I-O multipliers known as RIMS (Regional Industrial Multiplier System). In the mid-1980's, BEA completed an enhancement of RIMS, known as RIMS II (Regional Input-Output Modeling System II) and published a handbook for RIMS II users. In 1992, BEA published a second edition of the handbook, in which the multipliers were based on more recent data and improved methodology. Most recently, in 2007 BEA published a fifth edition of the handbook, which provides even more detail on the use of the multipliers and on the data sources and methods for estimating them.

RIMS II is based on an economic accounting framework called an Input-Output table, first developed by Wassily Leontief, and for which he received the Nobel Prize in Economics in 1973. For each industry, an I-O table shows the distribution of inputs purchased and outputs sold. A typical I-O table in RIMS II is derived from BEA's national I-O table and BEA's regional economic accounts, which are used to adjust the national I-O table to show a particular region's industrial structure and trading patterns.

RIMS II has several advantages for use in impact analysis. RIMS II multipliers can be estimated for any region composed of one or more counties and for any of the 473 industries or 60 industry aggregates in the national I-O table. The accessibility of the main data sources for RIMS II keeps the cost of estimating regional multipliers relatively low. Empirical tests show that the estimates based on the RIMS II modeling system and estimates based on relatively expensive surveys are similar in magnitude.

Effective use of the multipliers for impact analysis requires that users provide geographically and industrially detailed information on the initial changes in output, earnings, or employment which are associated with the project or program under study. The multipliers can then be used to estimate the total impact of the project or program on regional output, earnings, and employment.

RIMS II is widely used in both the public and private sectors. For example, in the public sector the Department of Defense uses RIMS II to estimate the regional impacts of changes in defense expenditures and the Florida Department of Transportation uses RIMS II to estimate the regional impacts of constructing and operating transportation facilities. Private-sector analysts, consultants, and economic development practitioners use RIMS II to estimate the regional impacts of a variety of projects, the most typical of which would be a new construction project.

### RIMS II MULTIPLIERS FOR OUTPUT, EARNINGS, AND EMPLOYMENT

#### Final Demand Multipliers

RIMS II provides users with three types of final demand multipliers: multipliers for output; multipliers for earnings, and multipliers for employment.

### ***Final Demand Multipliers for Output***

The final demand multipliers for output are the basic multipliers from which all other multipliers are derived. They are presented in the final demand output multiplier tables (RIMS II Table 1-1 & Table 2-1). In these tables, each entry indicates the change in output in each column industry group that results from a \$1.00 change in final demand (producer price) for the row industry. The impact on each column industry group is calculated by multiplying the final demand change in the row industry by the multiplier at the intersection of the row and column. The total impact on regional output is calculated by multiplying the final demand change in the row industry by the sum of all the multipliers for the columns except the household column, which is excluded to avoid double counting, since each of the other column entries includes household earnings.

### ***Final Demand Multipliers for Earnings***

The final demand multipliers for earnings are derived directly from the final demand output multiplier tables and are used for estimating earnings impacts. In the final demand earnings multiplier tables (RIMS II Table 1-2 & Table 2-2), each entry indicates the change in household earnings in each column industry group that results from a \$1.00 change in final demand (producer price) for the row industry. The impact on each column industry group is calculated by multiplying the final demand change in the row industry by the multiplier at the intersection of the row and column. The total impact on regional household earnings is calculated by multiplying the final demand change in the row industry by the sum of the multipliers for the columns except the household column.

### ***Final Demand Multipliers for Employment***

Final demand multipliers for employment are derived directly from the final demand output multiplier tables and are used for estimating employment impacts. In the final demand employment multiplier tables (RIMS II Table 1-3 & Table 2-3), each entry indicates the change in employment in each column industry group that results from a \$1,000,000 change in final demand (producer price) for the row industry. The impact on each column industry group is calculated by multiplying the final demand change in the row industry by the multiplier at the intersection of the row and column. Total impact on regional employment is calculated by multiplying the final demand change in the row industry by the sum of the multipliers for the columns except the household column.

## **Direct Effect Multipliers**

RIMS II provides users with direct effect multipliers for earnings and for employment.

### ***Direct Effect Multipliers for Earnings***

Direct effect multipliers for earnings are derived directly from the final demand output multiplier table. The direct effect multipliers for earnings can be used if data on the initial changes in earnings by industry are available. In the direct effect earnings multiplier tables (part of RIMS II Table 1-4 and Table 2-4), each entry indicates the total change in household earnings in the region that results from a \$1.00 change in earnings for the row industry.

### ***Direct Effect Multipliers for Employment***

Direct effect multipliers for employment are derived directly from the final demand output multiplier table. The direct effect multipliers for employment can be used if data on the initial changes in employment by industry are available. In the direct effect

employment multiplier tables (part of RIMS II Table 1-4 and Table 2-4), each entry indicates the total change in employment in the region that results from a change of one job for the row industry.

## SARATOGA COUNTY RIMS II MULTIPLIERS

In 2007, the Capital District Regional Planning Commission obtained the 2007 RIMS II Multipliers for the Saratoga County on behalf of Skidmore College. The set of multipliers consists of eight tables which may be used for estimating the economic impact of various projects and for developing a better understanding of interactions within the County's economy.

### RIMS II Model Tables Description

<i>Table</i>	<i>Contents</i>
1-1	Change in Output for each of 20 industry groups for a <u>\$1.00</u> Change in Output to Final Demand (producer price) by any of 473 industries.
1-2	Change in Household Earnings for each of 20 industry groups for a <u>\$1.00</u> Change in Output to Final Demand by any one of 473 industries. Includes a total column.
1-3	Change in Employment for each of 20 industry groups for a <u>\$1,000,000</u> Change in Output to Final Demand by any one of 473 industries.
1-4	Summary Table for Final Demand and Direct Effect Multipliers. For Final Demand, includes the total columns from tables 1-1, 1-2, & 1-3. For Direct Effect, includes 1) the Total Dollar Change in Earnings of Households for all industry groups resulting from a <u>\$1.00</u> Change in Earnings Paid Directly to Households by any one of 473 industries, and 2) the Total Change in Employment for all industry groups resulting from a <u>One Job</u> change by any one of 473 industries.
2-1	Change in Output for each of 20 industry groups for a <u>\$1.00</u> Change in Output to Final Demand in one of the 60 industry aggregations.
2-2	Change in Household Earnings for each of 20 industry groups for a <u>\$1.00</u> Change in Output to Final Demand in one of the 60 industry aggregations.
2-3	Change in Employment for each of 20 industry groups for a <u>\$1,000,000</u> Change in Output to Final Demand in one of the 60 industry aggregations.
2-4	Summary Table for Final Demand and Direct Effect Multipliers. For Final Demand, includes the total columns from tables 2-1, 2-2, & 2-3. For Direct Effect, includes 1) the Total Dollar Change in Earnings of Households for all industry groups resulting from a <u>\$1.00</u> Change in Earnings Paid Directly to Households by any one of the 60 industry aggregations, and 2) the Total Change in Employment for all industry groups resulting from a <u>One Job</u> change by any one of the 60 industry aggregations.

The RIMS II multiplier tables can be acquired for any region composed of one or more counties from the U.S. Dept. of Commerce, Bureau of Economic Analysis (RIMSREAD@BEA.DOC.GOV, 202/606-5343, or <http://www.bea.gov/bean/regional/rims/>).

### Economic Impact Analysis Using the RIMS II Model

Given estimates of output to final demand (e.g., construction costs and total sales) for a specific project, the final demand multipliers allow estimation of the project's total economic

impact on Saratoga County, the total change in County household earnings, and the total change in County employment, as well as individual changes in output, household earnings, and employment for each of 20 Saratoga County industry groups. The total County impact of any project will include, besides direct project expenditures and employment, the impact on secondary, tertiary, and other industries such as transportation; communications; publishing; wholesale trade; finance, insurance, and real estate; medical and business services, etc. Using estimates of earnings (i.e., payroll) or employment (full-time equivalents) for a project, the direct effect multipliers allow estimation of the project's total impact on County household earnings and employment. With estimates of earnings or employment for a project – often easier to determine than a producer's output to final demand – it is also possible to estimate the output to final demand and total economic impact of a project using a function of the final demand and direct effect multipliers.

Note that unlike previous RIMS II models, the 2007 Saratoga County model is based on the North American Industrial Classification System (NAICS) industries and industry groups.

### **ECONOMIC IMPACT OF SKIDMORE COLLEGE ON SARATOGA COUNTY**

Using estimates of \$68,600,000 for total payroll, and capital expenditure annual averages of \$1,835,000 for furniture and furnishings, \$2,480,000 for information technology, and \$14,526,100 for construction, estimates for total economic impact, household income impact, and employment impact on Saratoga County of Skidmore College were computed using Saratoga County 2007 RIMS II input/output tables.

The estimated economic impacts refer to annual impacts, since the most recent five-year and future five-year capital expenditure budgets were converted to annual averages. The estimated annual economic impacts for operations expenditures of Skidmore College on each of the County's 20 industry groups are detailed in the first table below. The total annual economic impact is estimated to be \$311,742,326, while the annual impact on household incomes is approximately \$95,498,404, and the annual employment impact on the County is approximately 3,150 total jobs. Since the output and impact estimates were based on payroll, they are subject to a  $\pm 10\%$  error. Note that the table displays both the direct and indirect impacts of College operations, so the Educational Services category is particularly high. Also note that the "Households" category reflects the portions of all of the other industry group amounts which go to County households, and it is not included in the bottom-line total to avoid double-counting.

The estimated average annual economic impacts for the capital expenditures of the College on each of the County's 20 industry groups are detailed in the second table below. The total annual economic impact is estimated to be \$30,449,016, while the annual impact on household incomes is approximately \$6,922,168, and the annual employment impact on the County is approximately 178 total jobs.

Finally, the total (operations + capital expenditures) estimated average annual economic impacts of the College on each of the County's 20 industry groups are detailed in the third table below. The total annual economic impact is estimated to be \$342,191,342, while the annual impact on household incomes is approximately \$102,420,572, and the annual employment impact on the County is approximately 3,327 total jobs.

## Economic Impact – Skidmore College Operations

Estimated Economic Impact on Saratoga County	Skidmore Operations		
	Total Economic Impact	Impact on Household Incomes	Impact on Employment
Agriculture, Forestry, Fishing, & Hunting	\$ 710,686	\$ 106,603	7.9
Mining	35,534	-	0.1
Utilities*	4,139,745	604,083	6.1
Construction	1,954,386	461,946	10.3
Manufacturing	7,302,297	1,048,262	23.8
Wholesale Trade	7,515,502	1,741,180	30.0
Retail Trade	11,122,233	2,682,839	111.8
Transportation & Warehousing, excluding Postal Service*	3,588,963	852,823	27.0
Information	4,406,252	959,426	15.9
Finance & Insurance	10,624,753	2,043,222	32.9
Real Estate and Rental & Leasing	38,519,170	2,540,702	81.1
Professional, Scientific, & Technical Services	6,893,652	2,291,962	46.6
Management of Companies & Enterprises	1,563,509	479,713	5.3
Administrative & Waste Mgmt. Services	7,213,461	2,220,893	91.7
Educational Services	180,993,906	69,629,441	2,340.7
Health Care & Social Assistance	9,718,628	3,304,689	86.2
Arts, Entertainment, & Recreation	1,989,920	639,617	28.5
Accommodation & Food Services	7,728,708	2,309,729	139.6
Other Services, except Public Administration*	5,721,021	1,581,276	64.4
Households	95,587,240	88,836	6.8
<b>Total Impact</b>	<b>\$ 311,742,326</b>	<b>\$ 95,498,404</b>	<b>3,149.7</b>

\*Includes Federal Government Enterprises

Prepared by the Capital District Regional Planning Commission based on BEA's 2007 RIMS II Model for Saratoga County

## Economic Impact – Skidmore College Capital Expenditures

Estimated Economic Impact on Saratoga County	Skidmore Capital Projects		
	Total Economic Impact	Impact on Household Incomes	Impact on Employment
Agriculture, Forestry, Fishing, & Hunting	\$ 72,728	\$ 10,235	0.7
Mining	74,473	11,621	0.2
Utilities*	299,223	43,454	0.4
Construction	14,614,046	3,407,917	76.9
Manufacturing	1,243,234	175,726	4.0
Wholesale Trade	979,896	227,752	3.9
Retail Trade	3,454,930	832,333	34.7
Transportation & Warehousing, excluding Postal Service*	361,246	71,981	2.0
Information	2,882,714	606,373	10.0
Finance & Insurance	1,028,424	195,830	3.2
Real Estate and Rental & Leasing	1,475,579	86,952	2.4
Professional, Scientific, & Technical Services	1,288,260	405,801	8.3
Management of Companies & Enterprises	302,464	91,079	1.0
Administrative & Waste Mgmt. Services	504,964	163,823	6.9
Educational Services	150,845	54,678	2.0
Health Care & Social Assistance	709,058	240,585	6.3
Arts, Entertainment, & Recreation	142,977	48,386	1.9
Accommodation & Food Services	470,645	141,244	8.5
Other Services, except Public Administration*	393,310	106,398	4.3
Households	6,929,355	5,611	0.5
<b>Total Impact</b>	<b>\$ 30,449,016</b>	<b>\$ 6,922,168</b>	<b>177.6</b>

\*Includes Federal Government Enterprises

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## Economic Impact – Skidmore College Operations & Capital Expenditures

Estimated Economic Impact on Saratoga County	Skidmore Operations & Capital Projects		
	Total Economic Impact	Impact on Household Incomes	Impact on Employment
Agriculture, Forestry, Fishing, & Hunting	\$ 783,414	\$ 116,838	8.6
Mining	110,008	11,621	0.3
Utilities*	4,438,968	647,537	6.6
Construction	16,568,432	3,869,863	87.1
Manufacturing	8,545,531	1,223,988	27.8
Wholesale Trade	8,495,398	1,968,932	33.9
Retail Trade	14,577,162	3,515,171	146.5
Transportation & Warehousing, excluding Postal Service*	3,950,209	924,804	29.0
Information	7,288,966	1,565,799	25.9
Finance & Insurance	11,653,177	2,239,052	36.1
Real Estate and Rental & Leasing	39,994,750	2,627,654	83.5
Professional, Scientific, & Technical Services	8,181,912	2,697,762	55.0
Management of Companies & Enterprises	1,865,973	570,792	6.3
Administrative & Waste Mgmt. Services	7,718,425	2,384,716	98.6
Educational Services	181,144,751	69,684,119	2,342.7
Health Care & Social Assistance	10,427,687	3,545,274	92.5
Arts, Entertainment, & Recreation	2,132,897	688,003	30.4
Accommodation & Food Services	8,199,353	2,450,973	148.1
Other Services, except Public Administration*	6,114,331	1,687,674	68.7
<b>Households</b>	<b>102,516,595</b>	<b>94,447</b>	<b>7.3</b>
<b>Total Impact</b>	<b>\$ 342,191,342</b>	<b>\$ 102,420,572</b>	<b>3,327.3</b>

\*Includes Federal Government Enterprises

Prepared by the Capital District Regional Planning Commission based on BEA's 2007 RIMS II Model for Saratoga County

## Economic Impact Technical Notes

### INTRODUCTION TO THE RIMS II MODEL

RIMS II multipliers are based on an economic accounting framework called an Input-Output table. For each industry, an I-O table shows the distribution of inputs purchased and outputs sold. A typical I-O table in RIMS II is derived from BEA's national I-O table and BEA's regional economic accounts, which are used to adjust the national I-O table to show a particular region's industrial structure and trading patterns.

RIMS II table inputs and outputs are for industry types and industry groups (depending on the level of detail contained in the table), and, therefore, represent industry type or group averages, not the inputs or outputs for any individual firm or organization.

### MEASUREMENT OF ECONOMIC OUTPUT

The basic input to the RIMS II I-O table is the *Output to Final Demand* of an industry or industry group (again, depending on the level of detail contained in the particular table). Output to Final Demand is a measure of the producer price for the output of an industry or industry group. The actual price paid for that output by a consumer may also include transportation costs and trade margins, whose impacts would be computed separately. If the Output to Final Demand for an industry or industry group is known, then it may be used directly to compute total economic impact, household income impact, and employment impact.

If, on the other hand, the Output to Final Demand is not known, it may be estimated using either payroll or full-time equivalent employment as inputs, and the result will be subject to a  $\pm 10\%$  error due to the estimation methodology.

The sum of the Outputs to Final Demand for all industries or industry groups within a specified area may be used as an estimate of the magnitude of that area's economy.

### MEASUREMENT OF AREA ECONOMIC OUTPUT

Total Economic Output, defined as the sum of the Outputs to Final Demand for all industry groups, may be estimated for various areas using their respective RIMS II I-O tables, together with the Regional Economic Information System (REIS) data on income by industry and place of work. The REIS data were developed by the U.S. Dept. of Commerce, Bureau of Economic Analysis as part of their regional accounts which are used in the derivation of regional I-O tables to adjust the national I-O table so that it represents a particular region's industrial structure and trading patterns.

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The Capital District Regional Planning Commission was established as a regional planning board in 1967, by and for the counties of Albany, Rensselaer, Saratoga, and Schenectady. It performs a wide range of activities, including comprehensive planning, aviation system planning, economic development planning, human resources planning, and technical assistance and information services for the Region. As part of its economic planning mission, the Commission is the federally designated and funded economic planning organization for the Capital Region Economic Development District. In this capacity, it performs a number of economic planning functions, such as maintenance of the Region's *Comprehensive Economic Development Strategy* and economic impact estimation for local governments and private businesses throughout the Capital Region.