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ABSTRACT

A study was conducted to determine the economic impact of Piedmont Virginia Community College (PVCC) on its service area for fiscal year 1992-93. Three models of economic impact were used in the study: the "short cut" method (SCM) calculating impact based on data on college, employee, and student expenditures in the service region; the Eastern Association of College and University Business Officers model based on the SCM but adding more refined analyses; and the Virginia Employment Commission's Impact Analysis for the Commonwealth, similar to the above models but not including student expenditure data. Results of the study, based on combinations of data from the three models, included the following: (1) PVCC spending in the region ranged from $0.2 to $0.6 million, employee spending ranged from $1.4 to $1.8 million, while student spending totaled approximately $10.7 million; (2) the direct economic impact of PVCC on the region was calculated at $12.4 to $12.6 million; (3) the total estimated economic impact of PVCC, including student spending, was $24.8 million; (4) PVCC employed 501 people and generated approximately 226 additional jobs within the region, with an additional 63 jobs generated statewide; (5) most of the additional jobs generated by PVCC were in the service (38%) and trade (31%) industries; (6) for every dollar paid by the state, PVCC generated $6.13; and (7) for every dollar spent by localities in support of the college, $1,629 were generated. (MAB)

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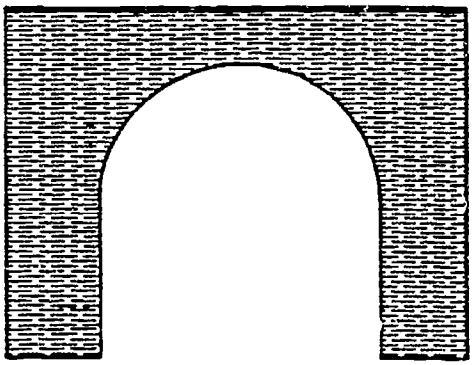

The Economic Impact of Piedmont Virginia Community College Upon Its Service Region

Office of Institutional
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THE ECONOMIC IMPACT OF PIEDMONT VIRGINIA COMMUNITY COLLEGE UPON ITS SERVICE REGION

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PVCC Institutional Research Brief

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THE ECONOMIC IMPACT OF PVCC UPON ITS SERVICE REGION

This brief highlights the findings of *The Economic Impact of Piedmont Virginia Community College Upon Its Service Region* (PVCC Institutional Research Report No. 2-94, March 1994), a study designed to measure the economic impact of Piedmont Virginia Community College (PVCC) upon the geographic area it serves. Although a model developed in 1971 by Caffrey and Isaacs is the methodology used most frequently by colleges and universities to measure economic impact, there are a number of drawbacks to community colleges using this model. Because of these drawbacks, in 1981, Dr. G. Jeremiah Ryan developed a model, which he termed the "short cut" method, specifically for community colleges. The "short cut" method was the first of three economic impact models used in the study. In 1989, the Two-Year College Committee of the Eastern Association of College and University Business Officers (EACUBO) refined Dr. Ryan's model, and the methodology developed by this group was the second model used in this study. Finally, the Virginia Employment Commission (VEC) has developed its own economic impact methodology, which it calls IMPAC (IMPact Analysis for the Commonwealth). IMPAC was the third model used in this study.

Findings of the study include the following:

- College spending in the service region ranges between 0.2 million dollars and 0.6 million dollars. Employee spending ranges between 1.4 million dollars and 1.8 million dollars, while student spending totals approximately 10.7 million dollars.
- The total direct economic impact of PVCC in the service region, including student spending, ranges between 12.4 million dollars and 12.6 million dollars.
- The total estimated economic impact of PVCC, including student spending, is roughly 24.8 million dollars.

(Continued on reverse side)

- PVCC employs 501 people and generates between 105 and 226 additional jobs within the service region. Within the state, generates still another 63 jobs.

- Most of the additional jobs generated by PVCC are in the services (38%) and trade (31%) industries.

- For every dollar paid by service region localities, PVCC generates $1,629.

- For every dollar paid by the state, PVCC generates $6.13.

Clearly, PVCC has a considerable economic impact upon its service region. In fact, economically as well as educationally, PVCC must be one of the best bargains around. For every dollar spent by localities in support of the college, $1,629 are returned. Few investments yield this rate of return, and viewed in this light, PVCC is an investor's dream.

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INTRODUCTION

Piedmont Virginia Community College (PVCC) plays a vital role in its service region, educating citizens from the counties of Albemarle, Buckingham, Fluvanna, Greene, Louisa, and Nelson and from the City of Charlottesville to lead more productive professional and personal lives. As a result of their study at PVCC, students obtain jobs, refine professional skills, transfer to senior colleges and universities, and acquire knowledge that enriches every aspect of their lives. In addition to serving individual students, the college provides technical training for regional businesses and industries, economic development for both businesses and government, and cultural events such as plays, art exhibitions, and lectures.

Often overlooked is the economic role PVCC plays in the service region. The college produces jobs, and its employees and students consume goods and services, own property, and invest in the community. Funds are circulated throughout the local economy through college expenditures, purchases of goods and services, salary payments, and capital construction. And these funds, in turn, stimulate the local economy, leading to new jobs and additional spending.

In short, the college has a significant economic impact upon the service region. Measuring that impact is the subject of this study.

METHODOLOGY

The model most commonly used to measure a college's economic impact was developed in 1971 by John Caffrey and Herbert Isaacs. In terms of methodology, the Caffrey and Isaacs model depends upon numerous surveys (faculty, staff, students, local businesses, community residents) and multiplier analysis to estimate indirect economic impact.

The multiplier effect used by Caffrey and Isaacs is based upon the notion that a portion of the money spent locally by residents results in additional jobs and services. As Caffrey and Isaacs note, approximately 35 cents of every dollar spent by community residents in local businesses is returned to the spenders as income. The remaining 65 cents is spent by the businesses for supplies and services from *other* businesses--locally, statewide, and nationally. A portion of this, again, is spent on additional supplies and services, and this cycle continues, with diminishing returns each time, until eventually the income received by local residents from the initial dollar spent totals approximately 66 cents. The ratio of the total income, 66 cents, to the initial income received, 35 cents, is typically almost two to one, so that if a college has a direct economic impact of, say, $1,500,000, the indirect economic impact, using the multiplier of two, would be $3,000,000.

Unfortunately, the Caffrey and Isaacs model is difficult to fully implement and is less applicable to a community college than to a four-year college or university. As Ryan and Malgieri have noted, three objections to the Caffrey and Isaacs model exist for community colleges:

> First, several of the economic estimates presented by Caffrey and Isaacs are either inappropriate or less appropriate for use by community college personnel. . . . Second, the survey of faculty and staff designed to produce estimates of their local spending presents a problem. This survey, which may be adapted for local purposes, presents several problems to the community college administrator who wishes to estimate the economic impact of his community college: the survey is difficult to adapt for a community college; the response rate among students is often too low to yield reliable information; and, most importantly, the development and implementation of the survey is a time-consuming task. . . . Third, a problem exists with the retail gravity model that was designed to enable researchers to determine the percentage of non-housing expenditures that an individual is likely to make in his local environment. The model is based on the gravity theory which states that the amount of money spent for non-housing expenditures is inversely proportional to the square of the distance to the point of purchase. This model presents certain problems to the community college economic impact estimator: The inherent mathematical complexity of the concept; the difficulty in obtaining appropriate retail sales data; and the difficulty in operationalizing a "sales area." [Ryan and Malgieri, 1992, pp. 4-5]

To overcome these objections, Dr. G. Jeremiah Ryan developed an economic impact model for community colleges, which he termed the "short cut" method. The "short cut" method is the first model used in this study, and results are described in the following section (see p. 4). In 1989, the Two-Year College Committee of the Eastern Association of College and University Business Officers (EACUBO) refined Dr. Ryan's model, and the methodology developed by this group is the second model used in this study. Results from this EACUBO model are described in the section beginning on p. 7. Finally, the Virginia Employment Commission (VEC) has developed its own economic impact methodology, which it calls IMPAC (IMPact Analysis for the Commonwealth). IMPAC is the third model used in this study and results from IMPAC are described in the section beginning on p. 11. All data used in the study are fiscal year 1992-93 figures.

THE "SHORT CUT" MODEL

As noted earlier, the "short cut" model was developed by Dr. G. Jeremiah Ryan in 1981 "to meet the objections of the dominant models: Data sets were developed to substitute for surveys; easily available nationally produced data was identified to substitute for the retail gravity model; and a conservative multiplier effect was recommended." [Ryan and Malgieri, 1992, p. 5] Essentially, the economic impact of a community college, as determined from this model, is calculated from data relating to college, employee, and student expenditures within the service area of the institution.

Total college expenditures were $2,366,670. Roughly 10% of this, or $236,667, was spent within the PVCC service region. The total student activities expenditures were $40,006, and of this, $4,007 was spent in the service region. Adding the two together, PVCC expenditures within the service region were $240,674.

Employee expenditures totalled $1,440,264. This included $1,411,652 spent by employees residing within the service region on non-housing items, $10,000 spent within the service region by full-time employees living outside the service region, and $18,612 in rental expenses by full-time employees residing within the service region. For the purposes of this study, the total number of college employees was 501 (121 full-time and 380 part-time), and the number of full-time employees residing within the service region was 111. The total disposable income available to employees was $3,931,600.

Student expenditures were $10,741,680. This included $2,471,520 spent by the 912 full-time student enrolled in 1992-93 and $8,270,160 spent by the 6,081 part-time students. Average annual college related expenses for full-time students, as calculated

from financial aid data, were $2,710, and average annual expenses for part-time students were $1,360.

The total direct, or initial economic impact within the PVCC service region, $12,422,618, was calculated by adding these three expenditures within the service region (college, employee, and student). The total estimated economic impact, $24,845,236, was calculated by doubling the direct impact. The multiplier used in the "short cut" model is 2.0, although as noted by Ryan and Malgieri [1972],

> A multiplier of 1.9 is the average among those reported in the literature review, computed for differing regions; the range being 1.2 to 3.0. The multiplier range for entire states is 2.5 to 3.0. The larger multiplier results because a state has such a varied economic base that fewer dollars "leak" out to other regions.

Table 1 presents detailed results from the "Short Cut" model. Table 2 presents summary results from the model. What is startling is the fact that for every one dollar invested by service region localities, $1,628.66 is generated. Few investments yield this rate of return, and viewed in this light, PVCC is a bargain investment.

TABLE 1: The Economic Impact of PVCC Upon Its Service Region Using the "Short Cut" Model

PART I. College Information		
A.	Total college expenditures	$2,366,670
B.	Pct. of total college expenditures spent in service region	10%
C.	Total student activity fees, expenditures	$40,066
D.	Total number of college employees	501
	Full-Time college employees	121
	Part-Time college employees	380
E.	Full-Time college employees living in service region	111
	Pct. of full-time college employees living in service region	92%
F.	Total disposable income available to employees	$3,931,600
G.	Total number of full-time students	912
H.	Total number of part-time students	6,081
I.	Avg. annual college related expenses (full-time students)	$2,710
J.	Avg. annual college related expenses (part-time students)	$1,360
PART II. Project Calculations		
K.	Total student govt. expenditures in service region	$4,007
L.	College expenditures spent in service region	$236,667
M.	Total service region expenditures by college	$240,674
N.	Disposable income of service region employees spent in service region on non-housing items	$1,411,652
O.	Expenditures of non-service region employees spent in service region on non-housing items	$10,000
P.	Rental expenditures by full-time service region college staff	$18,612
Q.	Total employee expenditures in service region	$1,440,264
R.	Total expenditures by full-time students	$2,471,520
S.	Total expenditures by part-time students	$8,270,160
T.	Total expenditures by students	$10,741,680
PART III. Local Economic Impact		
U.	Total college expenditures in service region	$240,674
V.	Total employee expenditures in service region	$1,440,264
W.	Total student expenditures in service region	$10,741,680
X.	Total initial economic impact of the college on the service region	$12,422,618
Y.	Multiplier effect	2.0
Z.	Total estimated economic impact of the college on the service region	$24,845,236

TABLE 2: Summary of the Economic Impact of PVCC Upon Its Service Region Using the "Short Cut" Model

Category	Amount
College expenditures in service region	$240,674
Employee expenditures in service region	$1,440,264
Student expenditures in service region	$10,741,680
Direct economic impact in service region	$12,422,618
Estimated economic impact in service region	$24,845,236
Ratio of local funds to estimated economic impact	$1.00 to $1,628.66

THE EACUBO MODEL

The EACUBO model, as mentioned earlier, is derived from the "short cut" model. Dr. Gene Winter of the Two-Year College Development Center for community colleges in New York State, located on the campus of the State University of New York (SUNY), Albany, essentially refined Dr. Ryan's model, and EACUBO computerized it. While much of the data in the two models is the same, the EACUBO model is more sophisticated and probably provides more accurate impact figures.

College expenditures within the service region were the same in the EACUBO model as in the "short cut" model ($240,674). Student expenditures were also the same ($10,741,680). Employee expenditures in the EACUBO model ($1,660,437) were slightly higher than in the "short cut" model ($1,440,264). Employee expenditures included $1,410,593 spent on non-housing items within the service region by employees residing within the service region, $26,500 spent on non-housing items within the service region by employees residing outside the service region ($10,000 by full-time employees and $16,500 by part-time employees), and $223,344 in rental expenditures by full-time college staff living within the service region. Rental expenditures were based upon 1990 census data.

The direct economic impact of PVCC within the service region, as determined from the EACUBO model, was $12,642,791. The estimated economic impact was nearly double that--$24,729,299. The multiplier used, 1.956, is the household sector multiplier from the Regional Input-Output Modeling System (RIMS II column #910000).

In addition to the monetary economic impact PVCC has upon the service region, additional jobs are generated because the college exists. The EACUBO model found

507 jobs directly related to the college and estimated that 727 full-time jobs are directly or indirectly related. This means that 226 additional full-time jobs exist within the service region because of PVCC.

The EACUBO model also calculates the economic impact of a college within a state. The total direct economic impact of PVCC upon Virginia as a whole was $13,727,342, and the total estimated economic impact was $26,850,681. Five-hundred fifty jobs were directly related to PVCC, and 790 full-time jobs were related to the college throughout the Commonwealth of Virginia.

Table 3 presents detailed results from the EACUBO model, and Table 4 presents summary results. As was the case with the "short cut" method, in terms of investment, PVCC proves a bargain. For every dollar of state funds invested in the college, $6.13 is returned, and for every dollar of local funds invested, $1,621.06 is returned.

TABLE 3: The Economic Impact of PVCC Upon Its Service Region Using the EACUBO Model

SERVICE REGION DATA		
A.	Total student activity expenditures in service region	$4.007
B.	College expenditures in service region	$236,667
C.	Total service region expenditures by college	$240,647
D.	Disposable income of service region employees spent in-region on non-housing items	$1,410,593
E.	Expenditures of non-service region employees in-region on non-housing items	
	(a) Full-time	$10,000
	(b) Part-time	$16,500
F.	Rental expenditures by full-time college staff living in service region	$223,344
G.	Total employee expenditures	$1,660,437
H.	Total expenditures by full-time students	$2,471,520
I.	Total expenditures by part-time students	$8,270,160
J.	Total expenditures by students	$10,741,680
K.	Total direct economic impact of PVCC on the service region	$12,642,791
L.	Multiplier effect	1.956
M.	Total estimated economic impact of PVCC on the service region	$24,729,299
N.	Full-time employees living in the service region	220
O.	Jobs related to the college	507
P.	Full-time employment related to college	727
Q.	Ratio of sponsor contribution to total economic impact	$1.00 to $1,621.06
STATEWIDE DATA		
A.	Total student activity expenditures in State	$20,003
B.	College expenditures in State	$1,183,335
C.	Total in-state expenditures by college	$1,203,368
D.	Employee non-housing expenditures	$1,538,828
E.	Expenditures of out-of-state employees in State on non-housing items	
	(a) Full-time	$0
	(b) Part-time	$0
F.	Rental expenditures by full-time college staff living in State	$243,466
G.	Total employee expenditures	$1,782,294
H.	Total expenditures by students	$10,741,680
I.	Total direct economic impact of the college on the State	$13,727,342
J.	Multiplier effect	1.956
K.	Total estimated economic impact	$26,850,681
L.	Jobs related to the college	550
M.	Total full-time employment related to the college	790

TABLE 4: Summary of the Economic Impact of PVCC Upon Its Service Region Using the EACUBO Model

Category	Amount
College expenditures in service region	$240,674
Employee expenditures in service region	$1,660,437
Student expenditures in service region	$10,741,680
Direct economic impact in service region	$12,642,791
Estimated economic impact in service region	$24,729,299
Total jobs related to college	727
Ratio of local funds to estimated economic impact	$1.00 to $1,621.06
Ratio of state funds to estimated economic impact	$1.00 to $6.13

Before continuing, a few words about limitations of the EACUBO model--and the "short cut" model, as well--are in order. As noted by the developers of the EACUBO model,

> Any study of this type only provides estimates of the real economic impact that colleges have on an area. Not included in this model are the following:
>
> -- expansion of the credit base of local banks due to college-related deposits
>
> -- expenditures by visitors to college-related events
>
> -- state and local taxes paid by employees
>
> -- increases in sales tax revenue due to college-related expenditures
>
> -- estimates of tax revenues foregone because of college property being tax-exempt
>
> These exclusions insure underestimation of the actual economic impact while simplifying data collection. [EACUBO, 1989, p. A9]

THE IMPAC MODEL

An economic impact analysis of PVCC, using the IMPAC model, was conducted by the VEC in February and March 1994. IMPAC incorporates IMPLAN (Impact Analysis for Planning), a regional economic impact modeling system, to measure the effects on jobs and salaries and wages within the defined geographic region. The IMPAC model describes "benefits to the area economy from local spending by the college for operation and maintenance and by college employees for goods and servic[illegible] measured in terms of employment and employee compensation." [Lang, 1994, p. 1].

One important difference between this model and the previous two is that

> This impact analysis is based solely on college expenditure data and excludes student expenditure data. Since community college students are already area residents and part of the local economy, we assumed that most of their purchases would have been made anyway regardless of the fact that they are students in the community college. [Lang, 1994, p. 1]

Assumptions upon which the impact analysis was based are listed below.

- The economic impact model for the study was constructed using 1991 economic data.
- The Consumer Price Index (CPI) was used to deflate the 1993 salaries and wages and expenditures data to 1991 dollars. Moreover, the impact estimates were inflated back to 1993 dollars using this price index.
- Approximately 17 percent of the employees' salaries and wages are paid to the federal and state government for taxes.
- The spending patterns for the college employees are similar to the medium income class ($20,000 - $40,000) consumption pattern in IMPLAN.

- It was assumed that the college's expenditures occurred in the following categories: Utilities, Telephone, Office/Equipment Purchases, Postage, Printing, Building Maintenance, Grounds Maintenance, Vehicle Expenses, Construction, Real Estate Rentals, Security, Media Services, and Equipment Repair.

- The employment generated from the multiplier effects include full and part-time jobs (annual equivalent).

- Employment compensation includes salaries and wages as well as benefits including life and health insurance, pension payments, and any other non-cash compensation.

- It should be noted that IMPLAN is a static I-O modeling system and does not incorporate the dynamics of an actual economy. Thus, the economic impact estimates should be used for short-term assessments. [Lang, 1994, pp. 1-2]

Another important difference is that economic effects are measured in terms of direct, indirect, and induced effects. Essentially, both indirect and induced effects are similar to the estimated impact of the "short cut" and EACUBO models. The VEC describes these three effects by way of the following analogy:

> As an example, consider the increase in demand for paper. An increase in demand would cause the manufacturer to increase production in order to meet the demand (Direct Effect). Consequently, the manufacturer would need additional production inputs generating an increase in production from the industries that supply the inputs (Indirect Effect). Finally, the increase in final demand would initiate an increase in household income (direct and indirect effects) generating an increase in income and employment in those industries that are a recipient of household spending (Induced Effect). [Lang, 1994, p. 2]

The economic impact analysis was based upon service region college operating and maintenance expenditures of roughly 0.6 million dollars and employee spending of approximately 2.9 million dollars. These figures indicate that PVCC generates an additional 1.8 million dollars in employee compensation and supports an additional 105

jobs within the service region. The economic impact, broken down into direct, indirect, and induced effects is shown in Table 5.

TABLE 5: Summary of Economic Impacts of PVCC Upon Its Service Region ($1993 Millions)

Category	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Employment	56	11	37	105
Employee Compensation	1.0	0.2	0.6	1.8

Over 80% of this economic impact results from the spending of college employees' salaries and wages. As can be seen in Table 6, the Services and Trade Industries account for the greatest impact (approximately 70% of the total impact on jobs occurring in these industries is in this category).

TABLE 6: Industry Division Impacts of PVCC Upon Its Service Region ($1993 Millions)

Major Industry Division	Employee Compensation	Employment
Agriculture	0.012	2
Construction	0.056	3
Manufacturing	0.156	8
Transportation, Communication, & Public Utilities	0.155	5
Wholesale & Retail Trade	0.464	33
Finance, Insurance, & Real Estate	0.203	11
Services	0.653	40
Government	0.122	4
Total	$1.820	105

Because the analysis of economic impact using this model focused solely upon the tangible benefits of PVCC to the local economy, used different data, and excluded student spending, it is difficult to compare it to the other two models. What is provided, however, are (1) employee compensation data--PVCC generates 1.8 million dollars

worth--(2) data relating to jobs--PVCC supports an additional 105 jobs--and (3) how PVCC affects different industries--70% of the impact is felt in the trade and services industries.

CONCLUSIONS

Summarizing and combining data from the three models, the following facts emerge:

- College spending in the service region ranges between 0.2 million dollars and 0.6 million dollars. Employee spending ranges between 1.4 million dollars and 1.8 million dollars, while student spending totals approximately 10.7 million dollars.
- The total direct economic impact of PVCC in the service region, including student spending, ranges between 12.4 million dollars and 12.6 million dollars.
- The total estimated economic impact of PVCC, including student spending, is roughly 24.8 million dollars.
- PVCC employs 501 people and generates between 105 and 226 additional jobs within the service region. Within the state, it generates still another 63 jobs.
- Most of the additional jobs generated by PVCC are in the services (38%) and trade (31%) industries.
- For every dollar paid by service region localities, PVCC generates $1,629.
- For every dollar paid by the state, PVCC generates $6.13.

Because students do spend money as a direct result of enrolling at PVCC, and because they do obtain jobs and promotions as a result of their PVCC education, it is the author's belief that to one degree or another, students must be accounted for in any economic impact analysis. Furthermore, because both the "short cut" and EACUBO

models take into account only student expenses related to their college study, the author believes that the figures generated using these models are realistic.

In summary, then, PVCC has a direct economic impact upon the service region of 12.5 million dollars and an indirect impact of nearly 25 million dollars. Two-hundred twenty-six additional jobs within the PVCC service region exist either directly or indirectly because of the college. For every local dollar supporting PVCC, an additional $1,629 are generated, and for every state dollar, an additional $6.13 are generated.

Clearly, PVCC has a considerable economic impact upon its service region. In fact, economically as well as educationally, PVCC must be one of the best bargains around. For every dollar spent by localities in support of the college, $1,629 are returned. Few investments yield this rate of return, and viewed in this light, PVCC is an investor's dream.

SELECTED BIBLIOGRAPHY

Caffrey, John, and Isaacs, Herbert H., *Estimating the Impact of a College or University on the Local Economy* (Washington, D.C.: American Council of Education, 1971).

Eastern Association of College and University Business Officers, Two-Year College Committee, *The Economic Impact of Colleges on Their Communities and States* (Jamestown, NY: Jamestown Community College, 1989).

Knapp, John L., Fox, Tyler J., McGrath, Richard D., and Cox, Robert W., *The University of Virginia's Impact on the Charlottesville Metropolitan Area* (Charlottesville, VA: University of Virginia, Center for Public Service, October 1990).

Lang, Ann D., *An Economic Impact Analysis of the Piedmont Virginia Community College* (Richmond, VA: Virginia Employment Commission, Economic Information Services, March 1994).

Ryan, G. Jeremiah, and Malgieri, Patricia, *Economic Impact Studies in Community Colleges: The Short Cut Method*, Paper No. 48 (National Council for Resource Development Resource, February 1992).

U.S. Department of Commerce, *Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System (RIMS II)* (Washington, D.C.: Bureau of Economic Analysis, May 1986).