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ABSTRACT

Universities influence local economies by generating gross real goods and services from institutional expenditures and personal expenditures of staff, students and visitors. A simple minimum cost methodology for determining the extent of the economic impact of a university on its local economy is described and illustrated. Local income, jobs, and business investment opportunities created as a result of staff, students, visitors and university expenditures are estimated. Estimates of multipliers for expenditures, initial income, and employment are used to yield economic impact in terms of generated local income and local jobs supported by the university. This methodology is applied to show the University of Calgary's economic impact on the city of Calgary for three years. (Author)

UNIVERSITY IMPACT ON LOCAL ECONOMY

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The purpose of this paper is to consider a related facet of the problem of accountability. Universities influence their local economies by generating additional gross real goods and services from institutional expenditures and personal expenditures of staff, students and visitors. A simple minimum cost methodology for delimiting the economic impact of a university on its local economy is described and illustrated by The University of Calgary's impact on the City of Calgary for three fiscal years.

Methodology

The methodology includes a calculation of total cash flow into the local economy from four types of university related expenditures leading to estimates of economic impact defined by local jobs and by earnings directly or indirectly supported by the university. The proposed methodology is structured to take full advantage of the peculiarities of the local economy in order to minimize the cost and time required to use it. Therefore, some judicious adaptation may be necessary when the methodology is applied to different types of local economies.

Staff disposable income, net university expenditures, visitors' expenditures and student expenditures are initial local income as shown in Figure 1.

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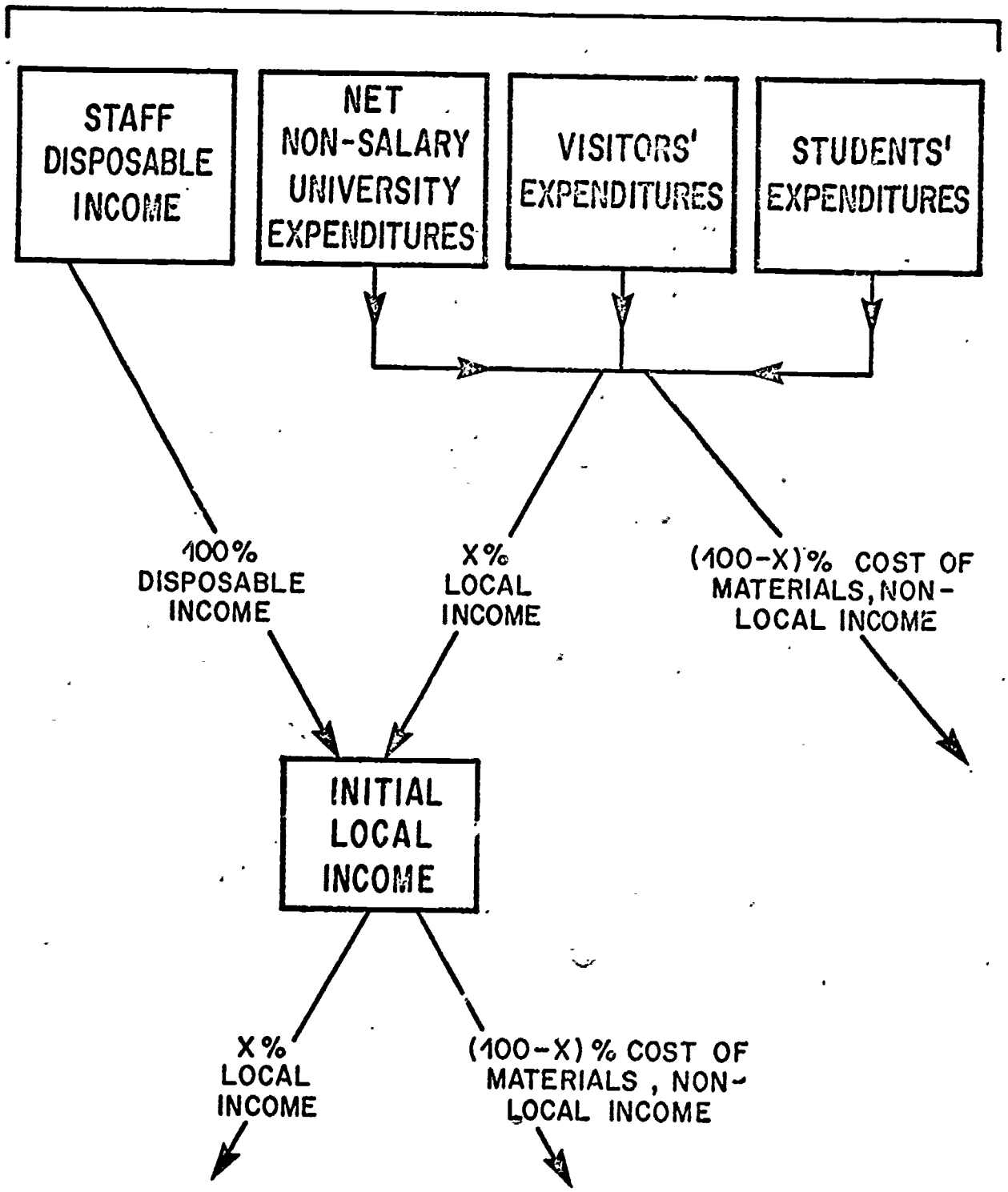
Figure 1

INITIAL UNIVERSITY-RELATED EXPENDITURES



Local staff expenditures are assumed to equal staff disposable income. Such items as savings and private expenditures outside of the city are assumed to be offset by other income sources. Surveys which would estimate leakages are costly to produce and the net effect of this approximation is judged not to be significant for the purposes of this study.

Net non-salary university expenditures include non-salary operating, non-salary trust fund, and capital expenditures. The value of goods and services purchased by the university which flow in first-round expenditures into the local economy is estimated[1] based upon the assumption that payments to firms flow directly into the local economy in the first-round if the firm has a local mailing address or a local business telephone number.[2]

Expenses of non-local delegates to campus conferences are considered to represent the majority of visitors' expenditures. An estimate of per visitor total local expenditures is applied to the number of annual non-local delegates to campus conferences.

Local expenditures per full-time student are based upon estimates from files of university financial aid offices.[3] It is assumed that full-time students if they are not attending university would be idle resources or

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[1]This estimate does not include investments, bank transfers, travel expenditures, pensions, fellowships, bursaries, scholarships or student loans.

[2]In order to minimize costs of data preparation, the ratio of local to total university expenditures calculated for one time period may be assumed constant and multiplied by capital, non-salary operating and non-salary trust fund expenses of succeeding time periods to yield estimated local first-round university expenditures.

[3]In the University of Calgary illustration, a questionnaire circulated by the Student Affairs Office to a ten percent sample of full-time students verified the estimates of per student expenditure used.

would be taking employment opportunities from someone else making the net effect nil. Also, it is assumed that in the absence of the university, students who live at home would have gone elsewhere to study and further that room and board expenditures of students living at home are the same as those for students living away from home.[1] The student expenditure estimate (not including tuition) is multiplied by the number of full-time students.[2]

Expenditure and Income Multipliers

University related expenditures within the region create local income, jobs and business investment opportunities. The first-round income accruing to local residents is partially respent in businesses round after round, becoming an infinite geometric progression creating additional income and employment.

Expenditure income and initial income multipliers are estimated based upon existing studies of various types of expenditures and regions with similar characteristics.[3] Multipliers vary depending upon comparative reliance on imports, spending and saving preferences of residents, patterns

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[1]This last assumption was tested with University of Calgary data to estimate the decrease in total students' expenditure if room and board expenses of students who live at home were not included. Room and board payments less an estimate of the costs to families for those students were deducted. The difference in cash flow into the local economy was approximately three percent. Therefore, the extent of economic impact was not significantly changed.

[2]University housing, food services centres and bookstore revenues are subtracted from the total cash flow because gross expenditures in university facilities are included in university operating expenses.

[3]Several estimates of expenditure-income multipliers which may be applied to university expenditures are cited by John Caffrey and Herbert H. Isaacs, Estimating the Impact of a College or University on the Local Economy (Washington, D. C.: American Council on Education, 1971), p. 44.

of consumer spending, and regional industrial and business structures. Multipliers within the ranges of values determined by relevant studies are chosen as reasonable estimates to multiply by initial income and university related non-salary expenditures within the region.

Employment Opportunities

Universities support many jobs in addition to those on campus. These jobs are an indicator of the economic impact of the institution on the community. An estimate of jobs supported is obtained using the average of results of two methods.

Method I -- University employment is assumed to form part of the regional economic base which consists of those activities providing employment and income on which the local economy depends. This theory[1] premises that "nonbasic" jobs are generated through employment of persons in activities which form part of the economic base.

Several estimates of the size of the multiple effect of additional basic employment have been made for various types of expenditures and regions. Employment multipliers within a region are larger the greater its population and employment diversity, and the less its dependence on imports.[2] A value for the employment multiplier may be based upon studies of regions of similar size, diversity and interdependence, and upon studies of similar types of

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[1] Charles M. Tiebout, "The Community Economic Base Study," Supplementary Paper No. 16 (New York: Committee for Economic Development, December 1962).

[2] John Caffrey and Herbert H. Isaacs, p. 44. City of Calgary employment is approximately 1/5 in the manufacturing sector and 2/5 in the trade and service sectors. Calculated from: "Estimates of Employees by Industry," Alberta Business Trends (Edmonton: Alberta Bureau of Statistics, January-December 1970 issues).

expenditures. This value multiplied by full-time equivalent university employees yields an estimate of additional jobs supported by university wages and salaries.

In addition, the non-salary operating, non-salary trust fund, and capital expenditures of the university support employment. Ratios of the value of construction work and wholesale trade to the number of employees within each industry are applied respectively to university capital and non-salary operating and trust fund expenditures to yield initial employment estimates. Average employment multipliers for contract construction and wholesale trade are estimated based upon studies of similar regions, and are applied respectively to these initial employment figures.

Method II -- The number of local jobs attributable to the presence of the university may also be estimated by applying an "employment requirements coefficient." Coefficients measure changes in local employment associated with the average household dollar spent locally when direct and indirect production requirements and induced income effects on local production are taken into account.[1] A suitable range of the coefficient is suggested by Caffrey and Isaacs in terms of man-years of employment per dollar of university related expenditures in local businesses. A coefficient which is chosen based upon criteria similar to those of the income and employment multipliers is multiplied by staff expenditures and university non-salary operating, non-salary trust fund and capital expenditures.

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[1] John Caffrey and Herbert H. Isaacs, p. 44.

Mathematical Statement of the Methodology

The methodology is summarized algebraically in Figure 2. Equation 1 shows the calculation for initial business volume while income generated is given by equation 2. The two methods of estimating employment generated are given by equation 3.

Figure 2

ALGEBRAIC STATEMENT OF THE METHODOLOGY

Equation 1

$$B = W + h\,(T + C) + fV + gS - R$$

in which:

- B = *initial local business volume*
- W = *disposable income of faculty and staff less that of faculty on leave*
- h = $\frac{\textit{local disbursements}}{\textit{total disbursements}}$
- T = *non-salary operating and non-salary trust fund expenditures*
- C = *capital expenditures*
- f = *per visitor estimated local expenditures*
- V = *number of conference delegates*
- g = *per full-time student estimated local non-tuition expenditure*
- S = *full-time students*
- R = *revenues from university facilities*

Equation 2

$$I = \alpha W + \Omega\,(B - W)$$

in which:

- I = *local income generated*
- α = *estimated initial income multipliers*
- Ω = *estimated expenditure-income multiplier*

Equation 3

$$J_1 = \lambda\,(E + mhC + nhT)\ ;\ J_2 = E + p\,[W + h\,(T + C)]$$

in which:

- J_1 = *FTE jobs using Method I*
- J_2 = *FTE jobs using Method II*
- λ = *estimated employment multiplier*
- E = *FTE faculty and staff employed by university*
- m = $\frac{\textit{FTE construction employees}}{\textit{value of construction work performed}}$
- n = $\frac{\textit{FTE wholesale trade employees}}{\textit{value of wholesale trade}}$
- p = *employment requirements coefficient*

Estimating Trend of Future Impact

Assuming that university-related expenditures are proportional to full-time students, and that initial income multipliers in the projection year equal those in the base year, annual local income generated over succeeding years may be estimated based on student projections. This estimate is likely to be low if the local economy is expanding because values of multipliers in the projection year tend to be higher than those in the base year.

The proportion of local jobs supported in a given year may also be estimated by assuming that the ratio of projected full-time students has a direct relationship to the projected regional employment directly or indirectly supported by the university.[1] An estimate of full-time equivalent employees within the region in the given time period is used to determine the estimated proportion of local jobs supported by the university.

Discussion of Methodology

The economic indicators of local income generated and full-time equivalent jobs created are not the only ones which could be chosen.[2] A balanced picture of the total economic impact of the university on the community must include many dimensions such as expansion of local credit bases, unrealized local business volume due to the university having its own facilities, the proportions and value of capital and property which relate to university generated business volume, and local government expenditures and revenues due to existence of the university. Each of these factors are important yet require detailed analysis. Their omission limits the results and the significance of their omission must be judged in light of the purpose of each application of the methodology. The proposed methodology attempts to yield

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[1] A sensitivity test was performed on this assumption using historical University of Calgary and City of Calgary data. The test yielded ratios only slightly higher than those calculated using this assumption.

[2] Another university impact is changes in nearby relative real estate prices. A comparative analysis of residential lots and houses at various distances from the university was done. Ratios of selling prices to assessment values in close and distant areas were compared for houses with similar living areas and lot sizes. The analysis shows that the university may have inflated selling prices of proximate homes. The location of The University of Calgary in a new section of a rapidly expanding urban region may make this observation peculiar to universities in this sort of physical environment.

evidence of the economic impact of the institution on the local economy to assist the institution in providing an accounting for resources provided by governments. Thus, local income generated and full-time equivalent jobs created seem most relevant for this purpose.

Illustration

Figure 3 shows the income and jobs generated in the City of Calgary by the University of Calgary in 1966/67, 1970/71 and 1971/72. Thus, as the number of full-time students increased from 4074 to 9173 the local income attributable to the university grew from $21 to 71 million and the number of full-time equivalent jobs resulting from university related activities jumped from 2850 to 7990.

Figure 3

RESULTS
IMPACT OF THE UNIVERSITY OF CALGARY ON THE ECONOMY OF THE CITY OF CALGARY

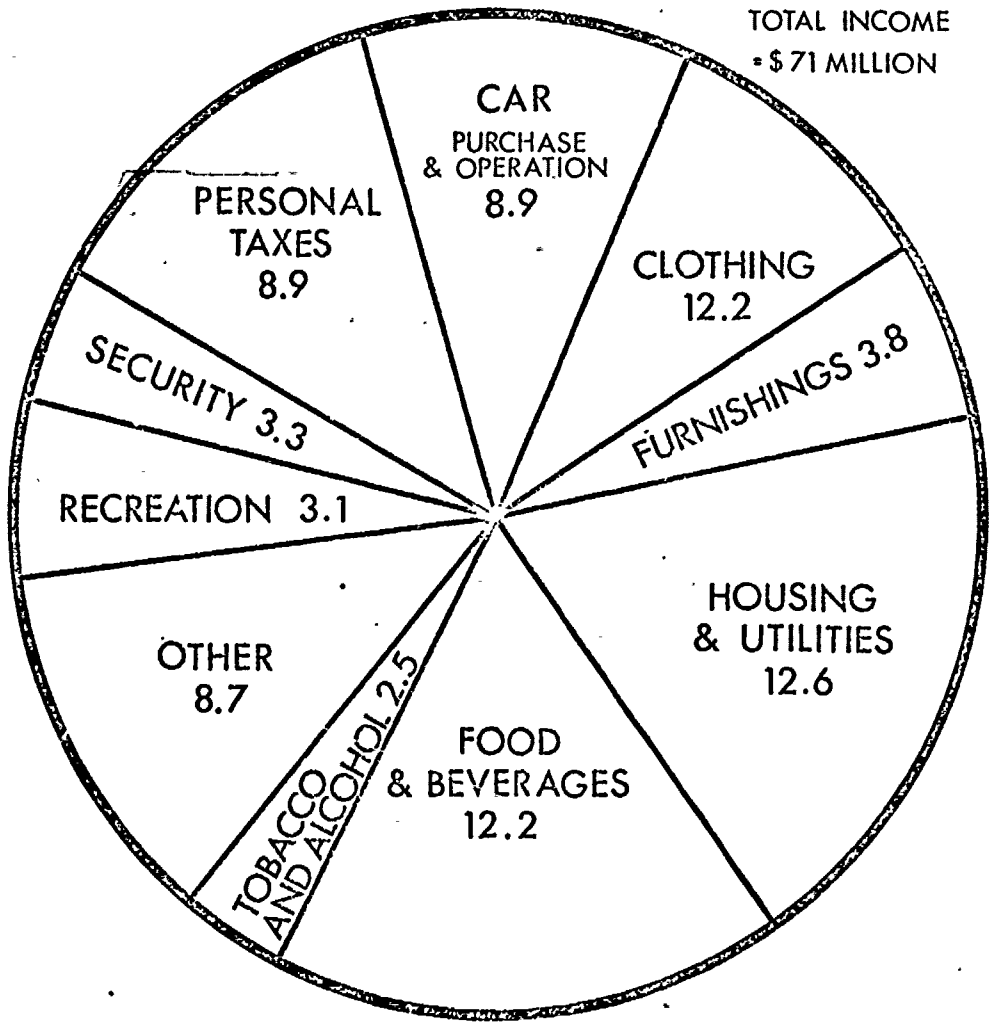
YEAR	FULL-TIME STUDENTS	GOVERNMENT INVESTMENT ($'000,000)	INITIAL LOCAL BUSINESS VOLUME ($'000,000) (B)	LOCAL INCOME GENERATED ($'000,000) (I)	FTE JOBS $(J_1+J_2)/2$	ESTIMATED PERCENT OF CALGARY EMPLOYMENT SUPPORTED
1966/67	4074	23	24	21	2900	3
1970/71	9237	42	59	64	7100	5
1971/72	9173	51	64	71	8000	5

Needs of people whose income and jobs are supported by the University of Calgary provide substantial marketing opportunities for local retail and service establishments. By assuming that university-generated income will be spent in a manner similar to that of average Canadian families,[1]

[1] Dominion Bureau of Statistics, Urban Family Expenditure, 1967, Catalogue #62-530 (Ottawa: Queen's Printer, March 1971), p. 31 (Edmonton pattern).

Figure 4

DISTRIBUTION OF LOCAL 1971/72 INCOME
GENERATED BY
UNIVERSITY OF CALGARY RELATED EXPENDITURE



(MILLIONS OF DOLLARS)

distribution of local retail activity in food, housing, clothing, automobile, furnishings and other industries can be estimated. Figure 4 shows the distribution of income generated by 1971/72 University of Calgary related expenditures into these sectors.