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ECONOMIC IMPACT OF UNIVERSITY AND FINANCIAL CONSEQUENCES OF UNIVERSITY BUDGET CUTS ON THE LOCAL AND STATE ECONOMY

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ABSTRACT

This study examines the financial contributions of a regional university's expenditures on the local and state economy using regional impact multipliers from an input-output model. The empirical application uses income and expenditure data from Emporia State University (ESU) in Kansas and estimates income, output, and employment multipliers. In FY 2000, ESU, its ancillary units, students, and visitors directly injected \$125 million into the state economy generating \$343 million output, \$94 million earnings, and 4,195 jobs in Kansas. For every dollar of University expenditure there is an additional \$1.74 output generated and for every job that the University creates there is an additional 1.25 jobs created in the state economy. This study extends the analysis to estimate the statewide cumulative impact from \$2.9 million university budget reductions in FY 2002-3.

I. INTRODUCTION

Colleges and Universities often exert significant influence on the urban and regional communities in terms of income/expenditure flows and employment generation. These institutions of higher learning purchase goods and services, hire workers, produce and sell education, art, entertainment, housing, and food services to the local populations. These economic activities have a ripple effect on the local economy as other economic sectors continue to respond to the increased demand for additional goods and services. Economic impact study for a university is useful to the university administrators to demonstrate the real value of their institution to the local business people, legislatures, and the common public specially during the times of recession and state budget shortfalls and cutbacks (as has been seen over the past two years in the entire nation). These studies are important because the audiences of such studies are interested to know the relationship between the economic impact of the University and its tax support. It is also important for the taxpayers to know the economic return they are getting out of each dollar of their tax support (Lichty and Jesswein 1978).

The purpose of this study is to report the economic impacts of a regional university on the local economy. Unlike estimating economic impact of the entire State university system or for a large PhD conferring institution, the current study focuses on a regional university. The case study is for Emporia State University (ESU) in Kansas, which is primarily a 4-year undergraduate regional university located in Emporia, a rural community of 30,000 people. With a student population of 6,000 (85 percent are fulltime and residential), the primary objective of ESU (typical for a regional university in the nation) is excellence in teaching, where creativity and research by the faculty are recognized and service to the community are encouraged. Although, this study applies conventional tools (input-output model) for estimating impact multipliers, the contribution of the current study lies in its empirical application and interpretation of the income, output, and employment multipliers representing the general magnitude of such influences by any regional university of similar size, mission, and funding on the local economy. The study also examines the impacts of recent University budget cuts on the state economy.

The presence of Emporia State University (ESU) exerts major influence on the local and State economy of Kansas. Although the primary mission of the University is to enhance the intellectual quality and personal development of the Kansans, each year the University injects millions of dollars into the local and state economy through direct purchases of goods and services. The University also enriches the quality of life for the local residents by sponsoring cultural and athletic events. The University community consisting of students, employees, and their families who consume local goods and services exerts a significant influence on the local economy of Lyon County. The University also brings out-of-state dollars into the state economy by attracting research grants by the faculty. If ESU did not exist many students would spend their education dollars outside the state or to another institution in the state and many employees would earn their payroll dollars outside the state or to another institution in state. The greatest economic impact of ESU is offering low cost but high-quality education to thousands of young people of Kansas, which enhances their productivity augmenting their skills, perspectives, and abilities.

Long-term intangible benefits of education such as lifetime earnings of ESU graduates, value of their contributions on national politics and culture, benefits of infrastructure and parks and recreational facilities built due to the existence of the University, etc., are difficult to measure. This study includes only short-term economic impacts. The short run economic impact uses interindustry procedures to derive the financial impact of ESU on the Kansas economy for the financial year 1999-2000. This study is a first attempt to estimate economic impacts of Emporia State University on the local and state economy using multipliers that have been specifically generated based on regional input-output model of Kansas's economy.

The next section discusses the methodology used. Assembly of data is discussed in the third section followed by two separate sections on the economic impact of university expenditures and the impact of budget reductions. The summary and conclusions are in the last section.

II. METHODOLOGY

Like any other government institution, ESU's expenditures provide a source of income and employment for Kansans. The University and its ancillary units directly affect the economic activity in the state by employing 1,866 full and part-time faculty, staff, and students and by spending more than \$64 million each year on wages and salaries, construction, equipment and supplies, and goods and services necessary for school operation. These expenditures create an indirect economic 'multiplier effect' on the local economy – which arises from spending by the faculty, staff, students, and out-of-state residents who come to ESU to visit students or attend University sponsored events (Hill, 1999). These local purchases generate additional income for local residents leading to further spending and income for residents. Thus, the spillover effect of University expenditure continues after the initial money is spent as it generates further income, employment, and earnings to those not directly associated with the University system. The multiplier effect of the University spending is the sum of direct, indirect, and induced impacts on local economy. Figure 1 depicts the interlinkages between the University (including ancillary units) and the community. ESU attracts students and visitors, pays wages and salaries to its employees, and purchases goods and services. Students and visitors also purchase goods and services. All these activities generate output, income, and employment for the local businesses, households, and government.

Table 1: Operating Revenue^a and Direct Expenditure^b by ESU and its Ancillary Units – FY 2000

Section A		
Sources of Revenue	(Million \$)	(Million \$)
1. University Generated	27.065	
2. State Appropriations	28.459	
3. Student Organizations and Local Agencies	6.070	
4. Athletics	1.208	
5. Memorial Union	2.289	
6. ESU Foundation	7.686	
Total		72.777

Section B		
Description of Expenditures		
1. University	56.887	
2. Athletics	0.633	<u>57.520</u>
3. Teachers' Hall of Fame	0.302	
4. Memorial Union	0.963	
5. ESU Foundation	3.019	
6. ESU Bookstore	0.279	
7. ESU Dinning Services	1.598	<u>63.681</u>
8. Student Expenditures	58.941	
9. Visitor Expenditures	15.254	<u>74.195</u>
Total		<u>137.876</u>

'a' - Source: ESU Annual Financial Report FY 2000

'b' - Source: ESU Annual Financial Report FY 2000, and Faculty and Student Survey. Expenditures amounting to real transactions are reported after necessary adjustments in consultation with the university budget officials. For ESU Dinning services and ESU Bookstore, only operating expenditures are reported.

Ever since the study by Caffrey and Issacs (1971), there have been several studies investigating economic impacts of University systems on the local economy (Girling et al 1993; Gazel 1994; Trewyn 1995; Trewyn *et al.* 1998; Beck *et al.* 1995; Harris 1997; Agapoff and Harris 2000; Woodward and Coffman 2001; and Pittsburgh State University 2002). The most commonly used technique for forecasting economic impact of a University system has been Leontief's (1936) input-output analysis. The input-output model breaks down the total University related expenditures into detailed economic sectors. Each sector is dependent to some degree upon other sectors. If there is a change in the level of activity in one sector, this will directly or indirectly cause a change in the level of production in other regional sectors. The amount of economic activity among different economic sectors measures the degree of interrelationship between sectors. These interdependencies among regional economic sectors can be estimated through interindustry or input-output analysis based on a transaction matrix and direct requirement matrix. A simple input-output model is produced in Appendix 1.

1. TRANSACTIONS MATRIX

Transactions matrix shows the monetary flows of goods and services between all individual sectors of the economy in a given year. The columns of the transactions matrix depict the composition of inputs required by a given industry to produce its output. The rows of the transactions matrix reflect the distribution of a given

industry's output throughout the economy. In other words, columns show the purchases by a given industry from all other industries, and rows show sales by a given industry to all other industries (Pogue *et al.* 1994; Harris *et al.* 1993).

2. DIRECT REQUIREMENTS MATRIX

The direct requirements matrix establishes the relationship among the processing sectors of the model. Direct requirement coefficients are calculated only for the processing sectors. It shows the requirements for a given industry to produce an average of \$1 of output. These purchase coefficients are obtained by dividing purchase data in each industry column of the transactions matrix by the corresponding output value for the industry. The column sum of the direct coefficients for a given industry shows the direct affect of changes in the volume of output of a given industry, upon other industries of the economy. (Sector and industry have been used interchangeably throughout the study.)

III. ASSEMBLING DATA

This section assembles the revenue and expenditure data from the operation of Emporia State University and its ancillary units. The final demand estimates are expenditures within each local economic sector. This requires initially identifying incomes and expenditures for the University, and expenditures by students and visitors. For operating revenues, we considered only ESU and its ancillary units, but for operating expenditures spending by students and visitors, Teachers' Hall of Fame, University bookstore, and the dining services were considered.

1. OPERATING REVENUES

Information on operating revenue for the University and its ancillary units were collected from the ESU Annual Financial Report, FY 2000. Table 1, Section A reports operating revenues for ESU and its ancillary units for financial year 1999-2000. In FY 2000, University-generated funds amounted to \$27.1 million and the state appropriation was \$28.4 million. The total revenue was \$72.7 million, which included revenues of student organizations and local agencies, athletics, the Memorial Union, and the ESU Foundation.

2. OPERATING EXPENDITURES

One of the major tasks in an economic impact study is the identification of all direct expenditures in the local economy by various sources. Table 1, Section B reports University-related direct expenditures and expenditures by the ancillary units, students, and visitors for FY 2000. University-related direct expenditures totaled

\$137.9 million, out of which \$57.5 million was from the University facilities fund. The University expenditures includes operating expenditures of various schools and colleges, investment in plant, land, buildings, and non-structural improvements, athletics, and the Teacher's Hall of Fame. The major portion of University-related direct expenditures was student and visitor expenditures, which was \$74.2 million. These expenditures are discussed below.

3. STUDENT EXPENDITURES

Student expenditures were determined from a student survey administered during Spring 2001. A total of sixty-five undergraduate and graduate courses were randomly selected from the ESU Spring 2001 class catalog. A total of 4,000 surveys were distributed to the instructors of those selected classes to administer. After deleting surveys with incomplete and missing information, 1,200 surveys were used in this study. Ninety three percent of the respondents are full time undergraduate students, whose expenditure pattern is not significantly different from the part time students in the sample. For the University as a whole, 73 percent of the students are undergraduates and 88 percent of them are full time. We recognize that over representation of full-time undergraduate students in our sample may overstate student expenditure in this study.

In estimating total direct student expenditures for the fiscal year beginning July 1999 and ending June 2000 (FY 2000) student enrollment for Summer 1999, Fall 1999, and Spring 2000 was considered. Though the survey was administered during Spring 2001, which falls in FY 2001, these expenditures were interpolated for student enrollment in FY 2000. In doing so, it is assumed that the student expenditures by category and proportion remained relatively unchanged between FY 2000 and FY 2001. Such an adjustment was necessitated by the fact that at the time of this study, the most recent University budget information accessible to the authors was FY 2000. Table 2, Section A reports student expenditures by category and its proportion in relation to total expenditures for the nine-month academic year.

Based on a nine-month academic year, a major part of student expenditures was college tuition (28 percent) followed by rent (15 percent) and food and beverage at home (8 percent). On average, ESU students spend \$683 per month or a total of \$6,147 for a nine-month academic year. Excluding tuition, an average student at ESU spends \$4,445 for nine-month academic year. A total of 14,139 students enrolled at ESU in FY 2000 i.e. Summer 1999, 3,364;

Table 2: Summary of Student^a and Visitor Expenditures (Local and Out-of-State) FY 2000

Section A		
Student Expenditures	9-Month Total	Percentage
1. House Rent	915	14.9
2. House Payment	310	5.0
3. House Repair	28	0.5
4. Real Estate and Other Taxes	68	1.1
5. Utilities	448	7.3
6. Food and Beverage at Home	510	8.3
7. Food and Beverage away from Home	256	4.2
8. Automobile Payments	410	6.7
9. Automobile Repairs	75	1.2
10. Automobile Gasoline	294	4.8
11. Insurance	265	4.3
12. Health Expenses	82	1.3
13. Personal Items	244	4.0
14. College Tuitions*	1,704	27.7
15. College Books and supplies	418	6.8
16. Child Care	70	1.1
17. Others	52	0.8
Total (\$)	6,147	100
Section B		
Visitor Expenditures	Local	Out of State
Total Number of Visitors	113,851	26,961
Total Visitor Days	217,456	71,385
Average Stay Per Visit (days)	1.91	2.89
Average Expenditure Per Day Per Visit (\$)	30.42	121.03
Total Expenditure (\$)	6,615,012	8,639,727

^a- Based on 1,200 observations, all expenditures are in current dollars

*not included in the impact study

Fall 1999, 5,610; and Spring 2000, 5,165. However, in estimating total student expenditures in FY 2000, expenditures for 879 student employees (employed by ESU and its ancillary units) were excluded to avoid double counting. This is because the

income (or expenditures) for these student employees are reported under 'wages and salaries' by the University and its ancillary units. Expenditures on 'salary and wages' are included in the 'household' sector in Table 3. Total student expenditures (other than tuition) for FY 2000 were estimated as \$58.9 million out of which \$17.1 million were expended in Lyon County, the home of 29 percent of the ESU students. It was revealed from student responses that 93 percent of the students are Kansans; and 14 percent of all respondents would have studied at some other institution out of state if ESU had not existed. Although it is recognized that the majority of the students would have studied at some other institutions of higher learning in Kansas if ESU did not exist we chose not to adjust the students' expenditure for impact analysis based on this assumption.

4. VISITOR EXPENDITURES

Visitor expenditures were derived from three sources: (i) faculty and student survey, (ii) athletics department, and (iii) the Emporia Area Chamber of Commerce and Visitor's Bureau. Visitors to the University were classified as fans attending athletic events, participants at cultural events, conferences/seminars, and continuing education programs, and visiting friends and families of student, faculty, and staff. Special care was taken to avoid double counting of some of these visitors compiling the information from three different sources. Basic information on total number of local visitors, average stay per visit, and average expenditure per day per visit for both local and out-of-state visitors was obtained from the student and faculty survey. However, in estimating total number of out-of-state visitors, information from the athletics department and Emporia Visitor's Bureau was used in addition to the information obtained from the student and faculty survey. Visitors whose primary purpose of visiting Emporia were for attending an event or activity sponsored by ESU and were less likely to be reported either by the athletics department or by the student/faculty survey were included from the information provided by the Emporia Convention and Visitor's Bureau. Daily visitor expenditures by category were determined based on information provided by the Emporia Convention and Visitor's Bureau (Kansas Department of Commerce and Housing, 1998) and from the authors' personal discussions with the experts in the hospitality industry in town. Table 2, Section B reports information on visitor expenditures. In FY 2000, 113,851 local and 26,961 out-of-state visitors visited Emporia to attend University-sponsored activities or events. On the average, local visitors stayed 1.91 days and out-of-state visitors stayed 2.89 days per visit. Average expenditures per day per visit for local visitors and out-of-state visitors were \$30.42 and \$121.03, respectively. Total visitor expenditures were \$15.25 million in FY 2000 and more than 56 percent of this expenditure was made by out-of-state visitors.

IV. ECONOMIC IMPACT OF UNIVERSITY EXPENDITURES

The impacts of expenditures by the University and its community have different affects on the local and state economy. Economic impacts are translated through the effect of multipliers. Expenditures on sectors associated with high multipliers would transmit higher economic impact than sectors with low multipliers. Multipliers used in this study are provided by the RIMS-II, Bureau of Economic Analysis, Washington D.C.¹ These multipliers were generated based on Input-Output model of Kansas' economy linked to the national economy. Of the two sets of multipliers provided by RIMS-II, this study uses final demand multipliers for output, earnings, and employment aggregated for 11 row and 38 column industries. These multipliers were obtained for both Lyon County and the State of Kansas.

In order to apply RIMS II multipliers (using 'changes in the bill-of-goods' method) all purchases/expenditures were converted into regional purchases in producers' prices and then multiplied by the final demand multipliers for output, earnings, and employment to yield the impacts.² Table 3, column 2 displays the disaggregation of the University's total expenditures into nine economic sectors, which is derived from an aggregation of 38 regional economic sectors (RIMS II). At first, information on each item of the University expenditure and associated object code (maintained by the ESU budget department) was collected from the University budget office and other ancillary units for FY 2000. These expenditures were then identified with the 91-industry groupings (also called economic sub-sectors) based on Standard Industrial Classification (SIC) Code as per detailed list provided by BEA for their input-output model. Once all expenditures are assigned to one of those 91-industry groupings, they were aggregated to 38 sectors (RIMS II), for which multipliers are available. However, before applying multipliers to these 38-sector expenditures, these sectors were further aggregated to 11 sectors (RIMS II), which are reported in column 2 of Table 3. Although RIMS II provided multipliers for 11-row industry aggregation, economic sectors in this study are represented by only nine aggregated sectors instead of eleven in Table 3. This is because no University expenditures were reported for 'Mining;' and 'Wholesale' and 'Retail' sectors are aggregated to 'Trade' sector thereby reducing the total number of sectors to nine in our analysis. Not all of the University expenditures were made in state, because some goods and services were purchased from out of state hence, those expenditures would not have any impact on the state economy. For example, most of the expenditures related to supplies for bookstore and dining services (owned by Sodexho) were made

¹ Benchmark Input-output Accounts of the US-1992, US Dept. of Commerce. Economics and Statistics Administration. Washington D.C. 20230.

² Regional Multipliers – a User Hand Book for the Regional Input-output Modeling Systems (RIMS II), Third Ed.

out of state while only operating expenditures were made locally. After consultation with the officials at the University budget department, athletics department, bookstore, and dining services it was determined that on average (except for certain sectors) eleven percent of all University expenditure went out of state. Furthermore, a major part of the University expenditures were made in Lyon County. The percentage of total in-state expenditures made in Lyon County was determined based on information collected from the University registration office, budget office, and the student survey. Column 2 of Table 3 reports total expenditure (instate and out of state) disaggregated to nine economic sectors. Column 3 and 4 of Table 3 shows expenditures made at Lyon County and in the State of Kansas, respectively, on those nine economic sectors. In FY 2000, the University's direct total expenditure was \$138 million out of which \$125 million was expended in Kansas including the \$76 million in Lyon County (Table 3). In FY 2000 the University and its ancillary units hired a total of 1,866 full and part-time employees.

Table 3: Direct Expenditures by Economic Sectors for FY 2000

Economic Sectors	Total Direct (millions \$)	Lyon County (millions \$)	Kansas (millions \$)
1. Agriculture	0.073	0.007	0.066
2. Construction	2.955	0.251	2.513
3. Non-durable	18.511	5.595	15.035
4. Durable	13.694	3.996	13.034
5. Transportation and Public Utility	13.107	6.546	11.784
6. Trade	0.353	0.058	0.584
7. F.I.R.E ^a	28.327	7.672	22.721
8. Services	16.328	11.232	15.272
9. Household	44.514	40.312	44.514
Total	137.865	75.669	125.523

^a- Finance, Insurance & Real Estate

Using final demand interindustry coefficient matrix, the indirect and induced impacts of University expenditures were calculated. These indirect and induced impacts are the result of re-spending of businesses and household incomes. The re-spending would continue to impact Kansas' economy by creating employment, increasing state economic output, and increasing household incomes. Table 4, Section A shows the estimated impacts of final demand multipliers for output, earnings, and employment for Lyon County and Section B shows similar impacts for the Kansas'

economy. The aggregation of expenditures from 38 sectors to 9 sectors was done after we applied multipliers to each of those 38 sectors. The University's direct expenditure of \$76 million in Lyon County (Table 4, Section A) generated an indirect and induced effect of \$80 million output, \$20 million earnings, and 1,084 jobs locally. These indirect and induced impacts, when added to the initial changes, yielded \$156 million in output, \$60 million in earnings, and 2,228 jobs in Lyon County. The two most important economic sectors in Lyon County are the service and household sectors. These two sectors together generated \$45 million in output, \$13 million in earnings, and 827 jobs in Lyon County.

Table 4: Effect of University Expenditures on Output, Earnings, and Employment in Lyon County and Kansas, FY 2000 (Using Final Demand Multipliers)

Section A: LYON COUNTY				
Economic Sectors	Direct Expenditure (million \$)	Impacts		
		Output (million \$)	Earnings (million \$)	Employment (jobs)
1. Agriculture	0.007	0.012	0.002	0.1
2. Construction	0.251	0.365	0.109	4.4
3. Non-durable	5.595	10.931	1.551	78.5
4. Durable	3.996	5.898	1.406	41.5
5. Trans. & P. Utility	6.546	9.309	2.200	77.7
6. Trade	0.058	0.081	0.023	0.8
7. F.I.R.E	7.672	9.209	1.317	53.9
8. Service	11.232	16.945	5.485	416.2
9. Household	40.312	27.689	7.667	411.3
Sub-total	75.669	80.409	19.760	1,084.5
Add Initial Change	---	75.669	40.312 ^a	1,144 ^b
Total Impact		156.078	60.072	2,228

Section B: KANSAS				
1. Agriculture	0.066	0.167	0.036	2.0
2. Construction	2.513	5.499	1.587	64.7
3. Non-durable	15.035	37.522	7.149	317.0
4. Durable	13.034	23.892	3.934	146.1
5. Trans. & P. Utilit	11.784	22.818	4.852	171.8
y				
6. Trade	0.584	1.061	0.299	10.4
7. F.I.R.E	22.721	38.756	7.617	305.9
8. Service	15.272	30.476	9.071	578.9
9. Household	44.514	57.170	15.082	732.2
Sub-total	125.523	217.361	49.627	2329.1
Add Initial	-----	125.523	44.514 ^c	1,866
Change				
Total Impact		342.884	94.141	4,195

'a'- Direct household earnings

'b'- Approximately 29% of 879 student workers and 90% of 987 faculty and staff employed

by the University in FY 2000 resided in Lyon County

'c'- Direct household earnings

Table 4, Section B shows the University's direct expenditure of \$125 million in Kansas, yielding \$343 million in output, \$94 million in earnings, and creating 4,195 jobs in the state economy. For the Kansas economy as a whole, the service and household sectors had the most significant impact from direct expenditure by the University. The University's expenditure of \$60 million in these two sectors generated \$87 million in output, \$24 million in earnings, and 1,311 jobs. The University's output multiplier was calculated as 2.74 and the household income multiplier as 1.36. This implies that for every dollar of direct expenditure by the University there will be an additional \$1.74 output and \$0.36 household income generated in the state economy. The University's initial employment of 1,866 full and part-time employees would generate 4,195 jobs in the economy leading to University's direct employment multiplier as 2.25.

V. ECONOMIC IMPACT OF BUDGET REDUCTIONS

In this section an effort is made to interpolate the economic impact of University budget reductions in FY 2002-3 based on multipliers used for FY 2000. Because of state fiscal shortfall, the University's budget for FY 2002-3 is reduced by \$2.904 million. Using similar analysis (discussed above) it is possible to calculate the impact of the University's budget reductions on output, earnings, and employment in

Kansas' economy. Information gathered from interviews with the University's budget officials revealed that budget reductions occurred mainly by delayed purchase of technical equipments (durable/non-durable sector) and maintenance activities, delayed hiring of faculty and staff (household sector), and reductions in business service expenditures. A total of \$2.904 million has been reported as the University's budget reductions for FY 2003. Table 5 reports sectoral direct expenditure decrease and its impact on

Table 5: Impact of University Budget Reductions on Output, Earnings, and Employment in Kansas, FY 2003 (Using Final Demand Multipliers)

Economic Sectors	Direct Expenditure (million \$)	Impacts		
		Output (million \$)	Earnings (million \$)	Employment (jobs)
1. Agriculture	0.0000	0.000	0.000	0.00
2. Construction	0.0000	0.000	0.000	0.00
3. Non-durable	0.0100	0.016	0.004	0.13
4. Durable	0.4758	0.874	0.208	7.64
5. Trans.&P.Utility	0.1050	0.196	0.036	1.21
6. Trade	0.0000	0.000	0.000	0.00
7. F.I.R.E	0.0000	0.000	0.000	0.00
8. Service	0.9547	1.832	0.598	27.81
9. Household	1.3585	1.346	0.355	17.24
Sub-total	2.9040	4.264	1.201	54.03
Add Initial Change	-----	2.904	1.358 ^a	12.00 ^b
Total Impact		7.168	2.559	66.03

'a' Direct household earnings

'b' Direct loss of full-time administrative positions due to delayed hiring

output, earnings, and employment in Kansas. The largest impacts occurred in household, service, and durable manufacturing sectors. The University's direct expenditure reductions of \$2.904 million generated an indirect and induced effect causing a reduction of \$7.168 million in output, \$2.559 million in earnings, and 66 jobs in Kansas. The University's output multiplier for budget reduction is calculated as 2.46 and the household income multiplier for budget reduction is calculated as 1.26 (Table 5). This implies that every dollar of University budget reduction would reduce output by an additional \$1.46 and for every dollar reduction in household income earned at the University would reduce an additional \$0.26 in household earnings in

Kansas. It is interesting to note that while the University's direct expenditure multiplier for output is 2.74 (Kansas), the output multiplier for budget reduction is 2.46. One of the reasons for a lower output multiplier for budget reduction might be that the majority of the University's budget reductions occurred where sectoral multipliers are smaller. As a consequence of these budget reductions, employment in the state would decline by 66 jobs. The largest decline in sectoral employment occurred in service sector (28 jobs) and the statewide household income is projected to decline by \$2.559 million (Table 5).

VI. SUMMARY AND CONCLUSION

This study examines the interlinkages of Emporia State University with the local and state economies of Kansas for FY 2000. The University's output multiplier is estimated as 2.74. This indicates that \$125 million direct expenditures yield \$343 million economic activity throughout the state's economy. The direct employment multiplier for the University is estimated as 2.25, which indicates that for every job the University creates there are additional 1.25 jobs created in the economy.

Following a similar procedure this study also calculates the impact of the University's budget reductions for FY 2003 on output, earnings, and employment. It is estimated that the University's direct expenditure reduction of \$2.904 million would reduce output by \$7.168 million, earnings by \$2.559 million, and would reduce 66 jobs in Kansas. The study found that the multipliers for output and household income for the University's budget reductions are lower than for the University's direct expenditures. For example, the University's household income multipliers for direct expenditures and for budget reductions (Kansas) are 1.36 and 1.26, respectively. This implies that a dollar increase in the University's expenditure would increase household income by \$0.36 but a dollar decrease in the University's expenditure would decrease household earnings by \$0.26. The intuitive explanation for this is that, the University's budget cuts affect those economic sub-sectors within the household sector where the multiplier effects are smaller.

This study is a fairly conservative estimate of Emporia State University's impact on the local economy because the impact of federal and state tax revenues generated by the activities of University and the benefits of lifetime earnings by the ESU graduates are not included in the study. However, the results of this study found substantial economic linkages exist between the local and state economy and the Emporia State University. The economic linkages are often neglected during legislative hearings and public opinion polls. The importance of the current study lies in its empirical application and interpretation of the income, output, and employment

multipliers representing the general magnitude of such influences by an average regional university of similar size, mission, and funding on the local economy.

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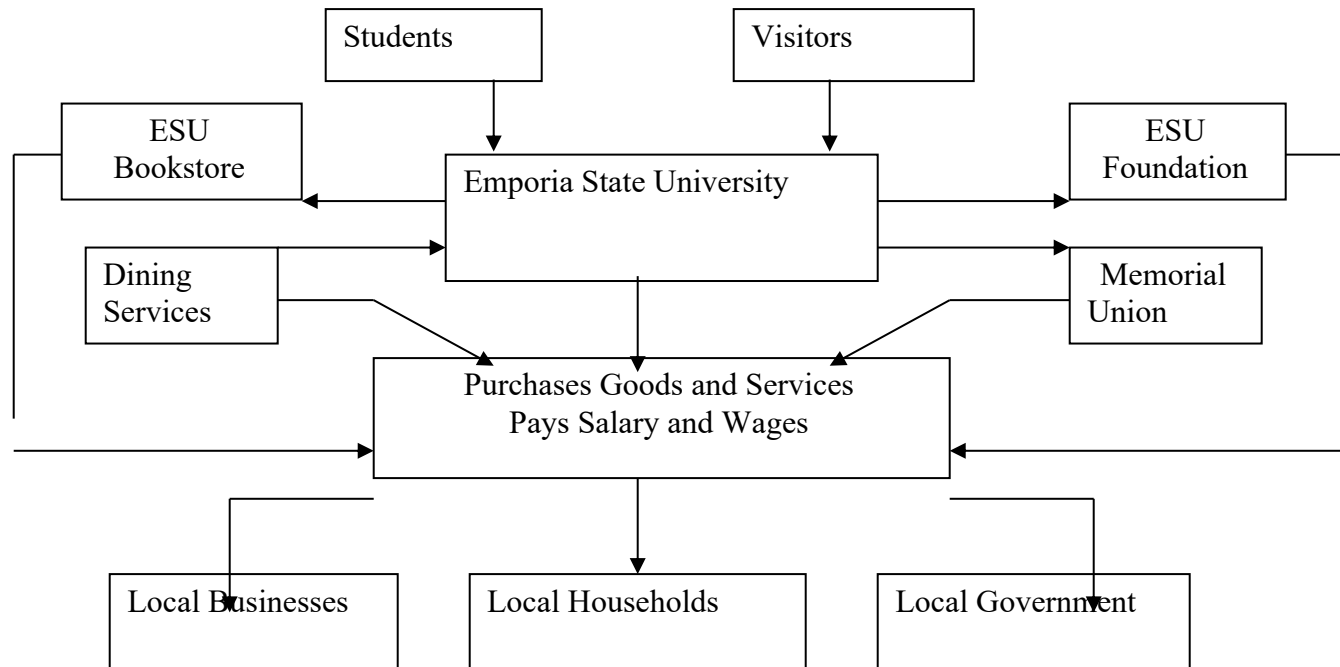
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Figure 1: Flow Chart for Impact of ESU and its Ancillary Units



APPENDIX 1: Simple Input-Output Model

Let X_j = Total output of sector j

x_{ij} = Flow of input from sector i to sector j

Y_j = Total final demand or consumption for j 's product such that we can write:

$$X_j = x_{j1} + x_{j2} + x_{j3} + \dots + Y_j$$

$$X_j = \sum_j x_{ij} + Y_j \quad i, j = 1, \dots, n \quad (1)$$

Let $a_{ij} = \frac{x_{ij}}{X_j}$

Where a_{ij} is the direct requirement coefficient i.e. purchase by sector j from sector i to produce \$1 worth of output by sector j , and X_j is the value of total output by sector j .

$$X_j = \sum_j \left(\frac{x_{ij}}{X_j} * X_j \right) + Y_i \quad (2)$$

$$X_j = \sum_j a_{ij} X_j + Y_i \quad (3)$$

$$\left(I - \sum_j a_{ij} \right) X_j = Y_i \quad (4)$$

Let $A = (n \times n)$ matrix of direct requirement coefficient of a_{ij} ,

$X = (n \times 1)$ vector containing total output of n sectors,

$I = (n \times n)$ identity matrix

Then, $(I - A)X = Y \quad (5)$

$$X = (I - A)^{-1} Y \quad (6)$$

Matrix X shows the effect on the regional economy from changes in sales to final demand.