SWT and San Marcos
An Economic Impact Analysis
1990

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Introduction

At the request of President Robert Hardesty of Southwest Texas State University, the economic relationship between Southwest Texas State University and San Marcos was studied for fiscal year 1985. This study was carried out through the use of the Caffrey-Isaacs cash flow model. In the 1985 fiscal year the university dominated the local economy.

In the fall of 1990, at the beginning of fiscal year 1991, a request was received from the office of President Jerome Supple that the study be repeated. This is the report of the second study. Given the time frame of the request, and the necessary time to conduct the study, the second study covers fiscal year 1990. It does, however, use the same methodology as the 1985 study. Small changes have been made in the computation and presentation of the results of the study. Changes in the data, 1990-1985, and an effort to clarify some of the results of the study are the reasons for the modifications. There were no modifications made that would interfere with the validity or comparability of the data. In fiscal year 1990, the university had expanded its total and relative contribution to the local San Marcos economy. The dominance indicated the 1985 study had become even more pronounced.

Methodology

As mentioned above, the methodology used is that of the "Caffrey-Isaacs" cash flow model. This model was suggested by the authors in 1971 and has gained wide acceptance as the method of choice for this type of study. The model itself is divided into sub-models and this style of presentation adds to the ease of

computation and the clarity of the results. The entire Caffrey-Issacs model and the modified San Marcos model are presented as Appendix A.

However, a brief description of the model would appear to be in order and is as follows. The university contributes to the San Marcos economy society, through the expenditures of the students, the faculty and staff, the university itself, and university-related visitors to the area. These are the sources of primary expenditures.

A primary expenditure is income to someone or some enterprise within the local economy and is therefore spent again. This gives the primary expenditure a multiple impact. The size of the multiple depends on the openness of the local economy. In a small open economic society such as San Marcos, the multiplier is small. The multiplier becomes larger as the size of the economic area expands. Thus, the world is a totally closed economy, the United States less so, Texas even smaller, and San Marcos very small. Therefore the size of the world multiplier is larger than the United States multiplier which is larger than the Texas multiplier etc. The size of the multiplier also depends on the interdependence between economic sectors and the productive linkages that have developed. Few linkages have developed. The multiplier derivation in 1990 revealed that the size of the multiplier had not changed. Each dollar of university-related expenditures generated an additional $0.70. Thus the business volume created by one dollar expenditure was $1.70. The multiplier computation is presented as Appendix B.

The model also considers the university's impact on local governing units. Both the revenue generated by the university, the university employees, and the secondary and tertiary revenue that comes from university-related expenditures, and the cost to local government of the university's presence are computed by the model. Often there is a bone of contention between the university and the local citizens as to the tax exempt nature of university buildings and other real estate. The model does allow for the computation of this cost.

Data Sources

Data to execute the model were gathered and computed from the following sources. The faculty/staff data was gathered from a consumer survey sent to all faculty/staff of Southwest Texas State University. The response rate was adequate to infer total expenditures by specified category for the university faculty/staff. The student body was so large as to preclude a survey of all students, over 20,000, so a representative sample of this group was surveyed. The sample determination, the computation of the level of confidence, and the degree of precision, is presented as Appendix C. The university provided the data as to university expenditures and the university business that was forgone by the local business community.

Tax and enterprise revenues that were generated by university business were gathered from the various offices of local government. Total university costs to local government were also gathered from the official documents of local governments and the

local government offices (Appendix C).

Results

Model Sector 1 A

LOCAL EXPENDITURES BY UNIVERSITY RELATED VISITORS

The university is a center for various athletic and academic activities. These activities bring visitors to San Marcos from various geographic localities outside the city. Examples of university activities which produce out-of-town visitors are athletic events, university workshops, university recruitment, book company representatives, etc. Other university-related visitors to San Marcos are relatives and friends of the students, faculty, and staff. The expenditures of all university-related visitors for food, lodging, gasoline and incidentals are a part of the overall economic impact of the University on the San Marcos economy. The data used to measure the magnitude of these expenditures were gathered from questionnaires. Questionnaires were sent to a sample of students, all faculty and staff, administrators, university support services, and academic departments at the university (student sample size, confidence levels, and levels of precision are explained in appendix C). The expenditure levels derived from the surveys are presented as Table 1.

TABLE 1
Visitor Expenditures - FY 1990

Faculty and Staff	$ 534,193
Students	3,919,408
Other University Visitors	7,421,982
Total Visitor Expenditures	$11,875,583

Source: Questionnaires

University-related visitor expenditures accounted for $11,875,583 in fiscal year 1990. The University accounted for the greater number of visitor expenditures ($7,421,982) followed in importance by the student contribution ($3,919,408), (Table 1). The faculty/staff were responsible for an additional $534,193. This category of expenditure had declined in the 5 year interim 1985-1990.

Expenditures by this group were $13,182,898 in 1985 (Table 1-1985 study). Thus, this class of expenditure had decreased over $1.25 million, for a decrease of about 10 percent.

SECTOR 1 B

EXPENDITURES BY STUDENTS

Student expenditures contribute a greater amount to the San Marcos economy than does any other sector of the university. Although the contribution per individual student may be less than a member of the faculty and staff, the number of students more than compensates. Table 2 presents the contribution in expenditures by the student population by class of student for fiscal year 1990.

TABLE 2
Student Expenditures

Non-local students	$ 8,893,941
Local Non-dorm students (rent not included)	52,220,784
Rent	17,189,970
Local Dormitory students	8,903,916
Total	$87,208,611

Source: Questionnaires

The level of expenditure per student, relatively and absolutely, varies with the student's place of residence. Those students who live off campus, but in San Marcos, contribute the

greater amount to local business. This contribution was $52,220,784 in expenditures for goods and services except for rent, and $17,189,970 in rental expenditures in 1990 (Table 2). The other residence categories of students contributed less but they were still important contributors to the San Marcos business volume. These contributions were $8,903,916 by dormitory residents and $8,893,941 by commuting students (Table 2). The students then accounted for $87,208,611 in total expenditures in 1990.

The students themselves could be counted in an economic analysis as being an Industry with an after-tax payroll of $87,208,611. In keeping with current local government location policy, this payroll could be viewed as being generated by a firm with a permanent tax abatement.

OTHER UNIVERSITY-RELATED EXPENDITURES AND TOTAL UNIVERSITY-RELATED EXPENDITURES - FY 1990

The students are not, of course, the sole contributors to the San Marcos business volume. About 811 faculty and 1055 staff members worked at the university in 1990. Of these employees, some 59 percent lived in San Marcos and the balance commuted from outside the corporate limits of the city. These individuals expended $28,301,311 in 1990.

The university, although it is restrained by law as to some purchases, also purchases some goods and services in the local community. The purchasing office records show that these purchases were $14,193,776 in FY 1990. Thus the combination of students, faculty, staff, and Southwest Texas itself accounted for a substantial volume of business in 1990. When this total amount is

multiplied by the local economy multiplier then the overall impact of the University on the local community can be assessed. Table 3 presents the direct business volume by category, the total of the categories, the amount of derived business volume and the total direct and derived business volume.

TABLE 3
Direct University-Related Expenditures, Derived Expenditures, and Total University-Related Business Volume in San Marcos - FY 1990

Visitors	$ 11,875,583
Students	87,208,611
Faculty/Staff	28,301,311
Other University	14,193,776
Total	$141,579,281
Derived	99,105,497
Total Direct and Derived	$240,684,778

Source: Tables 1 and 2, Appendix C

Summary of Sector I

The direct university-related expenditures, the derived expenditures, and the resulting university-related business volume reported in Table 3, show that the university community makes a substantial economic contribution to local business volume. The total level, direct and derived of business volume, $240,684,778, represents 49.4 percent of all business volume in San Marcos. It would require substantial industrial development to provide an impact of this magnitude.

Sector II

UNIVERSITY-RELATED BUSINESS INVESTMENT

Business volume generates related business investment in inventory, furniture, fixtures, and structures. These real investments in turn generate a real property tax base for local

government. Taxes assessed and collected from this base defray some of the cost of government services to the university community. This sector of the model estimates the local tax revenue from this tax base.

The local business community does not, of course, set aside a portion of its real asset investments as being dedicated to university business. It is necessary, therefore, to devise a procedure to compute this value. The procedure used in this model is described as follows.

Local business volume for 1990 was obtained from the Texas State Comptroller's Office. Then data as to the value of the total local inventory, furniture, fixtures, and buildings, were collected and the ratio of university-related business volume to total business volume was applied to these data.

The assessed value of all business investment was reported as $143,667,970 in buildings and $42,25546 in other property. The ratio of university-related business ($240,044,386) to all local business ($485,479,478) was 49.44 percent. Thus, the property dedicated to university-related business was $71,036,349. (See Appendix A for further calculations).

Sector III

UNIVERSITY-RELATED EXPANSION OF THE LOCAL CREDIT BASE

Another economic sector which is benefitted by the university's presence is the local financial sector. The university, faculty/staff, students, and a portion of local business deposits are attributable to the university's presence in

San Marcos. These deposits are accompanied by reserves which allow local financial institutions to expand credit locally and elsewhere.

The average deposits of the university-related group are presented as Table 4. The university deposit was obtained from the SWTSU financial office. Students and faculty/staff deposits were obtained from questionnaires and the university-related business deposits were computed from a ratio of cash on hand to business volume (see Appendix A). The total value of these combined deposits was $83,518,190.

TABLE 4
University-Related Expansion
of the Local Credit Base (Average Deposits)

University	$25,000,000
Faculty/Staff	11,328,486
Students	8,022,491
University-Related Portion of Business Deposits	39,167,213
Total	$83,518,190

Source: University Financial Office, Faculty/Staff and Student Questionnaires

Given that there is a deposit reserve requirement, not all of the reserves generated by these deposits are available for credit base expansion. Using reserve requirements information obtained from the Federal Reserve Bank in Dallas and applying the reserve ratio to the level of reserves that accompany university-related deposits, a credit expansion of $81,012,644 by local financial institutions is possible. If total credit expansion occurs, and the desired net bank spread of 2.5 percent to 3 percent is achieved, university-related financial activity generates from

$2,025,316 to $2,430,379 in net income to local financial institutions. The above profit level would be possible under ideal conditions.

Sector IV

UNREALIZED BUSINESS

University, faculty/staff, and student expenditures do enter into the flow of business in San Marcos. There are, however, some university activities which are quasi-business and possibly compete with local business. The university activities which are of this nature are primarily the university book store and dormitories. If the university did not operate these enterprises, the students, faculty/staff, and university expenditures for those items provided by the university would enhance the overall volume of business.

The absolute level of enhancement would be $9,504,289. On a relative basis this is about 2 percent of the total local business volume. This relative value leads to the conclusion that the competition between the quasi-business operations of the university and the local community is minor.

Sector V

IMPACTS ON GOVERNMENT REVENUES

In addition to the previously-mentioned contributions that students and faculty/staff make to the volume of business in the local community, they also pay fees, fines, and taxes directly. They are also responsible for some revenues to the city indirectly. This sector of the model addresses these phenomena.

Sector Va

UNIVERSITY-RELATED FEES, USER CHARGES AND TRAFFIC FINES

This sub-sector assesses the estimated revenues that are generated for local governments from the university community through the payment of automobile registration fees, user charges for utilities, and traffic fines. The absolute amount of expenditures and the components of the expenditures are presented as Table 5.

The contribution from the sources above to the local government was substantial. The total contribution in the 1990 version of this sector is not comparable to the 1985 version. The city of San Marcos purchased the electric utility in 1986. The contribution of the university-related activities is therefore not confined to fines, fees etc., but includes the user fees paid to the city-owned utility.

TABLE 5
Miscellaneous Local Revenues
to Local Government from University
Community Payment of Fees, Fines, etc. 1990

Auto Registration (students, faculty)	$ 89,003
User Charges for Utilities, Sewer	10,903,308
Assessment charges paid by the University	5,442,731
Traffic Fines (students, faculty)	94,849
Total University-Related Govt Revenue	$16,529,891

Source: City Budget, Table 3, SWTSU Financial Office, data from State Comptroller's Office

The local government received revenues in the amount of $16,529,891 in 1990. The largest single expenditure class was user fees for electricity, water, and sewer. The students, faculty, staff, and the related business volume generated about 65 percent of the

university-related revenue through their purchases of these services. Other contributions were in the order of magnitude: the university--32 percent, traffic fines--7 percent, and auto registration--6 percent (Table 5).

Sector Vb

UNIVERSITY-RELATED INTERGOVERNMENTAL TRANSFERS

This sub-sector divides the flow of intergovernmental funds between the university-related group and the non-university-related group. The amount of university-related funds was computed by applying the ratio of local university residents to all residents to total intergovernmental payments from the local government budgets. The amount of funds attributable to the university was $243,431.

Sector VI

UNIVERSITY-RELATED TAX REVENUE

This sector estimates the tax revenue paid and generated by the university community. The taxes estimated in this sector consist of: (1) sales taxes, (2) property taxes on inventory, and (3) real estate taxes. Table 6 presents the university-related tax revenues from the various sources above.

The city collects a one percent sales tax on the items that are sold in the corporate limits of San Marcos. The portion of these taxes that was attributable to the university through direct sales and derived sales was $1,655,257 in 1990 (Table 6).

The business community devotes a portion of its inventory to accommodate the university-related business volume. The taxes on

the value of this volume of inventory was $280,999 in 1990.

TABLE 6
Total Tax Revenues Paid and Generated by University-Related Business Volume to Local Government Units, 1990, Excluding Public School Taxes

Sales Taxes	$1,655,257
Inventory Taxes on Univ.-Related Business	280,999
Real Property Taxes Paid by Business	2,961,412
Real Property Tax Paid by Students	35,286
Real Property Taxes Paid by Faculty/Staff	490,410
Total Tax Revenues to Local Government	$5,423,864

Source: Computed from Questionnaires and State and Local Budgets

The business community also pays real estate taxes on the investments that are required to maintain the sales volume, direct and derived, that comes from university-related activities in the local community. In 1990 this contribution to the revenues of local governments was $2,961,412 (Table 6).

The magnitude of the real property taxes paid directly by real property owning students was relatively small in 1990-- $35,286. It is, however, necessary that they be considered when the total contribution of the university community is being considered.

As expected, the faculty and staff make a greater contribution to real property tax revenues. They are a part of the permanent, stable, local population. This contribution amounted to $490,410 in 1990.

The total tax revenue generated by the university and related activities was $5,423,864 (Table 6). This amount excludes taxes paid to the local school district. Schools in Texas are independent government agencies separate from the city and county and perform a separate and distinct function and are therefore assessed

separately.

PUBLIC SCHOOL REVENUE CONTRIBUTIONS

Southwest Texas State University, its employees, and the students contribute to the revenues of the public schools in two separate ways. There is a head count contribution, as state and federal aid are allocated to the district in this manner. Thus, the children of faculty, staff, and students earn revenue for the school district in this manner. The survey questionnaire indicated that there were 561 of these children in 1990. This is 10.2 percent of the students that attended the San Marcos Independent School District. The outside revenue reduces the local cost of public schools, so the revenues were computed on a local contribution basis.

Total university-related tax revenues were $2,765,341. Total local tax revenues were $11,744,249, therefore the university contribution was only 24 percent. The university and university-related activities account for about 49 percent of business and therefore it would appear that this contribution is low. The explanation probably lies in two reasons. The SMISD is not contiguous with the city of San Marcos and the property of the balance of the residents has more value of the property occupied by the students.

Summary of Sectors V and VI

Sectors V and VI specify local government revenues received as a result of Southwest Texas State University's presence in San Marcos. These revenues are paid directly and indirectly through

business volume generated by the university, faculty/staff and students. Sector V accounts for intergovernmental funding from all sources and also accounts for user charges, fines, fees, and other revenue sources. These data are estimated on the basis of head count of the university population and the student and faculty/staff questionnaires.

Sector VI accounts for tax revenues. These are the tax payments paid directly by the students and faculty/staff plus the amount of derived taxes paid by businesses on behalf of university-related business volume. The two sectors account for most of the government revenue that is received by the city, county, and the independent school district as a result of the presence of Southwest Texas State University.

SECTOR VII

THE COST OF UNIVERSITY-RELATED GOVERNMENT SERVICES

Government is necessary to all economic societies. It provides not only the services that are of a pure public nature, but the populace also demands that they provide some merit and other goods and services as well. This required provision of government goods and services carries significant cost. The population of the university, with the large number of students, faculty, and staff, imposes significant cost on the local community. Sector VII addresses this phenomenon.

SECTOR VIIa

UNIVERSITY-RELATED SCHOOL COSTS

University-related school children add to the cost of the

public school operation. This additional local cost was $1,193,789 in 1990. The expense incurred by the local school district on behalf of university-related children was computed by the simple method of calculating the local school district average cost per student and multiplying this cost by the number of student and faculty/staff public school students. The number of university-related public school students was estimated from the sample data.

SECTOR VIIb

OTHER UNIVERSITY-RELATED LOCAL GOVERNMENT COSTS

In addition to the added cost to the locality of university-related public school children, the added population of students and faculty/staff require additional county and municipal expenditures. This sub-sector (sector VIIb) of the model estimates the magnitude of these costs. The costs in this sector are assigned on the average cost method. The average cost of public services was applied to the dorm students, the off campus local resident students, the local resident faculty and staff, and one-half of all others.

On this basis, the cost of local government services that are chargeable to the university's population is $21,635,837. The total costs incurred by these computations, for local government and public schools were $22,829,626.

SECTOR VIII

GOVERNMENTAL CAPITAL ALLOCABLE TO THE UNIVERSITY

In addition to the required current government expenditures for ongoing services, the local municipality, county, and school

district are required to provide for a capital structure--roads, buildings, machinery, etc. The model used does not allow for the computation of costs at the marginal or incremental cost of growth. The model merely assigns a portion of the existing capital structure to university population. This assignment was done on the same basis as the budget assignments above. Table 7 presents the results of this assignment. This table presents the total value of the government capital as well as the university's portion of this cost.

TABLE 7
The Value of Assignable Government Capital and the Value of the University Related Part 1990

Government Property(except school property)	$70,451,746
School Property	40,458,640
University Related Population Part	34,468,934

Source: Financial Offices of City, County, and School Districts

The university-related part of the capital of the city, county, and school district was $34,468,934. This was about 34 percent of total local capital.

SECTOR IX

REAL ESTATE TAXES FORGONE

The real estate that any university occupies is a concentration of relatively expensive structures. This gives rise to the idea that a locality is subject to a monster that pays no real estate taxes, which of course would be forthcoming if it were not tax exempt. However, this model takes a more rational approach to the matter of taxes forgone. It simply assesses the forgone taxes if the acreage had developed as the rest of the locality has.

Southwest Texas State University occupies 375 acres or 3.3 percent of the surface area of the local municipality. Total real estate tax revenues collected by the governing units was $9,967,901. The taxes forgone then amount to $580,043.

SECTOR X

SELF-PROVIDED MUNICIPAL SERVICES

The municipal cost of the university is overstated by the extent that the university provides municipal services for itself. These self-provided services are a reduction in the costs of the university to the locality. The university provides for itself police and sanitation services. The cost of these services to the university were $813,000 for police and $123,250 for sanitation respectively. Thus, total provision of services by the university was $936,250.

SECTOR XI

IMPACT ON INDIVIDUALS

Industrial development is important because the presence of an industry generates jobs for workers and the accompanying personal income. Sector XI provides information on university job creation and personal income.

Each dollar of total business volume is responsible for some percent of a job. The ratio of jobs to dollars of total business volume was computed (see Appendix A) and applied to total university-related business volume. This calculation estimates the number of jobs in the area that are the result of the university's presence. The number of jobs was computed to be 6481 in 1990. This

was 49.4 percent of employment in the local area.

Industrial development also raises questions regarding its impact on personal income. The ratio of personal income (earned income) to total expenditures was calculated as described below.

Earned income was obtained from the Office of Business and Economic Research. The per worker earned personal income in Hays county was computed and the number of jobs derived from university-related business activity was multiplied by the average personal income per worker. This procedure determined that the level of personal income attributable to the university was $106,056,861.

Sector XII

DURABLE GOODS PROCURED WITH UNIVERSITY-GENERATED INCOME

The extent of durable goods purchases was computed more as a matter of interest than as an integral part of the impact of the university. It is a sector in the Caffrey-Isaacs model and was computed for the San Marcos Model.

The amount of durable goods purchased with university-related income is estimated to be $2,089,328. The amount is 2.94 percent of the university-generated personal income.

Analysis

It is obvious from the forgoing discussion that the university contributes substantially to the economic well being of the San Marcos economy. Further analysis is required, however, to bring the contribution of and the relationship between the university and the San Marcos economy into sharper focus. Tables 8, 8a, 8b, and 9 present data that are relevant to this further analysis.

Table 8 presents the local business volume, the university-related volume, and the relative value of the university business volume in San Marcos in 1990. The university accounted either directly or indirectly for a little less than 50 percent of all business volume in the city. This university overpowers the locality in which it is located.

TABLE 8
Analysis of the Relationship of
Southwest Texas State University
And San Marcos, TX FY 1990

Total Business Volume San Marcos Texas (Excl.Const.)	$485,479,478
University Related Business Volume	$240,044,386
Percent University	49.44
Construction	
University	
Buildings	$17,866,948
Furniture and Fixtures	$5,733,052
Other San Marcos Construction	$14,355.000
Total	$37,423,500
Percent University	62.2
Rental Income	
Faculty Staff	$ 1,718,016
Students	$17,189,970
Other San Marcos Residential Rent	$7,471,026
Total Rent	$26,379,012
Percent University	71.68

Source: Questionnaires, San Marcos Chamber of Commerce, University Records, and the U.S. Census 1990, Housing Table

This dominance becomes even more pronounced when one considers the construction industry. Central South Texas experienced a building boom from the early 1980's until 1986. As measured by the dollar value of building permits, private construction activity peaked in 1983 and peaked again in 1985 at $34.848 million. The value of this activity had declined to $14.35 million in 1990. The level of university construction was $23.6 in 1990. This was 62.2

percent of the construction expenditures in the city of San Marcos (Table 8).

Another economic sector in San Marcos that the students dominate is the residential rental market. They account for some $17,866,948 in rental income for the San Marcos economy. The student expenditure, when combined with the faculty rental expenditure ($1,718,016), is 71.68 percent of the rental income received in the city (Table 8).

Table 8 provides the evidence that the university is a major force in the local economic scene. The contribution to the local economy is not, however, without cost. Social infrastructure must be provided for the additional population that accompany this type of economic activity. Social services are also required by the additional population. The university community does not escape without paying directly and indirectly some portion of the cost. The tax exempt status of the land and physical plant should not be allowed to cloud the fact that the university, faculty/staff, and students pay taxes directly and indirectly when they pay the utility bill, buy clothing, or make rental payments.

Table 8A presents data as to the magnitude of these costs and the contribution of revenue by the university community to help defray these costs.

TABLE 8A
The University Impact on The Local San Marcos Government
Not Including the San Marcos Independent School District
1990

Impact on Local Government (Excl. Public School)	
Cost of Local Govt Service (Excl. Public School)	$49,730,090
University-Related Revenues	$22,196,686
University-Related Costs	$21,635,837
Net Contribution	560,849
Percent SWTSU Cost	43.51
Percent SWTSU Revenue	44.63

Source: Questionnaires and Various Local Public Documents

Local government costs were $49,730,000 in 1990. This number includes the cost of enterprises operated by the city. They also include the cost of traditional city and county government services. The ratio of the university-related cost to total cost was computed on the basis of head count at the university and in San Marcos. This tends to overestimate the university cost due to the number of commuting faculty/staff and students. The university costs calculated by this method were $21,635,837.

The revenues derived from university-related activities were computed from the student, faculty/staff, and university questionnaires, and various city and county documents. These revenues amounted to $22,196,686. Thus the university-related activity contributed more to the tax and other revenues than the university presence cost. This net contribution was $560,849 in 1990. On a relative basis, the cost of the university for public services was 43.51 percent and the revenue contribution was 44.63 percent (Table 8a).

The university's direct impact on the public school system is through the number of student, faculty, and staff children that

attend these schools. The survey indicated that there were 562 of these students--about 10 percent of the total public school enrollment in 1990. The total cost of the university children can then be computed by multiplying the number of University children by the average local cost per child. The local revenues can be computed as being that part of local real estate taxes that are generated by student, faculty/staff, and university direct and indirect expenditures. Table 8b presents the results of these computations.

Table 8b
Local Revenues and Costs, University Contributions and Costs, Net University Contribution and Percent University Revenues and Cost (FY 1990)

Local Revenues and Costs	$11,744,249
Total University Related Revenue	$ 2,735,641
University Cost	$ 1,193,789
Net Contribution	$ 1,541,852
Percent University Revenue	23.29
Percent University Cost	10.16

Source: Survey Data, Questionnaires, and San Marcos Independent School Data

The age and marital status of the students dictates that they make very little impact on the local school district. It is not surprising that the university makes a substantial net contribution. This contribution can be noted from Table 8b. The contribution was $1,541,842 in FY 1990 (Table 8b).

In the study year, the university not only contributed to the business volume in San Marcos, but made a net contribution to the operating revenues of the local governing units as well. The net contribution to the city and county was positive ($560,849), and the net contribution to the public school district was also

positive ($1,541,842).

Summary of the Contributions of Southwest Texas State University to the San Marcos Economy

The forgoing discussion of the relationship between San Marcos and Southwest Texas State University needs to be put into sharper focus. Table 9 attempts to accomplish this task.

Table 9
Summary
The Contributions of SWTSU to the San Marcos Economy (1990)

Business Volume Generated Directly and Indirectly (not including rents and construction)	$240,044,386
Construction Expenditures	$23,600,000
Resident Rents Faculty/Staff and Students	$18,907,986
City and County Revenue (excluding SMISD)	$22,196,686
SIMSD Revenues	$2,735,641
Personal Income	$106,056,861
Durable Goods Procured	$2,089,328
Number of Jobs	6481

Source: Preceding Tables

The total volume of university business ($240,044,386) accounted for about 50 percent of all business volume in the city of San Marcos. This business volume yielded personal income of $106,056,861 (Table 9). This number includes the university payroll as well as the local income generated by local inputs into the business process. This is the most important number in the study. Personal income measures the economic welfare of individuals within the economic society.

However, the impact of new industry in a location is most often cast in the terms of employment, i.e. jobs created. When the university and related activities are looked at in this light, there were 6481 jobs created directly and indirectly by university

economic activity in San Marcos, Texas (Table 9). This is also about one half of the total employment in the area.

Construction has been continuous over last few years at the university. Southwest Texas State University was desperately short on space whether the need for space was measured on a student count or any other reasonable criteria. The continuous construction is meant to fulfill some part of this need. This type of expenditure was $23,600,00 in FY 1990 (Table 9).

The students who live in San Marcos, but outside the dorm, also dominate the residential rental market. When their expenditure is combined with the faculty/staff expenditure, they account for about 72 percent of this type of income in the San Marcos area (Table 8).

The university-related economic activity also is responsible for a contribution to the financial health of the local and school district governments in the San Marcos area. The activities account for a contribution of $22,196,686 to the city and county in 1990 (Table 9). They also accounted for $2,735,641 in revenue to the local school district.

Changes in the SWTSU-San Marcos Economic Relationship: 1985-1990

The economic slowdown in Texas that began in 1985 and worsened in 1986-1987 and dominates the state at this time, did not spare the San Marcos area. However, the university grew slowly but steadily over this interim, thereby providing a buffer for San Marcos economy. This stabilizing force, of course, became more important in the local economy as other sectors of the economy

declined. This is a primary cause of changes that occurred in the percent of business volume that can be noted in the interim 1985-1990. It is also partially responsible for the shift of the university community from a negative net contribution to the local governments. Other events are also important in the transition of the university from a deficit to a surplus contribution. These changes can best be analyzed by referring to data. Table 10 presents these data.

The only dollar volume decrease that occurred over the five year interim was in the visitor expenditure category. This is probably due to the state-wide recession. Travel is one of the first expenditures to be cut in a recession. The decrease in this expenditure was $1,287,000; this was about 10 percent of visitors' expenditures in 1985.

Table 10
Comparative Statistics Economic Impact (in thousands)

Impact on Business	1985	1990
Visitors Expenditures	$13,163	$11,876
Student Expenditures	$52,440	$87,209
Faculty/Staff Expenditures	$16,149	$28,301
University Expenditures	$7,966	$14,194
University Related Expenditures	$89,719	$141,579
University Related Bus. Volume	$152,687	$240,044
Total Local Business Volume	$329,806	$485,479
Impact on Government		
University Related Revenues	$4,124	$24,932
University Related Costs	$5,385	$22,830
Value of University Self Provided Services	$530	$936
Government Property Allocable to University	$6,156	$34,469
Real Estate Taxes Forgone	$261	$580
Impact on Individuals		
Jobs Created	4639	6481
Personal Income Created	$73,152	$106,057

Source: Highlights 1985 and Impact Model 1990

Student local expenditures however increased substantially. The increase was from $52,440,000 in 1985 to $87,209,000 in 1990. This is an increase of $34,769,000, or 66 percent.

There are several explanations for this increase. Some of these explanations are: 1. inflation, 2. increase in student enrollment, and 3. a change in the residence patterns of the students. Inflation accounted for about 33 percent of the increase in student expenditures. Prices as measured by the CPI increased in the 5 year interim by slightly more than 6 percent per annum. The increase in total students accounted for in the study increased by 2853, from 17,781 to 20,638. This is a percent increase of 16 percent. The residence pattern of the students also changed.

In 1985, 6545 students, or 36.8 percent, lived in San Marcos, off campus. In 1990, this number had increased to 8756. This was a relative change of about 5.5 percent. Off campus students spend more in the local economy than do commuters or dormitory residents. Thus the increase in total students and the increase in the relative number of these students that live off campus has contributed to the increase in student expenditures.

If the residence pattern ratios that were present in 1985 are applied to the student population numbers in 1990, the monthly expenditure by the students will be 14.2 percent lower.

The explanation above accounts for about 63 percent of the increase in student expenditures. This expenditure increased by 66 percent (Table 10). This gives a statistical discrepancy of some 3 percent. This discrepancy is well within the limits for

statistical analyses.

The expenditures of the faculty/staff also indicated a substantial increase in the San Marcos area. If the effects of a 33 percent increase in the price level are discounted, this increase was still about 42 percent (Table 10). Some of this increase was of course due to the increase in the numbers of faculty/staff. This increase in percentage points was 17 percent. On a full time basis, the employment increased from 1346 to 1578 including both faculty and staff (University Fact Book 1984-1985 and 1989-1990).

The distribution between faculty and staff has changed slightly. However this would tend to reduce expenditures if the staff hired were on the lower end of the wage scale. In any case this change would not account for more than a few percentage points of the gain.

The wages at the university have increased but the gross number reflects both the change in numbers hired (17 percent) and the inflation rate (33 percent). When those are taken into consideration the gross compensation increased in net terms by only about 4 percent.

If the faculty/staff had rearranged their living accommodations, this would tend to explain the percentage difference. However the data do not indicate any change in this particular behavior pattern.

The cause of this increase suggests, though there is no statistical evidence to contradict nor support, that more of the

faculty/staff are spending in San Marcos. Perhaps the community shopping facilities have expanded or perhaps the faculty/staff have reordered their preferences.

The local expenditures of the university increased about 78.2 percent (Table 10) over the five year study period. A part of this increase can of course be attributed to inflation. The other would suggest that there are some backward linkages developing with the local industrial structure--that the local businesses are able to supply more of the needs of the university.

The re-computation of the multiplier did not, however, indicate that this was the case. It was the same as before. This could be the fault of the multiplier model. If there were subtle, gradual changes occurring, it would perhaps not be indicated by the model at this time.

The changes above summed to an increase in university-related business volume from about $153 million in 1985 to approximately $240 million in 1990. This was a percentage increase of 57.2 percent (Table 10). Local business volume had grown 47.2 percent in the same interim ($329 million-$485 million).

State-wide data indicate that San Marcos fared better than Texas in the downturn that followed the over-optimistic expansion into oil and especially commercial real estate. In fact, the city of San Marcos in 1990 was considerably ahead of Hays county in business expansion when compared to 1985. If one uses sales growth 1990 over 1985 as a yardstick, the state gained about 18 percent, whereas Hays County gained about 23 percent, and San Marcos gained

about 47 percent (State of Texas Comptroller Quarterly Reports and Estimations, see Appendix A). The university, with its steady growth in student head count, faculty/staff numbers, and university budget, did act as a buffer against the worst of the current recession. The importance of the university did increase. The university-related business volume increased in relative importance from 46.8 percent to 49.4 percent (Highlights 1985 and Table 8a).

This increase in importance as to the business volume is reflected in the government sector. There was an event that occurred in 1986 that tends to make the 1990 data as to the revenue generated and the local cost so different that no strict comparison is possible. This event was the purchase of the local electricity transmission system by the city of San Marcos. This system makes a profit; a portion of this profit is paid by the faculty/staff, the student, and the university user. So, it will be a more useful exercise to compare the net contribution that the university and the related activities make to the San Marcos budget.

The calculation in 1985 indicated that the cost of the university in net terms to all local taxing units was about $1.261 million. This deficit had changed to a net contribution in 1990. The value of this contribution was $2.002 million. The net contribution to the city and county was $560,894 and the balance ($1.542 million) was to the school district. This was a change in the contribution status of the university of some $3,263.

This change can be explained as follows: 1. the profit of the utility mentioned above, 2. the increase in the business taxes that

are attributable to university activity, 3. the addition of the taxes contributed by the students and faculty/staff by means of rental payments, and 4. increases in the tax rates.

The value for the government property committed to university-related business (table 10) also reflects the city's acquisition of the power distribution facility. Therefore it is not comparable to the 1985 value.

The increase in thee value of real estate taxes foregone reflect the change in the assessed value of the local real estate and the change in tax rate. This value increased from $261,882 to $580,043 (Table 10).

The total level of business volume and the other related items above are only important in the context of the impact on the individual. Growth of the total economy is counter-productive if the individual impact is negative.

When a new industry is announced for a locality, the advantages for the local economy are most often couched in terms of jobs created. If this is the criteria, then the university as an industry was responsible for 6481 jobs in 1990. These jobs include those that are created directly as the university hires and indirectly through the expenditure patterns of the faculty and staff. This is an increase of about 1842, or 40 percent (Table 10.)

In my estimation, the statistic that is more vital than the number of jobs created is the contribution that an industry makes to the income of the locality. The university, in all of its

economic aspects, generated $106,056,861 in personal income in the local area. This was an increase of 45 percent (Table 10).

Summary

Southwest Texas State University became more important in the San Marcos area economy in the interim 1985 to 1990. It increased its dominance as the local economy faltered due to a state-wide recession that began shortly after the 1985 study was done. The growth in importance of the university in the local economy highlights its influence as a stabilizing economic force.

This growth in importance was also partially responsible for the additional contribution that the university made to the revenues of the local governing units. Other factors that were partially responsible for the change were the purchase of the local power distribution center and increasing tax rates.

Summary and Conclusion

The university and the related activities that surround it, i.e. students, faculty/staff, etc., overwhelm the city of San Marcos. One half of the business volume, one half of employment, 70 percent of the residential rental income, and 62 percent of the construction were accounted for by the university presence.

The university presence also entails some cost to the city and county in which it is located. The local social overhead capital must be expanded to accommodate the populace. However, in 1990 as opposed to 1985, the university and its related activities contributed more in taxes and other revenues than its presence cost. A part of this contribution arose because the ratio and

absolute number of students that reside in San Marcos off campus housing increased. This group of apartment dwellers spend substantially more money locally, and pay more taxes directly and indirectly. The city of San Marcos also purchased the local power distribution system in 1986. The profit of this enterprise is used to increase the student, the faculty/staff, and the university contribution to the cost of public services and social overhead capital.

When the value of the taxes forgone is computed on a opportunity basis, the taxes forgone by the local governing units is minor relative to the positive contribution of Southwest Texas State University. Perhaps it would be better for the taxing authorities to view the university as an industry with a permanent tax abatement.

In conclusion, from an economic standpoint the fate of the San Marcos economy depends on the fate of the university at this time. Perhaps industrial development will occur which will lessen the dominance of the university; there is no reason that the university could be seen as a barrier to development. There are many reasons that it could be seen as a positive factor in the industrialization process.

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Appendix A

The Caffrey-Isaacs Model, The Southwest Texas State University Model, and a Description of the San Marcos-Southwest Texas University Variables

The Caffrey-Isaacs Model, The Southwest Texas State University Model, and a Description of the San Marcos-Southwest Texas State University Variables

THE CAFFREY-ISAACS MODEL

B-1. College-Related Local Business Volume
- B-1.1. College-Related Local Expenditures
  - B-1.1.1. Local Expenditures by the College
  - B-1.1.2. Local Expenditures by the Faculty and Staff
    - B-1.1.2.1. Expenditures by Faculty and Staff for Local Rental Housing
    - B-1.1.2.2. Local Non-housing Expenditures by Local Faculty and Staff
    - B-1.1.2.3. Local Expenditures by Non-local Faculty and Staff
  - B-1.1.3. Local Expenditures by Students
    - B-1.1.3.1. Local Miscellaneous Expenditures, Exclusive of Room and Board, by Students Obtaining Local Room and Board in Group Arrangements
    - B-1.1.3.2. Expenditures by Students for Local Rental Housing
    - B-1.1.3.3. Local Non-housing Expenditures by Students Who Rent Housing
    - B-1.1.3.4. Local Expenditures by Non-local Students
    - B-1.1.3.5. Local Expenditures by Local Fraternities, Sororities, and other Student Groups
  - B-1.1.4. Local Expenditures by Visitors to the College
- B-1.2. Purchases from Local Sources by Local Businesses In Support of Their College-Related Business Volume
- B-1.3. Local Business Volume Stimulated by the Expenditure of College-Related Income by Local Individuals Other Than Faculty, Staff, or Students

B-2. Value of Local Business Property Committed to College-Related Business
- B-2.1. Value of Local Business Real Property Committed to College-Related Business
- B-2.2. Value of Local Business Inventory Committed to College-Related Business
- B-2.3. Value of Local Business Property, Other Than Real Property and Inventory, Committed to College-Related Business

B-3. Expansion of the Local Banks' Credit Base Resulting from College-Related Deposits

B-4. Local Business Volume Unrealized because of the Existence of College Enterprises

G-1. College-Related Revenues Received by Local Governments
- G-1.1. College-Related Real-Estate Taxes Paid to Local Governments
  - G-1.1.1. Real-Estate Taxes Paid to Local Governments by the College
  - G-1.1.2. Real-Estate Taxes Paid to Local Governments by Local Faculty and Staff
  - G-1.1.3. Real-Estate Taxes Paid to Local Governments by Local Fraternities, Sororities, and Other Student Living Groups
  - G-1.1.4. Real-Estate Taxes Paid to Local Governments by Local Businesses for Real Property Allocable to College-Related Business
- G-1.2. College-Related Property Taxes, Other than Real-Estate, Paid to Local Governments
  - no model Inventory and Other Non-real-Property Taxes Paid to Local Governments by the College
  - G-1.2.1. Non-real-Property Taxes Paid to Local Governments by Local Faculty and Staff
  - G-1.2.2. Non-real-Property Taxes Paid to Local Governments by Local Fraternities, Sororities, and Other Student Living Groups
  - G-1.2.3. Inventory and Other Non-real-Property Taxes Paid to Local Governments by Local Businesses for Assets Allocable to College-Related Business.
- G-1.3. Sales Tax Revenue Received by Local Governments as a Result of College-Related Local Purchases
- G-1.4. State Aid to Local Governments Allocable to the Presence of the College
  - G-1.4.1. State Aid to Local Public Schools Allocable to Children of College-Related Families
  - no model Other State Aid Received by Local Governments on a Per Capita, Service Unit, or Tax Unit basis and Influenced by the Presence of the College
- G-1.5. Other College-Related Revenues Collected by Local Governments

G-2. Operating Cost of Local Government-Provided Municipal and Public School Services Allocable to College-Related Influences
- G-2.1. Operating Cost of Government-Provided Municipal Services Allocable to College-Related Influences
- G-2.2. Operating Cost of Local Public Schools Allocable to College-Related Persons

G-3. Value of Local Governments' Properties Allocable to College-Related Portion of Services Provided

G-4. Real-Estate Taxes Foregone through the Tax-Exempt Status of the College

G-5. Value of Municipal-Type Services Self-Provided by the College

I-1. Number of Local Jobs Attributable to the Presence of the College

I-2. Personal Income of Local Individuals from College-Related Jobs and Business Activities
I-3. Durable Goods Procured with Income from College-Related Jobs and Business Activities

The Southwest Texas State University Model

President's Eco. Study 1990	Estimated Value	Derived Value
Visitor's Expenditures	$11,875,583	$11,875,583
Expenditures of Sororities and Fraternities	0	
Expenditures per non-local student	$1,250	
Number of non-local students	7,118	
Expenditures by non-local students		$8,893,941
Non-housing expenditures per student	$5,964	
Number of students renting housing	8,756	
Non-housing expenditures by renters		$52,220,784
Average rental expenditure per student	$2,415	
Expenditures by students for rent		$17,189,970
Average expenditure by dorm students	$1,869	
Number of dorm students	4,764	
Expenditures by dorm students		$8,903,916
Local expenditures by students and visitors		$99,084,194
Total number of faculty/Staff	1,866	
Percent of Faculty/Staff residing locally	59.3	
Total disposable income of faculty/staff	$40,588,168	
Local non-housing expenditure by faculty/staff		$28,301,311
Expenditures by faculty/staff for rent		$1,718,016
Gross pay to faculty/staff, students	$52,711,906	
Local Expenditures by the University	$14,193,776	$14,193,776
Total college related direct expenditures		$141,579,281
Spending multiplier (decimal)	.68184	
Derived business volume		$96,534,417
Purchasing multiplier	.02	
Local business purchases		$1,930,688
College related local business volume		$240,044,386

Local business volume	$485,479,478	
Business average firm	$402,220	
Inventory to business Volume ratio	.09	
Value of inventory committed to University		$21,127,733
Ratio of assessed to market value	100%	
Assessed valuation of local business property	$143,667,970	
Real Business property committed to university business	$71,036,349	
Rental property committed to university business	$130,498,489	
Business property and rental property committed to University business		$222,662,571
Local reserve ratio (Time)	.	.03
Average time deposit of university	$20,000,000	
Average time (Faculty/staff)	·$4,906	
Average time deposit per student	$342	
Total Number of students	20,638	
Demand Deposit reserve ratio	.03	
Average demand deposit (university)	$5,000,000	
Average demand deposit of faculty/staff	$1,165	
Average demand deposit of students	$251	
cash to local business volume	.09	
Expansion of local credit base		$83,518,190
University income from auxiliary enterprises		$9,504,289
Auto registration (students, faculty/staff)	$89,003	
User charges City Utilities	$10,903,308	
University charges to local govt	$5,442,731	
Traffic fines etc.	$94,849	
Total university related Govt. Revenues		$16,529,891
Total School Enrollment	5519	
Number of faculty/staff children in public school	561	
Total state aid to public school	$9,266,237	
State aid generated by faculty /staff children		$941,902
Other state aid received by local government	$695,518	

State aid allocable to University		$243,431
Total sales tax collected locally	$3,412.902	
Local sales tax rate	.01	
Sales tax received due to the Univ.		$1,655,257
Local property tax rate	.0133	
Real estate tax paid due to the University business		$2,961,412
Real estate tax paid by students (local)		$35,286
Number of local residences	10923	
Total assessed value of private residences	$500,211,131	
Local tax rate	.0133	
Real estate taxes paid by faculty/staff		$490,410
University related real estate taxes paid (exclude public schools)		$3,487,107
University related revenues to local government		$22,196,686
Local expenditures for public Schools	$11,363,900	
University related cost of public schools		$1,155,127
Total local daytime population	35,066	
Number of persons in faculty/staff households	3,135	
Number of persons in student households	8,756	
Total local resident population	28,743	
Government budget (exclude public schools)	$49,730,090	
Cost of municipal services to the University bus.		$21,635,837
Value of govt. property , exclude public schools	$70,451,746	
Value of pub. sch. prop.	$40,458,640	
Value attributable to Univ.		$34,468,934
Geographic area of San Marcos	11,059	
Geographic area of University	375	
Total real estate tax collected by local government	$9,967,901	
Real estate taxes foregone		$580,043

Police and security services	$813,000
Sanitation	$123,250

Value of Univ. provided services		$936,350
Full-time jobs per dollar of expenditure	0.000027	
Number of jobs attributable		6481
Gross compensation of faculty/staff	$52,711,906	
Payroll &profits per dollar of expenditures	0.5608	
Personal Income attribute to jobs and business activity		$106,056,861
Pct. of income used for durable goods	.0294	
Durable goods purchased		$2,089,328

The Southwest Texas State University Economic Impact Model
Description of the Variables

Sector 1: University Related Expenditures

Sector Ia: University related Visitor Expenditures in San Marcos

The visitor expenditures were computed from a survey questionnaire of all departments (academic and administrative at the University) and questions on the student, faculty/staff expenditure questionnaire.

Sector 1b: Student expenditures

The various categories of student expenditures was computed from the survey data. Total expenditures by strata of students were computed by the estimated mean of expenditures by strata multiplied by the number of students in that strata. The numbers of students per strata were obtained from the 1989-1990 Student Profile and University Fact Book . This method was used for housing/non-housing and other expenditures.

Sector 1c: Expenditures by Faculty/Staff

The expenditures of the faculty/staff were determined in the same manner as the students. The average expenditure was computed from the survey data and the number of faculty/staff was determined from the payroll office and other sources. The faculty/staff were however separated as to residency and the faculty /staff residents/non-residents were computed separately.

Rental payments were computed by the above stratification. If the faculty/staff member was not a local residence his/her response, if they made one, was not considered.

Sector 1d: Local Expenditures by the University

Total local university expenditures were obtained from the university purchasing office.

Sector 1e: Multiplier Effects

The multiplier was derived from previous work by the Texas Water Resource Board, and Dr. V. Howard Savage. This process is described in Appendix B.

The purchasing multiplier was computed the same as the multiplier above.

Sector II: Property Committed to University Business and Business Volume

Local Business volume was computed as follows: the City of San Marcos sales were obtained from the Comptroller office of the State Of Texas. The rental volume was computed from the Census of Housing 1990, US Department of Commerce. The population and the number of households were obtained from the same source.

The average business volume was computed by dividing the total business volume by the number of businesses in the San Marcos area.

Value of Inventory Committed to University Business

The ratio of inventory to business volume was computed as follows: The value of commercial personal property divided by local sales volume. The source of the value of commercial personal property was obtained from the local appraisal district and the sales volume was as computed above.

The business property committed to university business was computed as : the value of business property (Hays Appraisal District) multiplied by the ratio of University business to total business.

Sector III: Expansion of the Local Credit Base

The survey data was used to compute the deposits of the students and faculty/staff. The average University average deposits were obtained from the office of the Financial Vice President of the university.

The reserve requirements were obtained from the Federal Reserve Bank of Dallas . A cash to business number was calculated from the Federal Reserve Bulletin . The desired operating ratios are from conversations with bankers and reference to banking literature.

Sector IV: Local Business Unrealized Due to University Operations

Business volume foregone due to university operations includes the dormitory rent, the book store and other auxiliary services. These data were provided by the Offices of housing and auxiliary services.

Va: Total Other Government Related Revenues

The other revenues include auto registration fees, traffic fines, and utility user fees.

The return to Hays County from auto registration fees was divided by the number of automobiles in the county (Department of Public Safety, Austin) giving the average fee per automobile. This average was then multiplied by 10 percent of the local student automobiles (Campus Parking Office) plus 2 cars for all the resident faculty/staff.

User fees were computed from the survey data, and the university Assessment was computed from information from the University Purchasing Office. Traffic fines were also derived from the survey data.

Vb: University-Related Intergovernmental Transfers

The ratio of university related population to all local population was applied to inter-governmental transfers.

Sector VI: University related Tax Revenue

Sales tax revenues were provided by the City Budget. The university related portion of this amount was the sales volume percent multiplied by the total sales tax received by the City.

The inventory tax contribution is the value of inventory multiplied by ratio of business inventory to business volume multiplied by the appropriate tax rate.

Real property taxes are the value of business real property multiplied by the ratio of business to all business, then multiplied by the appropriate tax rate.

Real property tax paid directly by the students is computed from the survey data.

The real property tax paid by faculty/staff is computed from the survey data.

Public school tax contributions: The real estate taxes paid by the students etc. due to residency and ownership was computed. The source of the data was the 1990 Census of Housing and the local school board as to tax rates.

Sector VII: Cost Associated with the University

SECTOR VIIa: University related cost of public schools
The local school costs were taken from the Financial Report of the SMISD. The University portion of this budget was computed as a ratio of faculty/staff and student population to all SMISD student population.

Sector VIIb: Costs of Municipal services Attributable to the University
The local daytime population was computed as a total of the resident population (28743) as reported by the US Census plus commuting students and faculty/staff.

The number of persons in local faculty households was computed as the number of resident faculty/staff households multiplied by the average number of persons per household as reported by the census.

The local student population was taken from the university records.

The county budget allocation to San Marcos was computed as the ratio of San Marcos population to Hays county population multiplied by the total county budget minus road and bridge expenditures.

The San Marcos City budget was added to the number derived above.

Sector VIII: Value of Government Property Attributed to the University

The value of all city property was provided by the city financial office. This number was added to a ratio of county property that was attributable to San Marcos.

The value of public school property was computed SMISD property value multiplied by the ratio of property in San Marcos to SMISD property.

Sector IX: Real Estate Foregone
The acreage that was in the corporate limits was obtained from the San Marcos City Engineers Office, and the acreage in the university campus was provided by the university planning office.
Taxes foregone were then computed as the opportunity costs of the acreage in alternative uses.

Sector X: Value of Self Provided Services
This value was provided by the university.

Sector XI: Impact of Individuals in the Community
The number of jobs in Hays county was obtained from the Texas Employment Commission. This number was used to compute the ratio of full time jobs per dollar sales volume. The result was used to compute the number of jobs that the university related sales volume would create.

Personal income was derived by the national income accounting method. Gross income and the ratio of gross income to personal

income was obtained from data included in the publication of the national office of business and economic research. Gross income was provided by the same source.

Sector XII: Durable Goods Procured with University Generated Income

This statistic was provided by the survey data.

Appendix B
The San Marcos Multiplier Derivation and Description

Appendix B

The Multiplier Derivation

The most accurate information as to the magnitude of the local economy multiplier can be derived from the structural relationships in an input-output model. The problems that arise with the computation of the multiplier are directly connected to a lack of data which are necessary to construct the input-output model. The method whereby a matrix was estimated and the multipliers computed for the San Marcos economy is as follows. The Texas Input-Output Model 1979 provided the basic Input-Output (I-O) model. It was of course necessary to modify this model to fit the local area. The modification entailed a determination of the industrial structure of the San Marcos area. This determination was done through reference to County Business Patterns, The City, County Data Book, and information as to income and income sources obtained from the Office of Business Economics of the U.S. Department of Commerce. If then it was determined that an industry was present in the San Marcos area that was specified in the Texas model, that row and column were left in the San Marcos model. Otherwise, that row and column were deleted. The result was a matrix of 31 rows and columns. The direct requirements in the rows and columns were further modified by applying employment location quotients to the relevant row coefficients in the Texas model. This assumes that if the location quotient (LQ) is one or greater, that the sales to other industries in the local economy conform to Texas sales. If the LQ is less than one, then only that portion of the industry output was available to the local economy and the balance was assumed to be imported.

The inverse of the matrix derived from the procedure above was then computed, and the column totals tabulated. The multipliers themselves are defined as being:

$$\hat{}DD + \frac{FD + \hat{}ID}{SV} / \frac{\hat{}FD}{SV} = m$$

where

^ indicates change
FD is final demand
ID is intermediate demand
SV is sales volume component change
DD is consumption or derived demand

The conditions of the equation above are fulfilled if the column totals of the $(I-A)^{-1}$ are summed.

The purchase multiplier or level of purchases is determined by adding the rows of the direct requirements coefficient matrix. This procedure gives direct sales from local industries to each other.

In general, the I-O model is as follows:

If it is assumed that all industries are in equilibrium for the period of time, then the system becomes n linear equations in n unknowns. Thus the growth output of X_i in equilibrium is:

$$X_i = x_{i1} + x_{i2} + \ldots\ldots + x_{in} + Y_i, \tag{1}$$

where X_i sells its output to itself, other industries, and final demand, Y_i. Then for industry j to produce X_j it will require a certain number of units of i. If it is assumed then that there are no economies of scale, the amount of i required by industry j is directly proportional to the output of industry j. The equation then for X_{ij} is:

$$X_{ij} = a_{ij}X_j, \tag{2}$$

where a_{ij} is the technical coefficient or the "constant of proportionality" which depends upon the technology of the jth industry. Then by substitution of (2) into (1),

$$X_i = a_{i1}X_1 + a_{i2}X_2 + \ldots a_{in}X_n + Y_i, \tag{3}$$

or

$$X_i - a_{i1}X_1 - a_{i2}X_2 - \ldots a_{in}X_n = Y_i, \tag{4}$$

which for each industry i yields a set of simultaneous equations.

$$X_1 - a_{11}X_1 - a_{12}X_2 - \ldots a_{1n}X_n = Y_1$$

$$X_2 - a_{21}X_1 - a_{22}X_2 - \ldots a_{2n}X_n = Y_2$$

$$\ldots\ldots\ldots\ldots\ldots\ldots$$

$$X_n - a_{n1}X_1 - a_{n2}X_2 - \ldots a_{nn}X_n = Y_n \tag{5}$$

Then by the assumption of constant production coefficients there are n equations in n unknowns. The unknowns being X_1, X_2, . . . X_n. The values of the a_{ij}'s and Y's must be determined from data gathered outside the model.

The n simultaneous equations in n unknowns can be solved through the use of matrix algebra. Given equations (5), they can be arranged in matrix form as follows. Since total product is used by intermediate uses and final demand, then:

$$X_j = {}_iC_{ji} + Y_j \tag{6}$$

where Y_j is equal to final demand and C_{ji} is equal to the intermediate uses and:

$$C_{ji} = a_{ij}X_j \tag{7}$$

Thus the intermediate demand for the output of the jth industry is equal to the production coefficient of the ith industry for the product of the jth industry multiplied by the total output of the jth industry. Then

$$X_j = {}_i a_{ij} X_i + Y_j \qquad (8)$$

for all j.

Then in matrix form:

$$X = AX + Y \qquad (9)$$

where X is the column vector of outputs, A is the square matrix of technical coefficients, and Y is the column vector or matrix of final demands. Providing (I-A) is nonsingular, we can write Equation (9) as:

$$X - AX = Y \qquad (10)$$

and thus,

$$X = Y(I-A)^{-1} \qquad (11)$$

where I is an nth order identity matrix. The solution to the vector of unknowns results from the multiplication of the final demand vector by the I-A inverse. If there are changes in the final demand matrix, the changes which will occur in the other sectors may be examined by exploring the elements of the inverse matrix in Equation (11).

The location quotient derivation of the LQ used to modify the selected Texas coefficients is as follows: A LQ is the ratio of two ratios thus:

$$LQ = \frac{\frac{E_{ism}}{E_{sm}}}{\frac{E_{iTx}}{E_{Tx}}}$$

where:

E_{ism} is employment in the ith industry in San Marcos, Texas.

E_{sm} is total employment in San Marcos, Texas.

E_{iTx} is employment in the ith industry in Texas.

E_{Tx} is total employment in Texas.

Texas was used as opposed to the more common use of the U.S. because the Texas model was the one to be modified.

The overall San Marcos multipliers were then computed as a weighted average of the various sector multipliers. The household sector was in each case considered endogenously. This is appropriate where the major impact of a local expenditure is transmitted to the balance of the economy through the household sector.

Appendix C

Student Sample Size, Confidence Levels, and Level of Statistical Precision of the Study

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Student Sample Size, Confidence Levels, and Level of Statistical Precision of the Study

As is often the case, resources were not available to survey the entire student population universe. It was necessary, therefore, to determine an acceptable sample size and to estimate the number of questionnaires required to elicit a return either equal to or in excess of the derived number. The students were surveyed on a random, stratified basis. The strata were dorm students, non-dorm San Marcos resident students, and commuting students. A description of the sample size determination follows:

$$n = \frac{N \Sigma Nh\ S^2h}{N^2D^2 + \Sigma NhS^2h}$$

where:
n = sample size
N = Universe (total student population)
Nh = population per strata
S^2h = variance per strata
$D^2 = d^2/z^2$
d = level of precision
z = confidence level

Then of the sample n, the proportions are:

$$nh = \frac{Nh}{N} \cdot n$$

where again:
nh = sample proportion per strata
Nh = total population per strata
N = population (universe)

Further, if n is less than 5 percent of N, then the finite population correction need not be considered.

It can be noted that the variance (S^2h) is called for in the

process of determining the sample size. An estimate of this number was made by surveying selected classes of students in the business school. These surveys provided data which were used in the determination of the variance and therefore the sample size. This procedure estimated the sample size to be 447 students.

A 25 percent response rate was estimated from the survey done in 1985 and, to assure ourselves an adequate sample, 2000 student questionnaires were mailed. The sample was drawn on a random systematic basis. That is a random name was chosen and then each name at a certain interval received a survey questionnaire.

The response rate was not overwhelming but it was adequate. Four hundred fifty nine usable student questionnaires were received. These questionnaires provided sufficient data for statistical conclusions on the basis of a confidence interval of plus or minus 2 standard deviations at a .075 precision level. In other words, we are 95 percent sure that the results conform to the population expenditure pattern plus or minus 7.5 percent.

Eighteen hundred and sixty six faculty/staff questionnaires were sent to the faculty through campus mail. Five hundred sixty one usable responses were received. This number was adequate for statistical purposes.