

VII. DIRECT, INDIRECT, AND INDUCED ECONOMIC IMPACTS OF UC SAN DIEGO

THE CONCEPT OF INDIRECT AND INDUCED ECONOMIC IMPACTS

The impact of UC San Diego on the local, regional, and state economies is greater than the total of the University's direct spending on payroll, goods and services, and construction. This is because money spent by the University is spent again by the recipient employees and local businesses. Employees use their salaries and wages to purchase goods and services from other businesses. Businesses make their own purchases and hire employees, who also spend their salaries and wages throughout the local, regional, and state economies. A chain reaction of indirect and induced spending continues, with subsequent rounds of additional spending gradually diminished through savings, taxes, and expenditures made outside the state. This economic ripple effect is measured by what is known as an "Input-Output" economic model, which uses a series of "multipliers" to provide estimates of the number of times each dollar of "input," or direct spending, cycles through the economy in terms of "indirect and induced output," or additional spending, personal income, and employment.⁵⁸ The mechanics of the input-output model are described in more detail in Appendix A.

IMPLAN Model

There are several input-output models commonly used by economists to estimate multiplier effects. With the assistance of the economic consulting firm Applied Economics, CBRE Consulting employed the IMPLAN input-output model in developing the estimates of UC San Diego's spending, income, and employment impacts. This model, initially developed by the U.S. Department of Agriculture, is described in more detail in Appendix A. The IMPLAN model examines inter-industry relationships in the local, regional, and national economies. Through Applied Economics, CBRE Consulting relied on IMPLAN to provide estimates of indirect and induced output, income, and employment impacts based on multipliers for the City of San Diego, San Diego County, and the State of California.

Multipliers and Spending, Employment, and Income Impacts

IMPLAN multipliers indicate the ratio of direct impacts to indirect and induced impacts. For example, a spending multiplier of 0.25 indicates that one dollar of direct spending generates an additional \$0.25 in indirect and induced spending.⁵⁹ Put differently, a spending multiplier of 0.25 can also be interpreted as indicating that \$1 of direct spending generates total spending of \$1.25. In the case of employment impacts, the multipliers measure the number of full-time equivalent (FTE) jobs supported by \$1.000 million in direct spending; for example, an employment multiplier of 10 indicates that \$1.000 million in spending generates 10 indirect and induced FTE jobs.

⁵⁸ Indirect impacts are the changes in inter-industry purchases as they respond to new demands of directly affected industries. Induced impacts typically reflect changes in spending from households as income increases or decreases due to changes in production. For more explanation of indirect and induced impacts, see Appendix A.

⁵⁹ Multipliers are rounded to two decimal places, throughout this report, to reflect their high level of precision.

Unless otherwise indicated, the reader should interpret the multipliers and impacts described in the following sections, and provided in Tables 16, 17, and 18 and Figures 3, 4, and 5, as cumulative – as multipliers and impacts attributed to larger geographies are inclusive of the multipliers and impacts found in smaller or subordinate geographies. For example, the impact of the University’s spending in San Diego County includes the impact of the University’s spending in the City of San Diego. Instances where tables and figures present non-cumulative impacts are labeled as such, with geographies labeled “Other San Diego County,” and “Other California.”

DIRECT, INDIRECT, AND INDUCED SPENDING IMPACTS

This chapter discusses the “total” economic impacts – including direct, indirect, and induced economic impacts – of University purchases of goods and services, payroll expenditures, and spending on construction projects. The analysis estimates total impacts in three distinct ways – spending, employment, and income. These spending, employment, and income impacts are estimated at the state, county, and city levels.

The methodology of estimating indirect and induced economic impacts is based on estimates of direct University spending in particular geographic areas. In order to estimate direct University spending in this way, UC San Diego staff identified the addresses of all vendors and employees who received payments from the University during the 2006-07 fiscal year. Appendix A provides further detail on the assumptions and methodology used in deriving these estimates.

Table 16: Total UC San Diego Spending in California, 2006-07

Geography	Direct Spending	Multiplier	Indirect and Induced Spending	Total Direct, Indirect, and Induced Spending	Percentage of Total Impacts
City of San Diego	\$1,240,202,608	0.83	\$1,034,791,566	\$2,274,994,174	56.6%
All San Diego County	\$1,659,648,328	0.92	\$1,532,666,358	\$3,192,314,686	79.4%
All California	\$1,968,739,244	1.04	\$2,053,463,743	\$4,022,202,987	100.0%
TOTAL	\$1,968,739,244	1.04	\$2,053,463,743	\$4,022,202,987	

Sources: UC San Diego Office of Design and Construction, General Accounting Services, and Payroll; Applied Economics; and CBRE Consulting.

Notes: Total does not account for spending that occurred outside of California. Figures may not add due to rounding. Spending and multiplier calculations are cumulative of all inclusive geographies.

In FY 2006-07, direct spending by UC San Diego on goods and services purchases, payroll, and construction projects in the State of California totaled \$1.969 billion.⁶⁰ This direct spending led to an estimated \$2.053 billion in indirect and induced spending throughout the state, for an estimated \$4.022 billion in total spending impact by UC San Diego during the fiscal year.

San Diego County benefited from the lion’s share of the University’s direct spending in California, with approximately \$1.660 billion, or 84.3 percent of the University’s statewide direct spending occurring within the county. This spending generated an additional \$1.533 billion in indirect and induced spending in San Diego County, for a total spending impact of

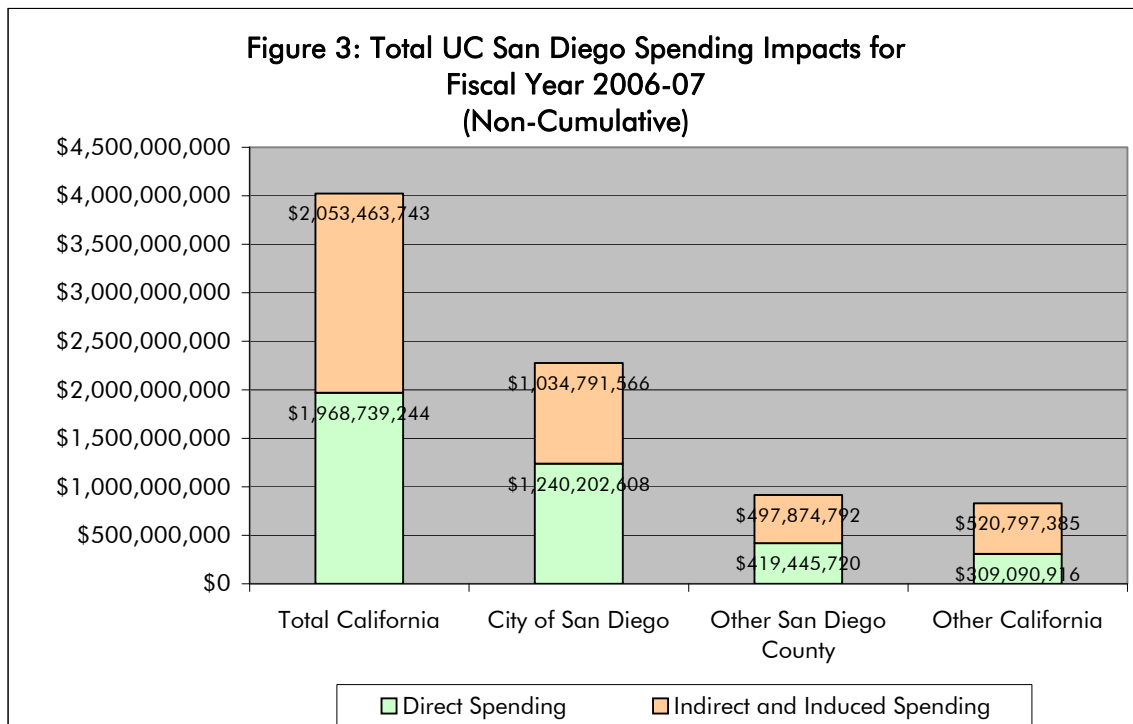
⁶⁰ For the purposes of the analysis of total economic impacts, the University direct payroll number excludes the payroll received by student employees. CBRE Consulting measures the impact of student spending in a separate analysis; therefore, to avoid double counting, students’ share of the total payroll is excluded from the analysis of University payroll impacts.

\$3.192 billion. This indicates that 79.4 percent of the University’s total spending impact was concentrated within San Diego County.

Within the City of San Diego, direct University spending in FY 2006-07 totaled approximately \$1.240 billion, and indirect and induced spending impacts are estimated at approximately \$1.035 billion. This indicates that the University generated \$2.275 billion in total spending impacts within the City of San Diego in FY 2006-07, which is approximately 56.6 percent of the University’s total spending impact statewide.

The estimates of indirect and induced spending reflect multipliers for the University’s spending at the state, county, and city level. Table 16 shows that the average state-level multiplier for UC San Diego’s direct spending is 1.04, which indicates that for every \$1.00 of UC San Diego direct spending in the state there is an estimated additional \$1.04 in indirect and induced spending throughout the state. The spending multipliers for San Diego County and the City of San Diego indicate that \$1.00 of direct University spending generates \$0.92 in indirect and induced spending in San Diego County, with the City of San Diego capturing approximately \$0.83 of that indirect and induced spending impact.

Figure 3 shows the spending impacts disaggregated by geography, indicating the discrete share of impacts for the City of San Diego, other San Diego County, and other California.



Sources: UC San Diego Accounting Services; Applied Economics; and CBRE Consulting.

EMPLOYMENT IMPACTS

Employment impacts and multipliers for UC San Diego are summarized in Table 17 and Figure 4. Based on IMPLAN multiplier estimates, spending by UC San Diego in FY 2006-07

supported a total of 34,230 full-time equivalent (FTE) jobs in the State of California. Approximately 55.1 percent, or 18,850 of these jobs, were indirect and induced jobs – or jobs in addition to the direct employment of University faculty, staff, and students. This reflects an average indirect and induced jobs multiplier of 9.57, which indicates that \$1.000 million in University spending supports approximately 9.57 jobs statewide *in addition to* the direct employment of the University. Looking at this information another way, UC San Diego supported approximately 1.23 indirect and induced jobs (FTE) for every direct University job (FTE).

Table 17: Total FTE Jobs in California Produced by UC San Diego Spending, 2006-07

<u>Geography</u>	<u>Direct Jobs (UCSD Employment)</u>	<u>Direct Spending</u>	<u>Multiplier</u>	<u>Indirect and Induced Jobs (FTE)</u>	<u>Total Direct & Indirect Jobs</u>	<u>Percent of Total California Jobs</u>
City of San Diego	10,394	\$1,240,202,608	8.38	10,392	20,786	60.7%
Other San Diego County	4,405	\$419,445,720	9.42	3,950	8,355	24.4%
Other California	580	\$309,090,916	14.58	4,507	5,087	14.9%
TOTAL	15,379	\$1,968,739,244	9.57	18,850	34,229	

Sources: UC San Diego Office of Student Research, Design and Construction, General Accounting Services, and Medical Center Accounting Services; Applied Economics; and CBRE Consulting.

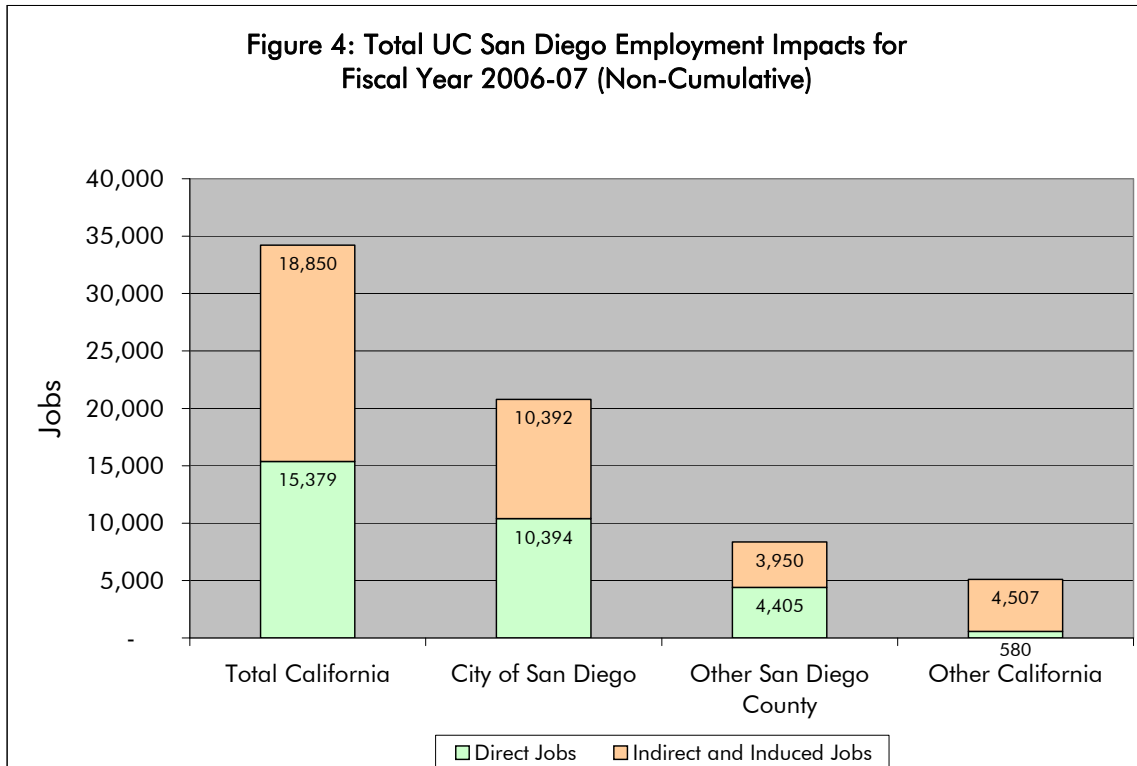
Notes: Figures may not add due to rounding. Spending and multiplier calculations are geographically non-cumulative. Job multipliers are calculated per \$1 million of output.

University spending supported 20,790 total FTE jobs in the City of San Diego, 10,390 of which were indirect and induced jobs. This reflects an employment multiplier of 8.38 indirect and induced jobs per \$1.000 million in University spending within the city’s economy. Within the City of San Diego, the University supports 1.00 indirect and induced job for every direct University job.

UC San Diego supported an additional 8,360 FTE jobs in San Diego County, of which 3,950, or 47.3 percent, were indirect and induced jobs. This reflects an average employment multiplier of 9.42 indirect and induced jobs per \$1.000 million of University spending in the unincorporated county.

Outside San Diego County but within California, University spending generated another 5,090 FTE jobs, of which 4,510 were indirect and induced jobs. This reflects an average employment multiplier of 14.58 indirect and induced jobs per \$1.000 million of University spending in California outside of San Diego County.

While the employment multipliers are greater at the state level than at the local level, the City of San Diego received a considerable share of the overall employment impacts. Of the total jobs generated by University spending in FY 2006-07, 60.7 percent were located within the City of San Diego. Excluding direct University employment, the City of San Diego benefited from 55.1 percent of the indirect and induced jobs generated by University spending statewide.



Sources: UC San Diego Payroll Office; Applied Economics; and CBRE Consulting.

PERSONAL INCOME IMPACTS

Personal income impacts and multipliers are shown in Table 18 and Figure 5. Spending by UC San Diego in FY 2006-07 generated total personal income of approximately \$2.324 billion in the State of California. This total includes approximately \$1.071 billion in direct UC San Diego payroll as well as \$1.253 billion in indirect and induced personal income – or income in addition to the direct payroll of University faculty and staff. The indirect and induced personal income impacts are generated by the spending associated with UC San Diego payroll as well as goods and services purchases and capital expenditures. The estimated personal income multiplier associated with the University’s total spending statewide was 0.64 in FY 2006-07, which indicates that \$1.00 of University spending generated \$0.64 in personal income throughout the state.

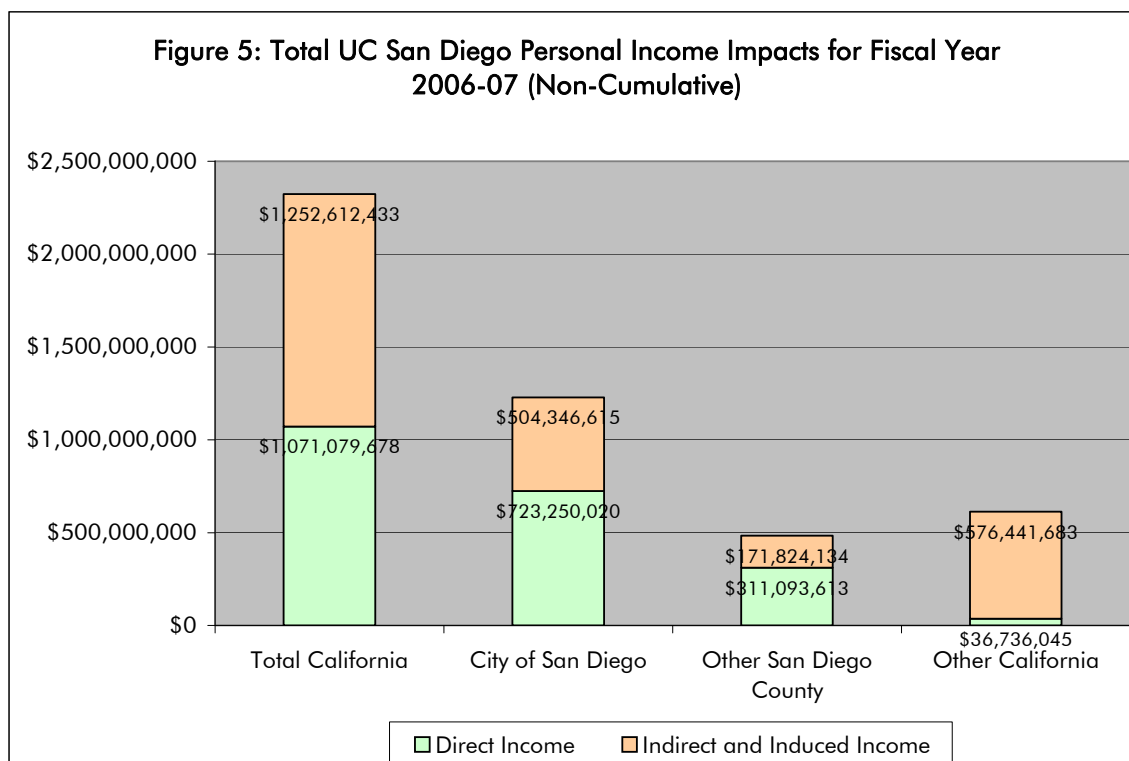
Of UC San Diego’s total impact on personal income statewide, approximately 73.6 percent, or \$1.711 billion, was generated within San Diego County. This includes \$1.034 billion in direct University payroll and an additional \$676.2 million in indirect and induced personal income generated by University spending in the area. The estimated personal income multiplier for UC San Diego spending in San Diego County was 0.41, which indicates that \$1.00 of University spending generated an estimated \$0.41 in personal income in San Diego County.

Table 18: Total Personal Income Produced in California From UC San Diego Spending, 2006 07

Geography	Direct Income (UCSD Payroll)	Direct Spending	Multiplier	Indirect and Induced Income	Total Personal Income Generated	Percent of Total California
City of San Diego	\$723,250,020	\$1,240,202,608	0.41	\$504,346,615	\$1,227,596,635	52.8%
Other San Diego County	\$1,034,343,633	\$1,659,648,328	0.41	\$676,170,750	\$1,710,514,383	73.6%
All California	\$1,071,079,678	\$1,968,739,244	0.64	\$1,252,612,433	\$2,323,692,111	100.0%
TOTAL	\$1,071,079,678	\$1,968,739,244	0.64	\$1,252,612,433	\$2,323,692,111	

Sources: UC San Diego Office of Student Research and Information, Design and Construction, General Accounting Services, Medical Center Accounting Services; Applied Economics; and CBRE Consulting.
 Notes: Figures may not add due to rounding. Spending and multiplier calculations are cumulative of all inclusive geographies.

Finally, UC San Diego spending within the City of San Diego contributed to \$1.228 billion in personal income for San Diego residents. This includes approximately \$723.3 million in direct University payroll and an additional \$504.3 million in indirect and induced personal income. The total income impacts reflect an estimated average income multiplier of 0.41, which indicates that \$1.00 of UC San Diego spending generated \$0.41 in personal income. The total personal income impact of University spending in the City of San Diego was approximately 52.8 percent of the total impact of University spending statewide.



Sources: UC San Diego Accounting Services; Applied Economics; and CBRE Consulting.

SUMMARY OF SPENDING, EMPLOYMENT, AND PERSONAL INCOME IMPACTS BY GEOGRAPHY

The estimated spending, employment, and personal income impacts of UC San Diego spending in the City of San Diego, San Diego County, and the State of California are summarized in Table 19.

Table 19: Summary of UC San Diego Impacts By California Geography (Non-Cumulative) Fiscal Year 2006-07				
	<u>City of San Diego</u>	<u>Other San Diego County</u>	<u>Other California</u>	<u>Total Statewide</u>
Spending				
Direct	\$1,240,202,608	\$419,445,720	\$309,090,916	\$1,968,739,244
Indirect	\$1,034,791,566	\$497,874,792	\$520,797,385	\$2,053,463,743
Total Spending	\$2,274,994,174	\$917,320,512	\$829,888,301	\$4,022,202,987
Employment (FTE)				
Direct	10,394	4,405	580	15,379
Indirect	10,392	3,950	4,507	18,850
Total Jobs	20,786	8,355	5,087	34,229
Income				
Direct	\$723,250,020	\$311,093,613	\$36,736,045	\$1,071,079,678
Indirect	\$504,346,615	\$171,824,134	\$576,441,683	\$1,252,612,433
Total Income	\$1,227,596,635	\$482,917,747	\$613,177,728	\$2,323,692,111

Sources: UC San Diego Office of Student Research and Information, Design and Construction, General Accounting Services, and Medical Center Accounting Services; Applied Economics; and CBRE Consulting.

Note: Figures may not add due to rounding.

- Overall, in Fiscal Year 2006-07, the impact of spending by UC San Diego in the City of San Diego was \$2.275 billion in total spending, 20,790 jobs, and \$1.228 billion in personal income, excluding UC San Diego employees.
- UC San Diego’s spending generated an additional impact of approximately \$917.3 million in total spending, 8,360 jobs, and \$482.9 million in personal income, excluding UC San Diego employees, elsewhere in San Diego County.
- UC San Diego spending contributed another \$829.9 million in total spending, 5,090 jobs, and \$613.2 million in personal income, excluding UC San Diego employees, elsewhere in the state.
- In all, UC San Diego’s total economic impact in California was \$4.022 billion in total spending, 34,230 full time equivalent jobs, and \$2.324 billion in personal income, excluding UC San Diego employees, in the 2006-07 Fiscal Year.