

The Economic Impact of the University of Nevada, Las Vegas on Southern Nevada

2014

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The views expressed are those of the authors and do not necessarily represent those of the University of Nevada, Las Vegas or the Nevada System of Higher Education.

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Executive Summary

Founded in 1957, the University of Nevada, Las Vegas (UNLV) is the only graduate and research institution in Southern Nevada. This report quantifies the university's economic impact within the local economy. As one of the ten largest employers in Clark County, the university employed 2,966 individuals in December of 2013. UNLV also contributes to the local economy via its expenditures on local businesses in support of its operations. We estimate that the university spent approximately \$93 million in Southern Nevada during fiscal year 2013. UNLV also provides economic activity in Southern Nevada via the expenditures of its students and visitors on local goods and services.

The primary impacts of UNLV to the Southern Nevada economy are summarized in the table below. In total, UNLV's primary quantitative economic impact is estimated at nearly \$1,051 million.

Total Estimated Primary Impact of UNLV*	
University Employment	2,966 jobs
University Employee Wages	\$227 million
University Demand for Goods and Services	\$93 million
Student Demand for Goods and Services	\$251 million
Visitor Economic Activity	\$480 million
Total Primary Economic Activity	\$1,051 million
*Fiscal Year 2013	

In addition, the university's direct impacts provide spinoff impacts that ripple through the local economy. Spinoff impacts are the result of additional rounds of

spending which take place after the direct spending has occurred. We employ a structural model of Clark County's economy developed by Regional Economic Models, Inc. (REMI) to calculate these spinoff impacts. The table below summarizes the total quantitative impacts of UNLV on the Southern Nevada economy. We estimate that UNLV generated a total of \$1,772 million¹ to the Southern Nevada economy during 2013. UNLV's state appropriations amounted to \$149 million in 2013. Hence, UNLV's Economic Impact Ratio (EIR) for 2013 is 11.9.² In other words, for every dollar of state appropriation funds the university generated an additional \$11.9 in economic activity to the Southern Nevada community. UNLV's EIR was 3.8 in 1993 and 8.6 in 2011.³ This increase over time is also a reflection of the maturity of UNLV as a research university. In addition, we find that each dollar of student spending generates approximately 1.7 dollars of economic activity for Southern Nevada.

The Thomas & Mack Center makes a unique contribution to our estimates because it is a university facility used by the community. We estimate that the Thomas & Mack Center contributed \$338 million in direct impact and \$398 million in total impact to the Southern Nevada economy in 2013.

¹ This figure is obtained by summing the primary impact (\$1,051 million) and the spinoff impacts (\$721 million).

² The Economic Impact Ratio (EIR) is defined as the Total Economic Impact divided by State Appropriations. This should not be interpreted as an annual return rate.

³ Tra, Constant, R. Keith Schwer, and Lynn Bretthorst. 2008. *The Economic Impact of the University of Nevada, Las Vegas on Southern Nevada*.

Total Estimated Economic Impact of UNLV				
	Primary 2013	+	Spinoff 2013-2050	= Total 2013-2050*
Employment	2,966	+	30,001	= 32,967 jobs
Gross Regional Product	\$1,051	+	\$16,689	= \$17,740 million

* Cummulative impact for entire period.

We also find that, by the year 2050, UNLV will supply the valley with nearly 33,000 jobs and roughly \$17.7 billion in economic activity. These estimates reflect a full accounting of magnifying effects. These estimates are, nonetheless, conservative as they do not include the numerous qualitative benefits the university imparts to the Las Vegas economy.

Given that these estimates represent a lower bound of the total economic impact, we conclude that UNLV plays a fundamental part of the Southern Nevada economy. As the only major university in a rapidly diversifying economy, moreover, the university will no doubt contribute to the region's future well-being and provide resources in helping the community reach its full potential.

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THE ECONOMIC IMPACT OF UNLV

I. Introduction

Founded in 1957, the University of Nevada, Las Vegas (UNLV) is the only graduate and research institution in Southern Nevada. It is also the largest institution in the Nevada System of Higher Education, with full-time equivalency enrollment over 50 percent higher than the next largest member, the University of Nevada, Reno. During fall semester 2013, 18,262 undergraduate students and 3,877 graduate and professional students enrolled at UNLV. These students were advised and taught by 2,003 academic and administrative faculty supported by 935 classified staff.⁴ This university community accounted for approximately 0.3 percent of Clark County's total employment in 2013.

UNLV is clearly a vital part of the Southern Nevada economy. This report, conducted by the Center for Business and Economic Research (CBER), quantifies the university's economic impact within the local economy. A traditional economic impact analysis is used to assess how the local economy would suffer if the university were removed as a participant. The university's economic activity is entered into economic modeling software, which carefully traces the ways the university contributes to jobs, expenditures, and income in Southern Nevada. These estimated quantitative effects are also supplemented by less tangible qualitative impacts, discussed at the end of this report.

This report first addresses the quantifiable (in dollar terms) impact that UNLV has on the surrounding community. We measure this impact in two steps. First,

⁴ The university payroll also includes 39 postdoctoral positions not included in this tally.

there is a *primary impact*, defined as UNLV's direct financial contribution to local economic activity. This includes university employment and expenditures, student expenditures, and expenditures by other university-related visitors, such as parents, alumni, and patrons.

We then estimate *spinoff impacts*, defined as UNLV's effect as it daisy-chains through the local economy. Each time a dollar from UNLV's primary economic activity is re-spent, a spinoff effect is generated. For example, university employees spend their paychecks at local businesses for housing, groceries, and clothing. Local business employees then spend those dollars again for their own housing, groceries, and clothing, and so on.

Finally, we argue that UNLV's true impact is larger than the quantifiable numbers that we present because the numbers do not include the difficult-to-define qualitative impacts. These qualitative impacts include community-wide benefits resulting from the university's cultural events, regional and national connections, and research and technology applications. Qualitative impacts lead to a better quality of life for local residents, either through direct interaction with the university or indirectly through the expansion of the economy brought on by the university. They are, therefore, important components of the university's impact on the local community and are discussed at the end of the report.

Recently, a study by Siegfried et al. (2008) has provided a number of criticisms of university impact studies.⁵ Our analysis addresses several of these criticisms. First, our calculation of primary impacts avoids double counting by only

⁵ Siegfried, John J., Allen R. Sanderson, and Peter McHenry. 2008. "The Economic Impact of Colleges and Universities." *Change Magazine*. March/April .

using expenditures by students and visitors that would not otherwise have come to the area. See section II. Second, our estimation of spinoff impacts does not use the simple multiplier approach. Rather, we use a dynamic input-output model, which leads to a more realistic expenditure multiplier. See section III.

The report is organized as follows. Sections II and III characterize the quantitative impact of UNLV on the Southern Nevada economy. Section IV discusses the qualitative impacts of UNLV in the community. Section V summarizes the results of the study and concludes.

II. Primary Impacts

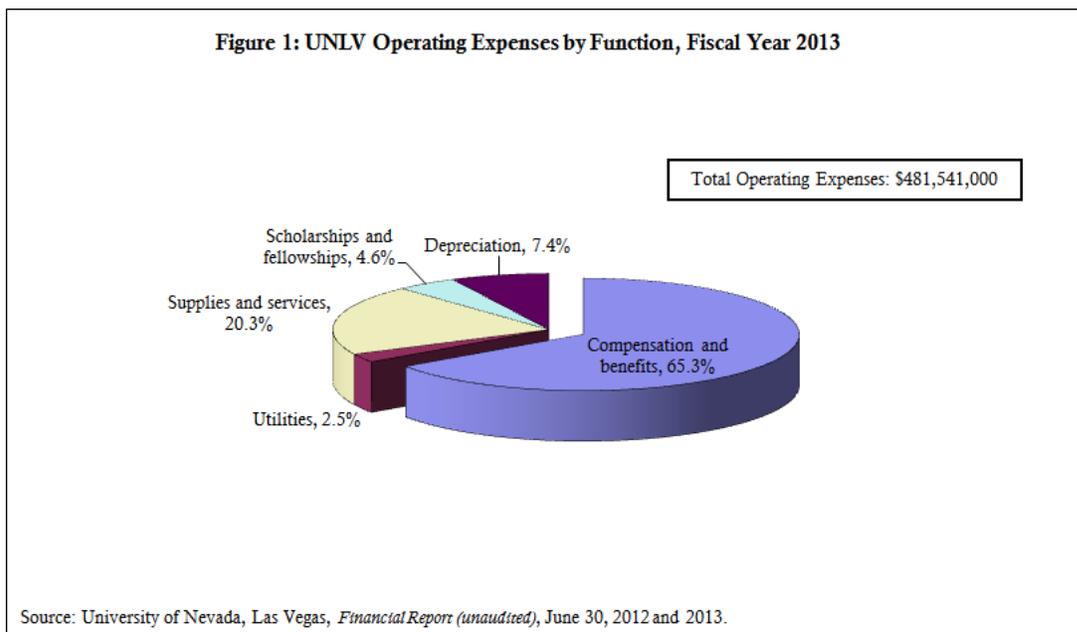
The first task of the study is to assess the primary impacts of UNLV on the Southern Nevada economy. These primary economic impacts will result from the local jobs created by the university, as well as the university's expenditures on local goods and services, and the expenditures of its students and visitors on local goods and services. These primary impacts are measured using university information on fiscal year 2013 (FY 2013) economic activity.⁶

A. University Expenditures

More than two-thirds of UNLV's total operating expenses for FY 2013 were devoted to employee compensation and benefits (see Figure 1). As one of the ten largest employers in Clark County, the university employed 2,966 individuals in December of 2013. This total includes academic and administrative faculty, as well

⁶ CBER would like to thank Mike Newcomb and the Thomas & Mack Center, Karla Kirk and the UNLV Controller's Office, Brent McPherson and the Office of Housing and Residential Life, Mya Starling and the Office of Decision Support, and UNLV Institutional Analysis and Planning for their assistance during the data-collection process.

as postdoctoral scholars and classified staff.⁷ The annual wage bill (not including benefits) for the 2,966 university employees was approximately \$227 million in 2013. Following the assumptions of previous economic impact studies done for UNLV (2008 and 2011) we count all university jobs as employment losses in the primary impact of UNLV on the local economy.⁸ The intuition behind this assumption is that most of the university employment will be lost to the local economy because employees would either seek jobs in other regions or drop out of the labor market.



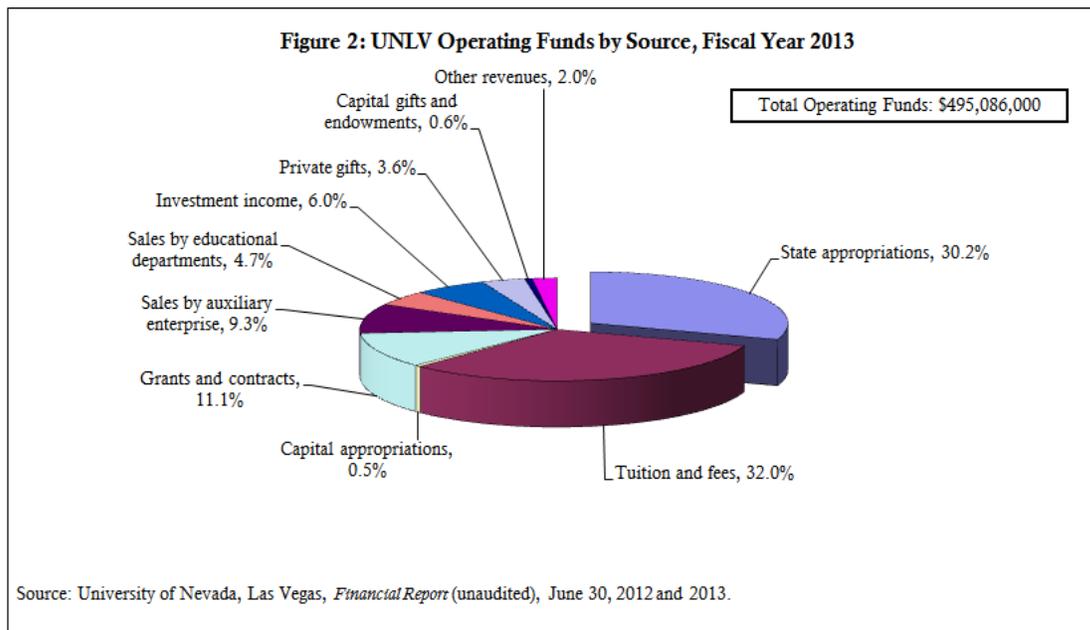
In addition to being one of the largest employers in Clark County, UNLV also contributes to the local economy via its expenditures on local businesses in support

⁷ These figures exclude student employees. This avoids double counting the impact of student expenditures on the local economy.

⁸ This procedure may slightly overestimate the total primary impact. However, this should not be a concern for two reasons. First, our impact estimates are extremely conservative and should be viewed as lower-bound estimates of UNLV's true value to the Southern Nevada economy. Second, the economic modeling software used to estimate total impact will shift some employment and wages into other local industries anyway to balance out the fact that the average university income is relatively high in this area.

of its operations. These expenditures will also be lost to the local economy if UNLV were to close. During FY 2013, UNLV spent a total of \$93 million on utilities, services, and equipment supplies. These expenditures represent approximately one-fifth of the university's total spending during FY 2013 (see Figure 1). We again follow the previous UNLV impact studies by assuming that 85 percent of the university's spending on goods and services, \$82 million, remains in the Southern Nevada economy.

Figure 2 provides a breakdown of UNLV's operating funds by source. The university's total operating funds for FY 2013 are estimated at \$495 million. Roughly 30 percent, \$149 million, of these funds originate from state appropriations. This suggests that for every dollar spent by Nevada taxpayers on higher education funding, UNLV generated approximately \$3.3 from additional sources.



B. Student Expenditures

Student enrollment at UNLV is higher than at any other university, public or private, in the state of Nevada. These students have a significant impact on Clark County through their demand for goods and services. Only the expenditures of students who would pursue an education outside of Clark County in the absence of UNLV may be counted toward the primary impact—otherwise, if students stayed in the valley, their expenditures would not be lost to the economy. Because UNLV is the only university in the Las Vegas area, we estimate that most students would go elsewhere. Using residency status (assuming all nonresident students would go elsewhere), test scores (assuming all top resident students would go elsewhere), and professional school status (assuming all dental and law students would go elsewhere), we estimate that approximately 67 percent of UNLV’s students would leave Clark County if UNLV did not exist. Student expenditures lost to the local economy, therefore, are estimated by multiplying the number of students we estimate would leave (14,844) by the average annual student expenditure on basic necessities.⁹

C. Visitor Expenditures

Attendees of special events at the university might not have participated in the local economy to the same extent without the draw of UNLV events. Economic activity generated by visitors to university events accounts for an additional \$480 million in benefits. During FY 2013, Cox Pavilion, Sam Boyd Stadium, and the

⁹ Average expenditures are computed for undergraduate, graduate, and professional students. The average student expenditure is derived using data from Student Financial Services. It includes spending in the categories of *room and board*, *books*, *transportation*, and *personal*. Based on the nature of these categories and the likelihood that average expenditure estimates are low, our analysis assumes that students spend at least this amount on locally produced goods and services.

Thomas & Mack Center hosted sports games, concerts, and other types of entertainment.¹⁰ Nearly 1,149,754 people, many of whom live outside the Las Vegas Valley, attended these events. The primary impact only includes visitor spending that would be lost in the absence of UNLV because the visitors would not have come otherwise and the events would not be held elsewhere in Clark County. We assume that such visitors accounted for 15 percent (73,472) of all university-related event attendees and 80 percent (527,955) of all other event attendees in 2013. Therefore, visitor economic activity is estimated by multiplying this total (601,427) by average per-visitor, per-trip spending as reported by the Las Vegas Convention and Visitors Authority (LVCVA) plus our estimate of gaming, \$799.¹¹

D. Total Primary Impact

The primary impacts of UNLV to the Southern Nevada economy are summarized in Table 1. In total, UNLV's primary quantitative economic impact is estimated at nearly \$1,051 million in 2013. This is larger than the entire gross domestic product of the nation of Gambia.

¹⁰ We provide a detail analysis of the impact of UNLV event venues in the appendix at the end of the report.

¹¹ We subtract spending on shows and entertainment from LVCVA's estimate of average visitor spending in this analysis because the events attended already capture the visitor's entertainment budget.

Table 1: Total Estimated Primary Impact of UNLV*	
University Employment	2,966 jobs
University Employee Wages	\$227 million
University Demand for Goods and Services	\$93 million
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Visitor Economic Activity	\$480 million
Total Primary Economic Activity	\$1,051 million
*Fiscal Year 2013	

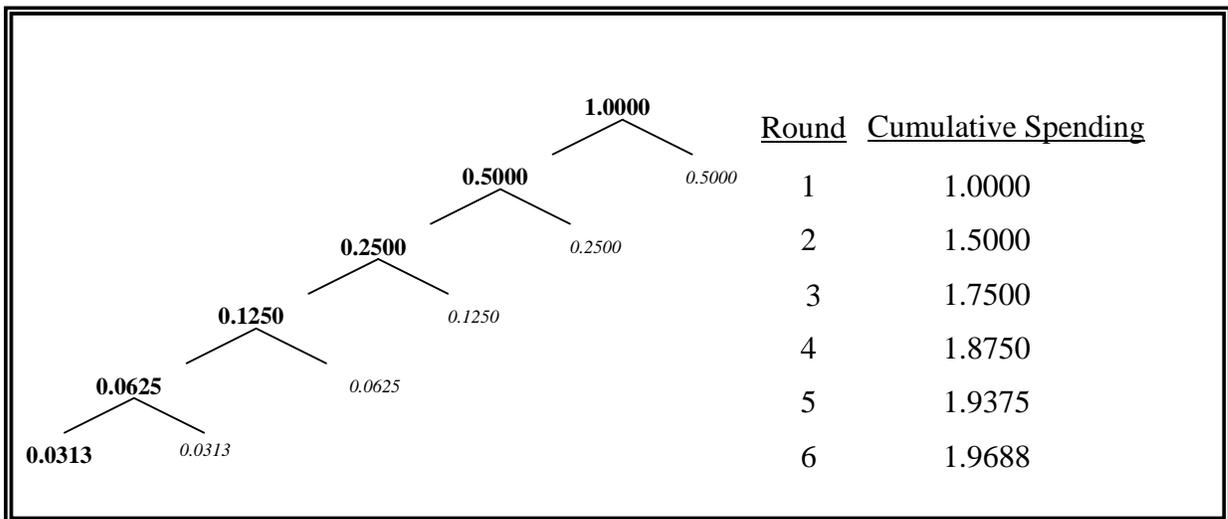
III. Spinoff Impacts

All primary impacts have spinoff impacts that multiply their effects substantially. Spinoff impacts are the result of additional rounds of spending that take place after the direct spending has occurred. For example, wages paid to a university employee may be used to purchase groceries. Thus, the same money that supports the university employee's job may also support the job of a grocery-store employee. The grocery-store employee will, in turn, spend money on other goods and services in the community, creating more jobs and wages. As the money goes through multiple rounds of spending, the spinoff impact is created in a daisy-chain effect.

Not all successive spending ripples through the local economy, fractions are leaked to other economies as residents purchase imported goods. Therefore, the amount counted in all subsequent rounds of spending for this analysis depends on the average propensity of local residents to consume local goods and services. Figure 3 shows economic effects of successive spending when the propensity to consume locally is 0.5—that is, when, for every dollar spent in the local economy, half is used

to purchase local goods and services, and the other half is saved or spent on imports. An initial dollar is spent in the local economy in the first round, 50 cents is spent in the second round, 25 cents in the third round, and so forth. After six rounds of spending, an additional \$0.97 of spinoff expenditure has been generated in the local economy by the \$1 primary impact—that is, the initial expenditure of \$1 results in a total expenditure of \$1.97.

Figure 3: Illustrative Example of Spinoff Expenditures Generation



The extremely simple example in Figure 3 is for illustrative purposes only. The actual estimation of spinoff effects for a real economy is necessarily complicated, depending on how money filters through the various components of an economy. Thus, we employ a structural model of Clark County’s economy developed by Regional Economic Models, Inc. (REMI) to calculate these spinoff impacts. This input-output model takes the numerous complex interactions of an economy into

account in following the primary impact as it flows through the system creating spinoff impacts.

UNLV's primary impacts are used as inputs in the REMI model, which filters them through the model of the Clark County economy and outputs the resulting effects. Essentially, the REMI model addresses the question: If UNLV shut down in 2013, how would this impact our community? We derive the spinoff impacts of the university over time from the REMI results.

The REMI model was chosen over other economic models because it has several desirable features. First, the REMI model contains over 100 economic and demographic relationships carefully constructed to represent regional economies and includes equations to account for migration and trade between regions.¹² These relationships are constructed utilizing the latest economic theory and empirical understanding.

Second, REMI is able to calculate how the impacts filter through the economy over an extended period of time.¹³ This is important for understanding the true economic impact of the university; for example, the loss of educated workers may have a delayed impact, only being fully realized as firms replace their work forces over several years. Other impact modeling frameworks fail to address this issue.

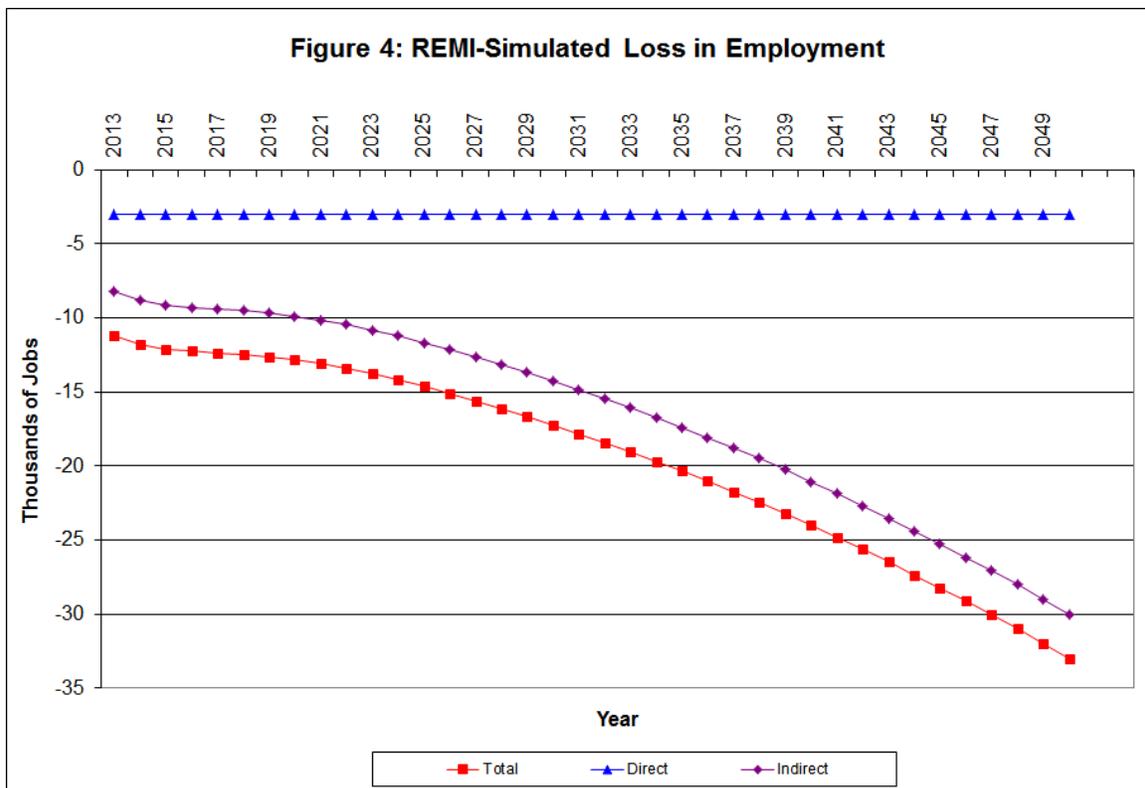
Finally, the REMI model is extremely flexible in its modeling capabilities, allowing us to tailor the model to the specific needs of the university in this report. For example, the closure of a university has a unique effect on the surrounding area

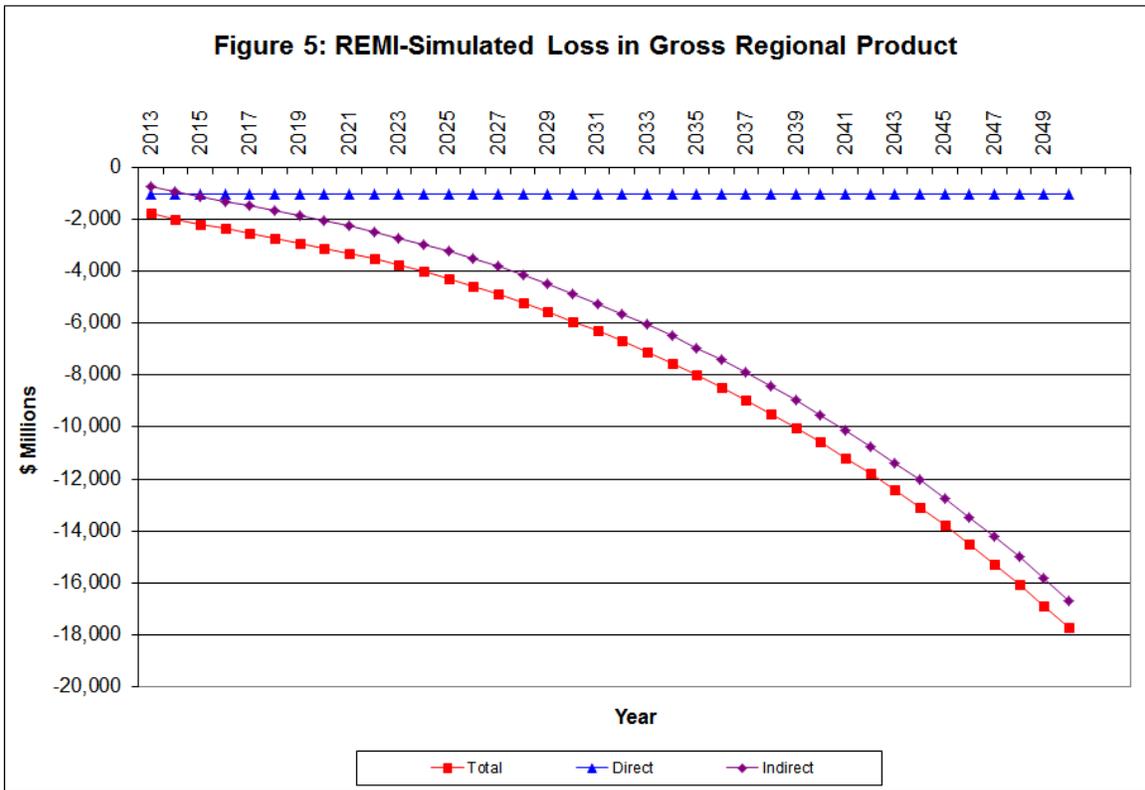
¹² The data used to construct the model begin in 1969.

¹³ Note that Figure 3 gives no indication of how long each round of spending takes to complete.

because lack of education will lead to productivity losses to local industry. The 1994 UNLV impact study did not address these extra effects. We model this unique aspect of the university “firm” by assuming productivity losses compound at a rate of 0.25 percent per year after an initial negative shock of 2.0 percent, which we feel is a conservative estimate of the projected productivity effects. In short, this adjustment picks up the full benefits of a university’s support of local growth and development.

Figures 4 and 5 show UNLV’s spinoff impacts on employment and gross regional product (GRP) (expenditures) over time. In all cases, the effect is negative and significant. The model predicts that the initial spinoff impact of UNLV on employment will result in the loss of roughly 8,245 jobs. Initial spinoff losses in total expenditures are \$721 million.





One can use the initial, i.e. short-run, spinoff economic impact to estimate the local economic multiplier resulting from \$1 of student expenditures. The multiplier is given by the sum of primary impacts and short-run spinoff impacts, divided by the primary spinoff impacts, which equals \$1.7.¹⁴ This implies that each dollar of student spending generates approximately 1.7 dollars of economic activity for Clark County.

UNLV’s long-run impact on spinoff employment is substantial. If the university were to have closed in 2013, we estimate a total spinoff loss of about 30,000 non-UNLV jobs by 2050, roughly 10 times the primary employment impact. The impact of UNLV on Southern Nevada’s GRP also grows over time, from \$721

¹⁴ $(\$1,051 \text{ million} + \$721 \text{ million}) / \$1,051 \text{ million}$.

million in the first year to \$16.7 billion by 2050. The total short- and long-run impacts on employment and GRP are summarized in Table 2.

Table 2: Total Estimated Spinoff Impact of UNLV	
Short-Run Impacts*	
Clark County Employment (non-UNLV)	8,245 jobs
Gross Regional Product	\$721 million
Long-Run Impacts**	
Clark County Employment (non-UNLV)	30,001 jobs
Gross Regional Product	\$16,689 million
*For 2013 (if Southern Nevada loses UNLV in 2013)	
**For 2013-2050 (if Southern Nevada loses UNLV in 2013)	

IV. Qualitative Impacts

In addition to quantifiable benefits, UNLV also confers Southern Nevada with a multitude of qualitative benefits that cannot be included in a traditional (quantitative) economic impact estimate. Although a complete analysis of these types of benefits is beyond the scope of this study (contingent valuation methods and primary data collection would be required), the existence and importance of these benefits are widely acknowledged in the literature.

Although not specific to UNLV, the literature discussing qualitative effects of a university is large. Caffrey and Isaacs' instruction manual, *Estimating the Impact of a College or University on the Local Economy*, is often cited for its insightful discussion of qualitative impacts.¹⁵ The reader is also referred to Rogers' paper, "The Role of the

¹⁵ Caffrey, John and Herbert H. Isaacs. 1971. *Estimating the Impact of a College or University on the Local Economy*. Washington, D.C.: American Council on Education.

Research University in the Spinoff of High Technology Companies,”¹⁶ and Goldstein and Luger’s paper, “What Is the Role of Public Universities in Regional Economic Development?”¹⁷ Several commonly cited qualitative benefits from these and other studies are shown in Table 3. All in all, qualitative factors represent important economic benefits, though we have not included them in our estimates. Thus, the final numbers presented in this report must be viewed as a conservative lower bound.

Table 3: Possible Qualitative Impacts of UNLV
<ul style="list-style-type: none"> • Enhanced participation in political processes • Increased demographic mobility • Increased local services • Larger supply and demand for cultural goods • Greater participation in educational advancement opportunities • Increased technology transfer and development in local industry • Better quality of life

V. Summary of Total Quantitative Impacts and Conclusions

Table 4 summarizes the total quantitative impacts of UNLV on the Southern Nevada economy. We estimate that UNLV generated a total of \$1,772 million¹⁸ to the Southern Nevada economy during the year 2013. UNLV’s state appropriations amounted to \$149 million in 2013. Hence, UNLV’s Economic Impact Ratio (EIR) for 2013 is 11.9.¹⁹ In other words, for every dollar of state appropriation funds the

¹⁶ Rogers, E. M. 1986. “The Role of the Research University in the Spinoff of High Technology Companies.” *Technovation*, 4: 169-181.

¹⁷ Goldstein, Harvey and Michael Luger. 1997. “What Is the Role of Public Universities in Regional Economic Development?” In Richard D. Bingham and Robert Mier (eds.), *Dilemmas of Urban Economic Development*. Thousand Oaks, California: Sage Publications, p. 104-134.

¹⁸ This figure is obtained by summing the primary impact (\$1,051 million) and the short-term spinoff impacts (\$721 million).

¹⁹ The Economic Impact Ratio is defined as the Total Economic Impact divided by State Appropriations.

university generated an additional \$11.9 in economic activity to the Southern Nevada community. UNLV’s EIR was 3.8 in 1993 and 8.6 in 2011.²⁰ This increase over time is also a reflection of the maturity of UNLV as a research university.

	Primary 2013	+	Spinoff 2013-2050	=	Total 2013-2050*
Employment	2,966	+	30,001	=	32,967 jobs
Gross Regional Product	\$1,051	+	\$16,689	=	\$17,740 million

* Cumulative impact for entire period.

We also find that, by the year 2050, UNLV will supply the valley with nearly 33,000 jobs and roughly \$17.7 billion in economic activity. These estimates reflect a full accounting of magnifying effects. These estimates are, nonetheless, conservative as they do not include the numerous qualitative benefits the university imparts to the Las Vegas economy.

Given that these estimates represent a lower bound of the total economic impact, we conclude that UNLV plays a fundamental part of the Southern Nevada economy. As the only major university in a rapidly diversifying economy, moreover, the university will no doubt contribute to the region’s future well-being and provide resources in helping the community reach its full potential.

²⁰ Tra, Constant, R. Keith Schwer, and Lynn Bretthorst. 2008. *The Economic Impact of the University of Nevada, Las Vegas on Southern Nevada*.

Appendix: Economic Impact of Spending by Visitors at UNLV Event Venues

Table A1: Total Estimated Economic Impact* of Visitors to Events at All UNLV Venues	
Lodging**	\$78 million
Food and Beverage	\$168 million
Local Tansport	\$36 million
Shopping (Retail)	\$85 million
Sightseeing	\$6 million
Gaming***	\$109 million
Total Primary Economic Activity	\$480 million
Total Spinoff Impact	\$85 million
Total Estimated Economic Impact	\$565 million
* Fiscal Year 2013	
** Calculated as: ((lodging per night x nights stayed)/number of room occupants) x visitors	
*** Calculated as: total gaming revenue x portion attributable to visitors/visitor volume	

Table A2: Total Estimated Economic Impact* of Visitors to Events at the Thomas & Mack Center	
Lodging**	\$55 million
Food and Beverage	\$118 million
Local Tansport	\$25 million
Shopping (Retail)	\$60 million
Sightseeing	\$4 million
Gaming***	\$77 million
Total Primary Economic Activity	\$338 million
Total Spinoff Impact	\$60 million
Total Estimated Economic Impact	\$398 million
* Fiscal Year 2013	
** Calculated as: ((lodging per night x nights stayed)/number of room occupants) x visitors	
*** Calculated as: total gaming revenue x portion attributable to visitors/visitor volume	

