



The Undergraduate College Education in USA: Schools with Best and Worst ROI

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Abstract

This study examined the ROI, total 4-year education cost, graduation rate and average loan amount for undergraduate education across schools in USA. The results indicate that students from Southwest region of USA enjoyed highest mean ROI (6.69%) along with highest median ROI (6.50%) with minimum standard deviation of 2.03% among all five regional analyzed over 20-year period. Yale University reports the highest graduation rate of 98 percent in the nation. Georgia Institute of Technology (In-state) enjoyed highest ROI of 12.30 percent over 20-years period of study.

Keywords: College ROI Cost Graduation Undergraduate

BREIF LITERATURE REVIEW

The cost of an undergraduate college education has been rising each year. The basic economic question is the time required to pay back educational debt after entering the workforce in USA. Allie Bidwell (February 2015) writes “It's a strange paradox. At a time when Americans overwhelmingly say it's important to receive a college education, their faith in the economic value of the investment is slipping, new research shows. A survey of more than 2,000 adults – 900 of whom were college graduates – released Tuesday by education technology company Greenwood Hall, shows more than half of graduates say those leaving college with a degree now will see a lower return on their education investment than those 10 to 15 years ago. Simply put, while the cost of college continues to rise and the economy is slowly coming out of the Great Recession, today's graduates might not get as much bang for their buck.”

Students may have piled a huge education debt loan upon graduation. 70% of graduating seniors will enter the workforce with an average student loan debt of \$29,400 (Carrie Sealy-Morris 2016). Hence, the question of ROI on college education is very important for graduates. ROI for a college degree is different than ROI of an investment/project due to opportunity costs; like students' time, working possibilities, and lost entertainments. In addition, students also have to study continuously and go through stress and pressure of regular assignments and exams. Thus, ROI on college education may be different than business's ROI.

Carrie Sealy-Morris (2016) writes “There are a lot of factors to take into consideration. You invest a lot more than just money into a college education – you invest time, work, and stress. That makes college fundamentally different from many other investments. ROI could be as simple as what income people make vs. what they paid for college and what they owe in student debt, but that is still too simple. Income isn't necessarily a measure of success, and student loan debt could just mean you took out more loans than you needed, not that the school was too expensive. While some short sighted people just want to know how much

money they can make straight out of school, others want a certain level of long-term career satisfaction. Neither is wrong.”

Studies like PayScale’s help would-be students (and their parents) make more informed choices. As Americans start to realize how much a bad choice can hurt them, they will demand more transparency. Some colleges are providing it, prodded by the federal government. For example, the University of Texas recently launched a website showing how much its graduates earn and owe after five years. (The Economist: Higher Education-6).

In the past, college education used to lead to better, brighter, and financially lucrative professional careers. However, in the present times, undergraduate education may not act as a ticket to better careers but may also result in significant educational loans upon graduation. According to the Federal Reserve Bank of New York, 44 percent of recent college graduates are underemployed -- working in jobs that don't require their degree -- as of 2012 (PayScale College ROI Report: Best Value Colleges: www.payscale.com/college-roi)

In spite of numerous articles printed in magazines, academic journals lack the analytical research on this topic. Therefore, this study is an initial step to analyze ROI and other factors relevant to students’ educational goals from an academic point.

DATA AND METHODOLOGY

The data is collected from information collected by Payscale.com's list of ROI rankings. Payscale.com website provides useful information on ROI and other factors important to college graduates. PayScale.com administers the largest real-time salary survey in the world with more than 150,000 new survey records added every month. The database of more than 54 million total salary profiles is updated nightly to reflect the most detailed, up-to-date compensation information available. Payscale.com data collection is strongly correlated with the size of the pool being considered, representing the diversity of the general workforce.

Both in-State and out-of-State educational institutions are included in this study. The following four variables (factors) are analyzed in this study:

1. Total 4-Year Cost (Principal Amount Invested): Full cost including tuition & fees, room & board and books & for a 2014 graduate. Actual net cost may vary based on a student's academic success and family income. Source: IPEDS. This variable is analyzed separately and is also used in computing ROI.
2. 20 Years ROI (Gain in Dollars over 20 Years Period after graduation): Difference between 20 years Median Pay for a bachelor’s grad and 24year Median pay for a high school grade minus total 4-year cost. This variable is not analyzed separately but is used in computing ROI.
3. Graduation Rate: Percent of full-time, first-time degree seeking undergraduate students who began their studies at the given school and graduate within 6 years. Source: IPEDS
4. Average Loan Amount: Received by full-time, first time degree seeking undergraduate students for the 2012-2013 school year, multiplied to represent amount over 4 years. Includes all Title IV loans and all institutionally and privately-sponsored student loans. Source: IPEDS
5. Annualized Return on Investment (ROI) Formula

Annual Percentage Yield (APY) = $(\text{principal} + \text{gain} / \text{principal}) (1/\text{years}) - 1$

For example:

Look at Indiana University Bloomington (in-State education)

20-Year Net ROI = \$303,000 (Gain over 20-years period)

Total 4-Year Cost = \$90,000 (Principal)

APY = $(\$393,000/90,000) (1/20) - 1 = 4.36660.05 - 1 = 1.076483 - 1 = 7.65\%$

Thus, ROI for Indian University Bloomington (in-State) graduate is 7.65% over a period of 20-years after graduation and entering the workforce.

The data is collected for 1,278 educational institutions across USA. However, incomplete data for 64 schools was dropped thereby reducing dataset to 1,214 schools. The data is also further divided in the five categories as follows:

- a. Midwest Region
- b. Southeast Region
- c. Northeast Region
- d. Southwest Region
- e. West Region

RESULTS

All schools in USA

The results of the analysis across all schools in USA are shown in Table 1 which shows that the mean annual ROI for undergraduate education in USA is 5.39 percent over the last twenty-year period with a standard deviation of 2.64 percent. The median annual income over the same period is found to be 5.50 percent.

The graduates from Georgia Institute of Technology (In-State) earned the highest annual ROI of 12.30 percent per year for 20 years, while Jackson State University, Mississippi (Out-of-State) graduates earned an average ROI of -10.30%. Comparison of total 4-year cost of education reveals that students at University of Chicago (Private) spent a total of \$245,000 while the total of cost education (\$46,500) at Elizabeth City State University of North Carolina was the cheapest among all schools in USA.

Yale produced highest graduation rate of 98 percent for the undergraduate students, while students at Baker College Flint MI were graduating at the lowest rate of 11 percent during the study period. The students at Clemson University (Out-of-State) took the highest loan of \$51,600 during their undergraduate educational life. On the other side, students at Colgate University (Private) were able to graduate with a minimum average loan of \$9,600 only.

Schools in Midwest Region

Table 2 (Panel A) shows the results for schools in Midwest Region. Data for 319 schools is used and incomplete data of 13 schools is excluded in this group.

The findings of this study indicate that the mean annual ROI for undergraduate education in Midwest region is 5.19 percent over the last twenty-year period with a standard deviation of 2.51 percent. Both these percentages are below the national average indicating that mean ROI is lower than national average with a tighter probability distribution. The median annual income is 5.35 percent which is slightly smaller than the national average.

The graduates from South Dakota School of Mines and Technology (In-State) earned the highest annual ROI of 11.94 percent per year for 20 years, while Ashland University (Private) of Ohio's graduates earned an average ROI of -3.30%. In this group of schools, students at

University of Chicago (Private) had to spend 4-year education cost of \$245,000 (which is also the highest in USA), whereas students at Missouri Southern State University faced the cheapest 4-year educational expense of \$58,900.

The highest graduation rate of 95 percent was reported by University of Notre Dame (Private), while students at Baker College Flint MI were graduating at the lowest rate of 11 percent during the study period (which is also lowest in USA). The students at Kettering University (Private) of Michigan had to take the highest educational loan of \$45,600. But, the students at Drury University (Private) of Missouri took the lowest loan of \$16,160 during their educational life.

Schools in Southeast Region

This study's results for schools in Southeast region are reported in Table 2 (Panel B). Data for 323 schools is used and incomplete data of 18 schools is excluded.

The results shown in this project suggest that the mean annual ROI for undergraduate education in Southeast region is 4.98 percent over the last twenty-year period with a standard deviation of 3.02 percent. While mean ROI is lower than national average, the standard deviation is higher national norms. Thus, according to findings of this study, mean ROI of this group is lower than national average with much wider distribution indicating relatively poor performance of the group. The median annual income is 5.19 percent which is smaller than national average.

The graduates from Georgia Institute of Technology (In-State) earned the highest annual ROI of 12.30 percent (which is also the highest in nation) per year for 20 years, while Jackson State University, Mississippi (Out-of-State) graduates earned an average ROI of -10.16% (which is also the lowest across USA).

In this group of schools, students at Georgetown University-Washington DC (Private) ended up paying \$236,700 (highest) for their 4-years education as compare to the lowest educational expenses of only \$46,500 at Elizabeth City State University (In-State) which is also the smallest educational cost in nation.

Students at Duke University enjoyed the highest graduation rate of 94 percent, while students at West Virginia State University (both In-State and Out-of-State) had to settle with the lowest graduation rate of 19 percent. Students at Clemson University (both In-State and Out-of-State) took highest loan of \$51,600 (which is also the highest for nation). In contrast, Southern University and A&M College (both In-State and Out-of-State) were able to graduate with the minimum educational loan of mere \$12,760.

Schools in Northeast Region

Table 2 (Panel C) shows the results of this project for schools in Northeast region. Data for 299 schools is analyzed in this group whereas incomplete data of 19 schools is excluded in this project.

Mean annual ROI for undergraduate education in this region is 5.20 percent over the last twenty-year period with a standard deviation of 2.19 percent. Similar to Midwest region, both these percentages are below national average indicating that mean ROI is lower than national average with a tighter probability distribution. The median annual income is 5.31percent lower than the national norms. Massachusetts Maritime Academy (In-State) graduates were

able to earn the highest annual ROI of 11.52 percent for 20-years period, while Centenary College (Private) of New Jersey graduates earned minimum ROI of -2.07%.

In this group of schools, students at Columbia University (Private) paid \$241,600 (highest) for their 4-years education as compare to the lowest educational expenses of \$77,300 00 at Rhode Island College (in-State). Yale University graduates enjoyed a graduation rate of 98 percent (highest in the nation), while students of Long Island University Brooklyn (private) faced the lowest graduation rate of 30 percent only. University of New Haven (private) students took the highest loan of \$49,200, while Colgate University (private) graduates were able to graduate with minimum educational loan of mere \$9,760 (which is also lowest in USA).

Schools in Southwest Region

Table 2-Panel D shows that data for 323 schools is analyzed in this group while incomplete data of 18 schools is excluded

Mean annual ROI for undergraduate education in this region is 6.69 percent much higher than national average with a standard deviation of 2.03 percent much lower than national average. In fact, this group has the highest mean ROI and lowest standard. The median annual income is 6.50 percent which is also highest among all regions. Thus, the results reported in this analysis indicate that graduates of Southwest region enjoyed highest return with least risk among all five regions studied.

New Mexico Institute of Mining and Technology (In-State) graduates received highest ROI of 11.87 percent while the lowest ROI of only 0.25% belonged to the graduates of Oral Roberts University of Oklahoma. Southern Methodist University (Private) students faced highest educational cost of \$229,300 whereas students at Northeastern University (In-State) of Oklahoma were able to graduate with a minimum cost of \$53,300. Highest graduation rate of 91% is enjoyed by Rice University students while graduates at Texas Southern University had to settle with the lowest graduation rate of 16 percent.

Comparison of average loan for graduation shows a tie between Baylor University (private) and Texas Southern University (In-State) for loan of \$50,400. In contrast, students at University of Texas –Pan American (IN-State) graduated with a minimum loan of \$15,320.

Schools in West Region

This study's results for schools in West region are reported in Table 2 (Panel E). Data for 178 schools is used and incomplete data of 11 schools is excluded.

The results shown in Table suggest that mean annual ROI for undergraduate education in West region is 6.09 percent over the last twenty-year period with a standard deviation of 2.79 percent. While mean ROI is higher than national average, the standard deviation is also higher than national norms. Thus, according to findings of this study, mean ROI of this group is higher than national average with much wider distribution. Median ROI for the group is 6.08% which is also higher than national average. A closer look at table 2 also indicates that colleges in West region are second to colleges in Southwest as per ROI ranking.

Graduates of Brigham Young University earned highest ROI of 12.28 percent while Adams State College (Out-of-State) graduates earned minimum ROI of -6.96 percent. The maximum educational cost of \$238,100 belonged to graduates of Occidental College, whereas students at University of Alaska (Fairbanks campus) were able to graduate with a minimum cost of \$66,300.

Highest graduation rate of 96% is reported at Stanford University while students at Adams State College (both In-State and Out-of-State) received the lowest graduation rate of 23 percent. Maximum educational loan of \$45,600 was taken by graduates of Dominican University of California whereas graduates at California State University-Los Angeles (both In-State and Out-of-State) were able to graduate with a minimum loan of \$16,420.

CONCLUSION

The results of this study indicate that students from Southwest region of USA enjoyed highest mean ROI (6.69%) along with highest median ROI (6.50%) with minimum standard deviation of 2.03% among all five regional analyzed over 20-year period. Colleges in West region are second to colleges in Southwest as per ROI ranking. Students of colleges in Northeast region had to pay the highest educational cost (\$152,577) over the period of study but they also enjoyed the highest graduation rate of 63.22% among five regions. Yale University reports the highest graduation rate of 98 percent in the nation. Georgia Institute of Technology (In-state) enjoyed highest ROI of 12.30 percent over 20-years period of study.

Table I: Undergraduate College Degree's Return on Investment across Schools in USA

	Mean	Standard Deviation	Median
Annual ROI	5.39%	2.64%	5.50%
Total 4 Year Cost	\$130,233	\$47,642	\$121,900
Graduation Rate	56.71%	17.06%	55.00%
Average Loan Amount	\$27,878	\$5,642	\$27,400
For the Group	Name of School		Value
Maximum Annual ROI	Georgia Institute of Technology(In-State)		12.30%
Minimum Annual ROI	Jackson State University (JSU)(Out-of-State)-MS		-10.16%
Maximum Total 4 Year Cost	University of Chicago(Private)		\$245,000
Minimum Total 4 Year Cost	Elizabeth City State University (ECSU)(In-State)-NC		\$46,500
Maximum Graduation Rate	Yale University(Private)		98.00%
Minimum Graduation Rate	Baker College - Flint, MI(Private)		11.00%
Maximum Average Loan Amount	Clemson University(Out-of-State)		\$51,600
Minimum Average Loan Amount	Colgate University(Private)-NY		\$9,680
Total Number of Schools	1214*		
* Data for additional 64 schools was incomplete and hence dropped from the analysis			

Table II (Panel A): Undergraduate College Degree's Return on Investment Across Schools in Midwest

	Mean	Standard Deviation	Median
Annual ROI	5.19%	2.51%	5.35%
Total 4 Year Cost	\$124,471	\$42,734	\$120,200
Graduation Rate	54.97%	15.82%	54.00%
Average Loan Amount	\$27,916	\$4,833	\$27,440
For the Group	Name of School		Value
Maximum Annual ROI	South Dakota School of Mines & Technology(In-State)		11.94%
Minimum Annual ROI	Ashland University(Private)-OH		-3.30%
Maximum Total 4 Year Cost	University of Chicago(Private)		\$245,000
Minimum Total 4 Year Cost	Missouri Southern State University (MSSU)(In-State)		\$58,900
Maximum Graduation Rate	University of Notre Dame(Private)		95.00%

Minimum Graduation Rate	Baker College - Flint, MI(Private)	11.00%
Maximum Average Loan Amount	Kettering University(Private)-MI	\$45,600
Minimum Average Loan Amount	Drury University(Private)-MO	\$16,160
Total Number of Schools	319*	
* Data for additional 13 schools was incomplete and hence dropped from the analysis		

Table II (Panel B): Undergraduate College Degree's Return on Investment Across Schools in Southeast

	Mean	Standard Deviation	Median
Annual ROI	4.98%	3.02%	5.19%
Total 4 Year Cost	\$116,972	\$41,851	\$107,400
Graduation Rate	51.04%	18.11%	48.00%
Average Loan Amount	\$26,704	\$5,358	\$26,840
For the Group			
	Name of School	Value	
Maximum Annual ROI	Georgia Institute of Technology(In-State)	12.30%	
Minimum Annual ROI	Jackson State University (JSU)(Out-of-State)	-10.16%	
Maximum Total 4 Year Cost	Georgetown University - Washington D.C.(Private)	\$236,700	
Minimum Total 4 Year Cost	Elizabeth City State University (ECSU)(In-State)	\$46,500	
Maximum Graduation Rate	Duke University(Private)	94.00%	
Minimum Graduation Rate	West Virginia State University(Both: In-State and Out-State)	19.00%	
Maximum Average Loan Amount	Clemson University(Both: In-State and Out-State)	\$51,600	
Minimum Average Loan Amount	Southern University and A&M College(Both: In-State & Out-State)-LA	\$12,760	
Total Number of Schools	323*		
* Data for additional 18 schools was incomplete and hence dropped from the analysis			

Table II (Panel C): Undergraduate College Degree's Return on Investment Across Schools in Northeast

	Mean	S.D.	Median
Annual ROI	5.20%	2.19%	5.31%
Total 4 Year Cost	\$152,577	\$50,348	\$148,300
Graduation Rate	63.22%	16.73%	63.00%
Average Loan Amount	\$30,469	\$6,741	\$30,500
For the Group			
	Name of School	Value	
Maximum Annual ROI	Massachusetts Maritime Academy(In-State)	11.52%	
Minimum Annual ROI	Centenary College(Private)-New Jersey	-2.07%	
Maximum Total 4 Year Cost	Columbia University(Private)	\$241,600	
Minimum Total 4 Year Cost	Rhode Island College(In-State)	\$77,300	
Maximum Graduation Rate	Yale University(Private)	98.00%	
Minimum Graduation Rate	Long Island University - Brooklyn(Private)	30.00%	
Maximum Average Loan Amount	University of New Haven(Private)-CT	\$49,200	
Minimum Average Loan Amount	Colgate University(Private)-NY	\$9,680	
Total Number of Schools	299*		
* Data for additional 19 schools was incomplete and hence dropped from the analysis			

Table II (Panel D): Undergraduate College Degree's Return on Investment Across Schools in Southwest

	Mean	Standard Deviation	Median
Annual ROI	6.69%	2.03%	6.50%
Total 4 Year Cost	\$108,743	\$38,354	\$97,400
Graduation Rate	46.42%	16.67%	44.00%
Average Loan Amount	\$25,629	\$6,175	\$24,700
For the Group			
	Name of School	Value	
Maximum Annual ROI	New Mexico Institute of Mining and Technology (In-State)	11.87%	
Minimum Annual ROI	Oral Roberts University (ORU)(Private)-OK	0.25%	
Maximum Total 4 Year Cost	Southern Methodist University (SMU)(Private)	\$229,300	
Minimum Total 4 Year Cost	Northeastern State University(In-State)-OK	\$53,300	
Maximum Graduation Rate	Rice University(Private)	91.00%	
Minimum Graduation Rate	Texas Southern University (Out-of-State)	16.00%	
Maximum Average Loan Amount	Tie- Baylor University(Private)	\$50,400	
	Tie- Texas Southern University(In-State)		
Minimum Average Loan Amount	University of Texas - Pan American (UTPA)(In-State)	\$15,320	
Total Number of Schools	95*		
* Data for additional 3 schools was incomplete and hence dropped from the analysis			

Table II (Panel E): Undergraduate College Degree's Return on Investment Across Schools in West

	Mean	S.D.	Median
Annual ROI	6.09%	2.79%	6.08%
Total 4 Year Cost	\$137,053	\$50,182	\$128,750
Graduation Rate	55.67%	18.29%	53.00%
Average Loan Amount	\$24,862	\$4,645	\$23,680
For the Group			
	Name of School	Value	
Maximum Annual ROI	Brigham Young University (BYU)(Private)	12.28%	
Minimum Annual ROI	Adams State College(Out-of-State)	-6.96%	
Maximum Total 4 Year Cost	Occidental College(Private)	\$238,100	
Minimum Total 4 Year Cost	University of Alaska - Fairbanks Campus(In-State)	\$66,300	
Maximum Graduation Rate	Stanford University(Private)	96.00%	
Minimum Graduation Rate	Adams State College(Both: In-State and Out-State)	23.00%	
Maximum Average Loan Amount	Dominican University of California(Private)	\$45,600	
Minimum Average Loan Amount	California State University-Los Angeles(Both: In-State &Out-State)	\$16,240	
Total Number of Schools	178*		
* Data for additional 11 schools was incomplete and hence dropped from the analysis			

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