

# Investment Strategies and Returns of University Endowment Funds

**K. Thomas Liaw**

Department of Economics and Finance

Tobin College of Business

St. John's University

8000 Utopia Parkway

Queens, NY 11439

[Liawk@stjohns.edu](mailto:Liawk@stjohns.edu)

718 9907308

## ***Abstract***

*The endowment model generated strong returns for mega university endowment funds. Such success has attracted endowments of all sizes to increase exposure in alternative assets. From 2002 – 2008 period to 2009 – 2017 period, the large endowments (with more than \$1 billion) increased the exposure by more than 20 percent to close to 60 percent. Other endowments similarly allocated a larger portion of their portfolios in alternatives. However, many small and midsize endowments failed to generate the anticipated higher returns and they underperformed the passive index benchmark. Even for large endowments, the average investment returns fell short of the passive 60% equity/40% fixed-income benchmark during 2009 – 2017 period. The preliminary results from our panel data regressions did not show positive marginal impacts of alternatives on investment returns.*

Keywords: University endowment fund, Endowment model, Spending rate, Investment strategies, Asset allocation, Alternative assets

## 1. Introduction and Literature Review

Large university endowments have performed strongly since they started increasing allocation from public investments of stocks and bonds to illiquid alternative assets such as hedge funds, private equity, and venture capital in 1980s (the endowment model). Observers often cited the successes of Harvard, Yale, and Princeton universities as evidence of higher returns from alternative assets. Many smaller endowments have followed, increasing exposure to alternatives. Data from National Association of College and University Business Officers (NACUBO) showed university endowments of all sizes have significantly increased exposure to alternatives. Data also showed a positive relationship between university endowment size and asset allocation in alternatives. In addition, large university endowments (with more than \$1 billion in assets) have generated better investment returns. However, majority of university endowments, especially those with less than \$1 billion in size, have not been able to replicate the same strong investment performance. This is the primary reason that Wallick, Wimmer, and Balsamo (2014) concluded that majority of endowments would have been better off had they simply invested in passive market indexes.

There is rich literature on asset allocations of university endowments. Cejnek, et al. (2013) provided a comprehensive review of publications in how university endowments managed their money. They classified papers in four areas. First on the subject of asset allocation, they discussed the theoretical framework and relevant observations across time and across types of endowments. On the subject of performance, they reviewed risk-adjusted performance by type and size of endowment. Third, they reviewed literature on spending and what endowments did in practice. The fourth area in their discussions is organization. They reviewed governance structure and discussed investment policy statement.

Goetzmann and Oster (2012) analyzed the factors contributing to the shift in asset allocation of university endowments towards alternative investments. They found that universities competing in the same markets for students follow similar asset allocation policies and universities used alternatives to catch up to their close rivals in competing for undergraduate applications. They showed evidence that when a school's return lagged behind its immediate rival, it tended to change its asset allocation. In addition, endowments with recent positive experience with alternative strategies tend to increase exposure as well.

Lerner et al. (2008) discussed trends in university endowment returns and investments in the United States between 1992 and 2005. The study showed that ivy league schools, private schools, universities with large endowments, and high SAT scores had better performances. The allocation in alternative assets contributed to better returns as well. The skill and experience of investment managers also played a role in the success of endowment investment. In addition, the levels of compensation were positively correlated with excess returns, size of endowments, and SAT scores. Across endowments, institutional characteristics such as endowment size and admissions selectivity are better predictors of success than the allocation to risky asset classes. Moreover, top endowments might possess superior asset selection ability beyond their strategies for allocating funds to certain asset classes.

Brown, Garlappi, and Tiu (2010) examined asset allocation and performance of university endowment funds. They found that asset allocation accounted for about 75 percent of return level and variation in the time series. However, the average contribution of an endowment manager's asset allocation to cross-sectional variation was only about 10 percent. They also showed that actively managed funds generated significantly larger alphas than passive ones, because active

mangers exploited their security selection abilities by over-weighting asset classes in which they had superior skills.

Dimmock (2010) tested the effect of background risk (the volatility of other income) on university endowment portfolios. The results showed that higher background risk is associated with lower portfolio standard deviations. Universities with higher background risk invested significantly more in fixed income and less in alternative assets. A one standard deviation increase in background risk increases the allocation to fixed income by about 15 percent relative to the mean. Rosen and Sappington (2015) also examined how other flows of income to the university (background income) affected asset allocation decisions by university endowment funds. They looked at both the decision to invest in alternative assets and the proportion of portfolio allocated to such assets. They showed that managers incorporated expected level and variability of background income into their portfolio allocation decisions. Universities that expected higher levels of background income were more likely to invest in alternative assets and allocated a larger percentage of their endowments to alternative assets. The decision to include alternative assets increased by 11.3 percent with a one standard deviation increase in expected background income and decreased by 8.2 percent with a one standard deviation increase in the variability of background income. In addition, the allocation to alternative assets increases by 7.5 percent and decreases by 1.1 percent with a one standard deviation increase in expected background income and its variability, respectively.

In spending area, Brown, et al. (2014) used large financial market fluctuations to analyze endowment payout behavior. They found that university endowments reduced payouts relative to their stated policies following negative shocks, and that endowments tended to leave current payouts unchanged in response to contemporaneous positive shocks. Such endowment hoarding behavior is evident especially among endowments whose current value is close to the benchmark value at the start of the university president's tenure. They also documented the effect of negative endowment shocks on university operations.

In this paper we revisit the perceived linkage between investment performance and exposure to alternatives for university endowment funds. The analysis is based on portfolio asset allocation and return statistics published by National Association of College and University Business Officers (NACUBO) from 2002 to 2017. We discussed observations from the data and employed panel data regressions to analyze the relationships between investment performance and asset allocation (in alternatives, fixed-income, and equities). In addition, we also divided the sample period to two sub-periods, 2002 – 2008 and 2009 – 2017. As such, the paper contributes to the literature in providing additional insights in how asset allocation impacts performance, especially for time periods before and after the global financial crisis.

The article proceeds as follows. The next section provides an overview of university endowment spending rates and investment returns. Section 3 discusses changes in asset allocation and the resulting returns in recent years. This section also includes statistics for endowments of different sizes and the variability over time. In Section 4, we use panel data regressions to analyze the impact of asset allocation on investment returns. The regressions are performed for the entire sample period (2002 – 2017), before the financial crisis (2002 – 2008), and after the financial crisis (2009 – 2017). The results show that increasing exposure to alternatives does not result in higher returns. Section 5 concludes the paper.

## 2. Spending Rates and Investment Returns

To conduct our empirical research, we use data from the publications by NACUBO in the following discussions and analyses. The annual data are from 2002 to 2017. Data include spending rate, investment returns, and asset allocation in equities, fixed income, and alternatives. Data are based on academic year, not calendar year. University endowment funds are grouped to over \$1 billion, \$501 million to \$1 billion, \$101 million to \$500 million, \$51 million to \$100 million, \$25 million to \$50 million, and under \$25 million. Data also include bond market index and stock market index. The bond market index is Barclays Aggregate Bond Index (formerly Lehman Brothers Aggregate Bond Index). The index includes U.S. government, corporate and mortgage-backed securities with maturities of at least one year. The stock market index is the S&P 500 index.

University endowments have become an important source of funding. Universities thus make efforts in capital campaigns to raise money and in investment strategies to increase their investment performance. In the pursuit of higher returns, they shifted endowment investments from fixed income to equities in the 1970s and 1980s and then towards alternatives.

Table 1: Annual Spending Rates

	Over \$1 Billion	\$501 Million to \$1 Billion	\$101 Million to \$500 Million	\$51 Million to \$100 Million	\$25 Million to \$50 Million	Under \$25 Million
2002	4.8	5.0	5.1	5.3	4.9	5.2
2003	5.3	5.2	5.2	5.3	4.9	4.8
2004	5.2	5.0	5.0	4.9	4.7	4.5
2005	4.8	4.7	4.7	4.8	4.7	4.7
2006	4.5	4.5	4.6	4.7	4.7	4.7
2007	4.4	4.4	4.6	4.8	4.8	4.6
2008	4.2	4.5	4.2	4.6	4.3	4.1
2009	4.6	4.9	4.4	4.7	4.3	3.9
2010	5.6	5.7	4.9	4.6	4.1	3.5
2011	5.2	5.2	5.0	4.5	4.0	3.7
2012	4.7	4.7	4.3	4.3	3.8	3.7
2013	4.8	4.6	4.4	4.4	4.3	4.1
2014	4.6	4.3	4.3	4.4	4.2	4.6
2015	4.3	4.1	4.1	4.4	4.0	4.5
2016	4.4	4.3	4.3	4.4	4.1	3.8
2017	4.8	4.6	4.5	4.5	4.2	4.0
Average	4.76	4.73	4.60	4.66	4.38	4.28
Standard deviation	0.39	0.41	0.35	0.30	0.35	0.49

Data Source: National Association of College and University Business Officers (NACUBO).

Universities have spending policy that governs how they spend money from the endowment. Table 1 lists the annual spending rates (for academic year) from 2002 to 2017 for different-sized endowments. During this period, the spending rate declined slightly for all endowments. The

average spending rate increased with the size of the endowment. For example, the average spending rate for the largest endowments (over \$1 billion) was 4.76 percent, higher than those with smaller endowments. The spending in other groups of endowments were 4.73 percent, 4.60 percent, 4.66 percent, 4.38 percent, and 4.28 percent, respectively. The observations in Table 1 also indicate that there is no particular pattern in the variation (standard deviation) in spending rates over the sample period.

Investment performance fluctuated, as evidenced by the rates of returns listed in Table 2. Endowments lost money in three of the sample years. University endowments post a return of -6.2 percent in 2002 (the internet bubble), -18.7 percent in 2009 (global financial crisis), and -1.9 percent in 2016. The average rate of investment returns was 6.16 percent. The average spending rate for the sample period was 4.55 percent. During the time period, the spending rates decreased from 5.1 percent in 2002 to 4.4 percent in 2017.

Table 2: Average Annual Spending Rates and Investment Returns (Percentage)

Year	Spending Rate	Investment Returns
2002	5.1	-6.2
2003	5.1	3.2
2004	4.9	15.3
2005	4.7	9.3
2006	4.7	10.8
2007	4.6	17.2
2008	4.3	-3.0
2009	4.4	-18.7
2010	4.5	11.9
2011	4.6	19.2
2012	4.2	-0.3
2013	4.4	11.7
2014	4.4	15.5
2015	4.2	2.4
2016	4.3	-1.9
2017	4.4	12.2
Average	4.55	6.16
Standard deviation	0.29	10.26

Data Source: NACUBO.

### 3. Investment Strategies and Asset Allocation

As mentioned previously, large university endowments have performed strongly since some started increasing allocation from public investments to illiquid alternatives. Smaller endowments followed with increased exposure to alternatives. As a result, nearly all university endowment funds have significantly increased exposure in alternatives. However, the results of investment returns were mixed. As Table 3 shows, the average rate of returns for large endowments (over \$1 billion) was 7.781 percent, higher than any of the groups with smaller endowments during 2002 – 2017. Such performance was also better than the traditional 60% equity/40% fixed-income performance of 6.69 percent.

Table 3: Annual Returns for Different-Sized University Endowment Funds (Percentage)

Size	2002—2017	2002—2008	2009—2017
Over \$1 Billion	7.781	9.771	6.233
\$501 million to \$1 Billion	6.838	8.143	5.822
\$101 Million to \$500 Million	6.244	7.029	5.633
\$51 Million to \$100 Million	5.856	6.200	5.589
\$25 Million to \$50 Million	5.756	5.871	5.667
Under \$25 Million	5.425	4.857	5.867
60% Equity/40% Fixed-Income	6.69	4.24	8.58

Data Source: NACUBO.

The performances varied for the sub-sample periods (2002 – 2008 and 2009 – 2017). During 2002 – 2008 period, the investment performances were similar to the whole sample period. After the global financial crisis (2009 – 2017), the results showed that it is worthwhile to reexamine the investment strategy of increasing exposure to alternative assets. For the period, the largest endowments had an average of 6.233 percent gains in their investments, still better than other endowments of smaller sizes (all between 5.50 percent and 5.90 percent). However, the active investment strategies of increasing exposure to alternatives did not result in better investment gains. The simple 60% equity/40% fixed-income outperformed all groups of endowments. The passive benchmark generated 8.58 percent returns.

The investment returns after the financial crisis indicated that alternative assets are not the guarantee for better performance. But, all endowments continued to up their allocations to alternatives. Table 4 provides more details in asset allocation to alternative assets for university endowment funds of different sizes. Overall, larger endowments allocated a higher percentage of endowments in alternatives. For the sample period (2002 – 2017), the largest endowments (over \$1 billion) invested almost half of assets in alternatives (49.85 percent). The smallest endowments (under \$25 million) allocated 8.43 percent in alternatives. The pattern is that the allocation to alternatives increases with the size of endowments.

Table 4: Asset Allocation in Alternatives for Different-Sized University Endowment Funds (Percentage)

Size	2002—2017	2002—2008	2009—2017
Over \$1 Billion	49.85	38.23	58.89
\$501 million to \$1 Billion	37.89	29.19	44.67
\$101 Million to \$500 Million	27.96	20.04	34.11
\$51 Million to \$100 Million	18.53	12.20	23.44
\$25 Million to \$50 Million	14.51	10.31	17.78
Under \$25 Million	8.43	5.12	11.00

Data Source: NACUBO.

To understand investment strategies of university endowments better, we also examine their allocations in the sub-sample periods. During the first sub-sample period of 2002 – 2008, larger endowments allocated a higher percentage to alternatives. During the second sub-sample period of 2009 – 2017, their allocations to alternatives showed a similar pattern. Comparing allocations in the two sub-sample periods, university endowments increased exposure to

alternatives in the second period significantly. The largest endowments (over \$1 billion) increased by more than 20 percent, from 38.23 percent to 58.89 percent. As Table 4 shows, endowments with less than \$1 billion also raised allocations to alternatives. The smallest (under \$25 million) more than doubled their exposure from 5.12 percent to 11.00 percent.

As discussed previously, the average investment performances declined from the first sub-sample period to the second. Increased exposure to alternative assets did not lead to better investment performance. It is thus helpful to reevaluate the market environment and revise investment strategies. Following the endowment model may not lead to investment success. The empirical observations suggest that, even for the largest endowments, active strategies (and increasing exposure to alternatives) are not always better than the simple 60% equity/40% fixed-income passive, cost effective strategy.

#### 4. Empirical Analyses

Panel regressions are performed to analyze the impact of asset allocation on investment returns. The panel data analyses control for covariates such as year and size of the endowments. The panel data regression model is:

$$R_{it} = a_i + bE_{it} + bF_{it} + bA_{it} + u_{it}$$

Where

a is a constant term,

R is the annual rate of return,

E is the percentage of portfolio allocated to equities,

F is the percentage of portfolio allocated to fixed income,

A is the percentage of portfolio allocated to alternative assets,

u is the error term.

The i and t are the group index and the time index. The university endowments are grouped to (1) over \$1 billion, (2) \$501 billion to \$1 billion, (3) \$101 million to \$500 million, (4) \$51 million to \$100 million, (5) \$25 million to \$50 million, and (6) under \$25 million.

Table 5 shows the summary statics of returns and asset allocations. The mean return was 6.16 percent, with a standard deviation of 10.11 percent. The maximum return was 21.30 percent while the minimum was -20.50 percent. In asset allocation, the mean in equities was 49.93 percent, in fixed-income was 18.57 percent, and in alternatives was 26.19 percent. Note that the highest allocation in alternatives was 61.00 percent.

Table 5: Summary Statistics

	Mean	Standard Deviation	Minimum	Maximum
Annual Returns	6.16	10.11	-20.50	21.30
Asset Allocation In Equities	49.93	9.63	26.00	63.20
In Fixed-Income	18.57	6.33	7.00	31.00
In Alternatives	26.19	16.04	3.30	61.00

Data Source: NACUBO.

The estimates from panel data regressions are reported in Table 6 for the whole sample period. The estimated coefficient for equities is 0.059, for fixed-income is -0.192, and for alternatives is -0.207. The t-value for each of the estimates is low. Thus, the estimated coefficients are not significant at 10 percent significance level. The R-squared is 0.322 and the adjusted R-squared is 0.105.

Table 6: Panel Regression Estimates

	Coefficients	Standard Error	t-value
Equities	0.059	0.118	0.503
Fixed-Income	-0.192	0.182	-1.057
Alternatives	-0.207	0.131	-1.581
R-Squared	0.322		
Adjusted R-Squared	0.105		

Data Source: NACUBO.

Panel data regressions were also performed for the two sub-sample periods. For 2002 – 2008 period, Table 7A shows the estimated coefficient for equities is -0.594, for fixed-income is -0.843, and for alternatives is -0.594. The negative impacts of fixed-income and of equities are significant at 5 percent level. The negative marginal contribution of alternatives is significant at 10 percent level. Table 7B shows the estimated results for period 2009 – 2017. The coefficient for equities is estimated at -0.054, for fixed-income at -0.053, and for alternatives at -0.089. The estimates are not significant at 10 percent level.

Table 7: Panel Regression Estimates Before and After the Financial Crisis

Table 7A (2002 – 2008)

	Coefficients	Standard Error	t-value
Equities	-0.594	0.234	-2.541**
Fixed-Income	-0.843	0.275	-3.067**
Alternatives	-0.480	0.245	-1.959*
R-Squared	0.340		
Adjusted R-Squared	-0.002		

Note: “\*\*” denotes significance at 0.05 and “\*” denotes significance at 0.10.

Table 7B (2009 – 2017)

	Coefficients	Standard Error	t-value
Equities	-0.054	0.179	-0.301
Fixed-Income	-0.053	0.219	-0.241
Alternatives	-0.089	0.171	-0.524
R-Squared	0.008		
Adjusted R-Squared	-0.421		

Data Source: NACUBO.



In summary, the results of panel data regressions do not show significant positive impact of increasing exposure in alternative assets on investment returns. As a matter of fact, the impact was negative during 2002 – 2008.

## 5. Conclusion

The endowment model generated strong returns for large university endowment funds in recent years. Such success has attracted endowments of all sizes to increase exposure in alternative assets. During 2002 – 2008, alternative investments comprised 38.23 percent of portfolios for endowments with over \$1 billion. During 2009 – 2017, they averaged 58.89 percent. For endowments with less than \$1 billion, the allocations also increased significantly. However, the investment performance declined as the allocations to alternative assets increased. The results from the panel data regressions did not show positive impacts of alternatives on investment returns.

The reported successes of mega university endowment funds from the endowment model could not be duplicated by endowments of all sizes. Yes, there are winners. But, many small and midsize endowments fell short. They failed to generate the anticipated higher returns and they at times underperformed the simple index benchmark. Successful investing in alternatives is more complex than allocation of money. They also need to identify and access top performing managers at the right time.

## References

- Brown, J.R., Dimmock, S.G., Kang, J-K., Richardson, D., and Weisbenner, S.J., 2011. “The Governance of University Endowments: Insights from TIAA-CREF Institute Survey,” *Research Dialogue*, TIAA Institute, Issue no. 102 (July).
- Brown, J.R., Dimmock, S.G., Kang, J-K., and Weisbenner, S.J., 2014. “How University Endowments Respond to Financial Market Shocks: Evidence and Implications,” *American Economic Review* 2014, 104(3): 931-962.
- Brown, K.C., Garlappi, L., and Tiu, C., 2010. “Asset Allocation and Portfolio Performance: Evidence From University Endowment Funds,” *Journal of Financial Markets* 13: 268-294.
- Dimmock, S.G., 2010. “Background Risk and University Endowment Funds,” Nanyang Technological University, working paper.
- Cejnek, G., Franz, R., Randl, O., and Stoughton, N., 2014. “A Survey of University Endowment Management Research,” *Journal of Investment Management*, third quarter,
- Gilbert, T., and Hrdlicka, C., 2013. “Why Do University Invest So Much in Risky Assets?” working paper, Foster School of Business, Washington University.
- Goetzmann, W.N., and Oster, S., 2012. “Competition Among University Endowments,” NBER Working Paper 18173.

Lerner, J., Schoar, A., and Wang, J., 2008. “Secrets of the Academy: The Drivers of University Endowment Success,” *Journal of Economic Perspectives* 22 (3): 207–22.

Rosen, H.S., and Sapington, A.J.W., 2015. “What Do University Endowment Managers Worry About? An Analysis of Alternative Asset Investments and Background Income,” NBER Working Paper 21271.

Wallick, D.W., Wimmer, B.R., and Balsamo, J.J., 2014. “Assessing Endowment Performance: The Enduring Role of Low-Cost Investing,” Vanguard Research, 2014 (July).