WORKING PAPER

How do Financial Expertise and Networks Affect Investing? Evidence from the Governance of University Endowments *

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Abstract

Using the unique laboratory of university endowments, we study the effects of expertise and networks on investment performance. Using detailed information on more than 11,000 unique board members for 579 university endowments, we show that the financial expertise of an endowment's governing board is positively correlated with allocations to alternative investments and higher total returns. The type of expertise matters as elements appear unique to particular subsets of alternatives, such as private equity and venture capital which are more difficult to analyze and manage than traded public securities. Further, we find that endowments whose board members have extensive networks of investment professionals invest significantly more in both private equity and venture capital. With respect to returns, we find that endowments benefit from both higher allocations to private assets and in some cases selection of high performing managers with assets calls. Expertise in venture capital, in particular, is associated with endowments being able to earn higher returns in alternative investments than predicted by benchmarks for the asset class. This is consistent with improved manager selection and access to high performing funds. To shed light on the channels through which elevated performance arises, we conduct a unique survey of endowments. The respondents confirm our empirical results, reporting that more knowledgeable and connected investment committees are associated with more frequent recommendations of and access to restricted, high-performing funds. Our results suggest that endowments directly benefit from having experts in alternative investments serving on their boards.

Keywords: Endowments, Hedge Funds, Networks, Private Equity, Venture Capital.

JEL Classification: G11, G23.

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University endowments spend billions of dollars a year to support higher education in the United States. Rather than rely on investments in public securities such as stocks and bonds to fund this spending, many (and especially large) endowments have high allocations to private assets, such as hedge funds, private equity or venture capital. This shift to "alternative assets" is often explained as the opportunity to earn higher returns by capturing illiquidity premia that accompany private assets. Endowments are in a position to harvest illiquidity premia since, unlike many investors, they have essentially an infinite investment horizon, tax preferred status, limited restrictions on asset choice, and scale. Another possible benefit of investing in alternative asset markets is that they are likely less efficient than public markets due to frictions in trading and obtaining information. This may create larger potential to benefit from identifying and investing with high performing managers than would be the case with public securities. For instance, there is a much wider dispersion of performance among private equity funds than for traditional funds (e.g. stock mutual funds). Endowments may be well positioned to invest with top performing managers in private assets based on expertise, links to alumni, and the lack of constraints on investment choices. The "endowment model" of asset management often blends these selection/access and liquidity arguments to motivate higher allocations to alternative assets. Originally developed by David Swensen at Yale (and hence often called the Yale model) this investment strategy has been adapted by many university endowments.

Despite these possible benefits, accessing private asset classes comes with frictions and costs. Investments in many alternative assets are illiquid, not easily scaled, and have high search and monitoring costs. Further, not all endowments may be able to execute on the potential of tapping higher returns. Given the complexity of alternative asset classes, an endowment may need considerable expertise to make successful investments in areas such as private equity, venture capital, and hedge funds.

University endowments provide an especially good laboratory for research on decisions by institutional investors as they typically have the institutional flexibility to pursue a wide range investment opportunities, have a favorable tax status which may reduce frictions in investing and have a long term (infinite) investment horizon. Moreover, endowments are more likely to be free

from external political influence and other constraints facing some large institutional investors. While prior research indicates that endowments have had higher returns along with their larger allocations to alternative investments, there is mixed evidence on whether this comes purely from illiquidity premia or also involves selection skills. Moreover, no study has examined endowment level measures of investment expertise or clearly identified the role of governing boards in driving asset allocation or endowment returns.

In this paper, we examine how the investment expertise and networks resident in a university's governance affects allocations to various assets and whether the resultant returns are due to general premia in an asset class or rely on picking high performing funds within that space. We pay particular attention to private assets for which such skill and contacts may be especially important.

We develop our data using three sources: The National Association of College and University Business Officers (NACUBO, which provides a wide array of information on endowment allocations, returns and characteristics), Guidestar (which identifies names of individuals affiliated with nonprofits) and BoardEx (which gives detailed professional profiles at the individual level). Merging our sources, we collect information on over 11,000 unique individual trustees for 579 endowments. This allows us to construct novel measures of expertise that include granular information related to specific experience in hedge funds, private equity, and venture capital. We are also able to develop measures of networks showing connections that individuals have in the financial sector, again at a granular level (e.g. within venture capital). To explore specific channels through which expertise and networks may affect endowment investing, we also conduct a survey of endowments asking specific questions about governance and the investment process.

Our analysis reveals several features of university endowments and their investments. First, there are notable differences across endowment boards in the expertise and networks resident in their governing bodies. Not surprisingly, larger endowments tend to have governing boards with more financial expertise and larger networks, especially in the areas of alternative assets. Second, more expertise in alternative assets goes along with higher allocations to those assets. This effect is true even after controlling for size. Moreover, the nature of relevant expertise appears to be

geared to specific subsets of alternative assets. Expertise in hedge funds matters for allocations to hedge funds, whereas it is expertise in private equity or venture capital that matters most for each specific area, respectively. This pattern suggests that some elements of expertise do not readily travel across different types of alternative assets but are unique to the type of investment. Consistent with this pattern, we find that having a CIO is positively linked to allocations in private equity and venture capital, both of which involve complexities such as managing capital calls and dealing with illiquidity. For hedge funds, however, the presence of a CIO is not linked to allocations. These findings across hedge funds, private equity, and venture capital are consistent with the relative difficulty of managing and accessing these alternate asset classes. Third, in addition to expertise, we also find that connections to investment professionals (networks) matter, especially for allocations to private equity and venture capital. This is consistent with being able to overcome restrictions or barriers to investing in funds that might otherwise be difficult or impossible to access.

Our evidence also has implications for returns. Fourth, we find that on average endowments have earned higher total returns due to investing in alternative assets. Part of the return increase is due to allocations to harvest higher returns in an asset class (e.g., harvesting a liquidity premium). Moreover, there are additional return benefits associated with fund allocations that outperforming benchmark returns, consistent with an ability to invest with high performing managers within as asset class. These effects are especially prominent for large endowments. Fifth, the extra returns experienced by endowments are related to investment expertise. We find that this higher return is not simply the result of decisions about asset allocation. Expertise leads to higher "selection" returns in alternative assets – that is, extra returns having controlled for benchmarks of average performance in an asset class. These importance of expertise emerges even after controlling for endowment size and are particularly notable in venture capital. For example, a 10% increase in the proportion of the board with venture capital experience is associated with a 100 to 120 basis point increase in the selection returns from alternative investments. This is consistent with the importance of access to high performing venture capital partnerships and shows that expertise matters for the selection components of returns in alternative investments.

We also document that a sophisticated and investment-savvy board appears to be more relevant for endowments without a CIO, where Trustees drive most of the investment program. Institutions without a CIO seem to benefit the most from the presence of a sophisticated board with extensive expertise in private equity and venture capital. On the other hand, network connections are significantly positively correlated with returns among endowments that use a CIO.

Finally, we provide evidence of some specific channels of impact on the investment process. We find that expertise affects how endowments navigate choices between direct funds and funds of funds, which provide an additional layer of inter-mediation (and fees). Endowments with more expertise resident in their boards are more likely to use direct funds (rather than funds of funds) to invest in alternative assets, consistent with an increased ability to understand and access direct funds. Further, our survey results corroborate the patterns in our large scale empirical study. We find that respondents report that their experience shows benefits from more knowledgeable and better-connected governance bodies. Also, they note that such bodies are associated with more frequent recommendations of and access to alternative investment funds, especially those that might be restricted or closed. This confirms a prominent role for expertise and networks. Overall, our findings indicate that endowments likely benefit from seeking out investment experts, where the potential benefits seem highest in areas such as private equity and venture capital.

We proceed as follows. Section 1 discusses features of endowment governance and related research. Section 2 presents data on endowment returns and allocations and provides a return decomposition to distinguish between effects due to allocation decisions and those due to fund selection. Section 3 outlines our measures of investment expertise and networks and describes the characteristics of endowment governance. Sections 4 and 5 study how asset allocations and returns, respectively, are affected by investment expertise and networks. Section 6 examines some specific channels for effects on the investment process, including the results of our endowment survey on the topic. Finally, section 7 concludes.

1 University Endowments: Investment Process, Governance and Past Research

University endowments make headlines every year when they report asset allocations and returns. On behalf of their schools, these endowments in the U.S. collectively manage over half a trillion dollars (2015) and annually spend 4 to 5 percent of this aggregate wealth on, among other things, scholarships for students, support for faculty, and investments in infrastructure for teaching and research. Endowments' investment performance is thus vital for the future of what schools strive to accomplish. Schools have adopted different plans for governing endowments but most share some common features. The typical governance structure includes a Board of Trustees that specifies spending policies, broader fund objectives, and delegates responsibilities. Responsibilities are often given to an investment committee (IC) that sets investment policy and risk limits. The IC is often a subset of the larger trustee board, sometimes supplemented with additional members. In turn, the IC often further delegates investment and operational power to a management staff. For larger endowments, the IC may delegate substantial discretion to a full-time staff that includes a Chief Investment Officer (CIO) and a range of investment professionals. In small endowments, there may be few or no professional staff with investment expertise, and the IC itself remains closely involved with details of the investment process, often working with a consultant. Endowments typically create an Investment Policy Statement codifying key features of endowment policy. [1]

The governance of endowments may have a number of effects on endowments including spending policy, appetite for risk, and effectiveness in executing strategy. Our focus is on how the investment expertise and networks resident in a university's governance affects allocations to various assets and the resultant returns. We further study whether endowment returns are purely due to harvesting higher returns on private asset classes or rely on selecting and accessing high

[1] A number of surveys and analysis of governance structures are available from industry sources, including NACUBO, Cambridge Associates, and the Greenwich Roundtable. Some universities set up the endowment as a separate management company with its own separate board. Some have blended models that outsource staff responsibilities to another firm which has a Chief Investment Officer and professional staff.

performing funds. An endowment's expertise and networks may be especially important for private assets. For instance, studying private equity, Cavagnaro et al. (2017) find that more institutional investors (limited partner investors in private equity) do consistently better or worse (relative to median returns) than can be explained without the presence of differential skill among the private equity managers. Their study does not, however, use specific measures of skill which we develop in our work. Moreover, networks may also play a vital role if access to particular funds is facilitated by interactions made possible those serving in endowment governance.

University endowments provide an especially good laboratory for research on decisions by institutional investors. These endowments often have the flexibility to pursue fairly unrestricted investment opportunities, have a favorable tax status which may reduce frictions in investing, and have a long term (infinite) investment horizon. Moreover, endowments are more likely to be free from external political influence and other constraints facing some large institutional investors. For instance, studying the boards of pension funds, Andonov et al. (2018) find that the lack of financial experience on the board contributes to poor investment performance. Moreover, pensions whose boards have a high fraction of government officials have lower returns within investment categories, such as real estate and venture capital, likely due to political pressures favoring certain (sub-optimal) investments.

While there is existing research on university endowments, none has studied investment performance through the lens of detailed measures of expertise and skill resident in endowment governance. Some prior research has focused on the impact of financial and income shocks on endowment spending and asset allocation (see, for example, Brown et al. (2014), Dimmock (2012), Rosen and Sappington (2016)). Research on private equity provides some insights into endowments' experience and results in alternate assets. Lerner et al. (2008) document how large endowments shifted their asset allocation towards alternative investment and earned higher returns. They conclude that top endowments have superior ability to select and access managers, but caution against a simple mimicking strategy of higher allocations to private equity. They note that replicating this manager selection may depend on an endowments' skill and attributes, but their study does not have specific

measures of expertise and networks at the endowment level. Sensoy et al. (2014) also examine private equity and find that endowments enjoyed superior returns over the 1991-1998 period. They attribute this advantage to access to high-performing venture capital funds. After 1998, however, the authors find that endowments' advantages disappear and that other institutional limited partners do just as well investing in private equity. Sensoy et al. (2014) attribute this erosion of endowments' advantages to a maturation of the private equity industry.

Academic research on endowment investment performance is limited (Barber and Wang (2013), Brown et al. (2010)). For instance, studying the 1991-2011 period, Barber and Wang conclude that university endowments do not exhibit any ability to beat high level benchmarks through selection or timing skills. They conclude that "elite" institutions (e.g. Ivy League and high SAT level schools) benefit from higher returns on alternative assets (e.g. due to high allocations) but do not earn any extra returns over and above private asset benchmarks. This finding is broadly consistent with conclusions from Sensoy et al. (2014). Barber and Wang (2013) do not, however, develop specific measures of expertise and networks.

Fundamental questions remain about endowment investing and results. Unanswered questions are particularly salient when we look across the wide range of universities and their endowments in the U.S. Do endowments reap advantages from higher allocations to alternative assets? If so, is this simply the harvesting of an illiquidity premium or does it depend on accessing high performing funds within an asset class? Is endowment size all that matters? What characteristics of endowment governance in terms of investment expertise and networks matter? Our research tackles these questions.

2 Endowment Returns, Allocations and Characteristics

Data on Endowments Returns, Allocations and Characteristics

Data on returns and allocations come from comprehensive annual surveys of higher education endowments by the National Association of College and University Business Officers (NACUBO).[2]

[2]NACUBO and the Commonfund Institute joined forces in 2009 to create a single, comprehensive annual study of

These provide an individual endowment's annual return and detail on its asset allocation. In addition, NACUBO reports an array of data such as the endowment's size, spending rate, characteristics of its investment committee, whether it is public or private and whether it employs a Chief Investment Officer. We have surveys for the years 2004 through 2015, and thus include the years (missing from some earlier studies) of the financial crisis.

Table 1 displays summary statistics related to fund characteristics and asset allocations for all endowments covered by NACUBO for the years 2004 through 2015. As shown in Panel A, the average endowment has total assets of just over $500 million, spends 4.45% of assets annually and has an annual return of 7.39%. Figure 1 plots average return by year. Not surprisingly, endowments were not immune from the dramatic fluctuations in markets around the financial crisis. Panel A of table 1 also reveals striking differences in size across endowments. A few endowments with assets well above a $1 billion bring asset-weighted size (e.g. weighted by the dollar value of the endowment) to approximately $7.9 billion. Comparison of the asset-weighted means to simple means shows that larger endowments tend to play a larger role in a school's budget (asset-weighted mean of 18.4% versus mean of 9.91%) and have slightly higher spending rates. The figures also reveal that larger endowments have earned higher average returns (asset-weighted mean of 9.74% versus mean of 7.39%). Panel B of table 1 shows asset allocations (percentage of total assets). The average endowment allocates about one-fourth of its assets to alternative investments (24.3%) with the remaining three-quarters to public markets (domestic equity, fixed-income, and international equities). Larger endowments tilt their asset allocation toward alternative strategies. The asset-weighted mean allocation to alternatives stands at almost 50 percent. Table 2 provides an additional illustration of the strong relationship between endowment size, allocations and returns.

Large endowments invest almost half (48.79%) of their assets in alternative strategies, while smaller endowments allocate only 18 percent. Figure 2 shows that smaller endowments have increased allocations to alternatives over the years but still have much smaller allocations than larger funds. Table 2 also highlights pronounced differences in total returns linked to endowment size.

higher education endowments (NCSE).

The difference in annual returns between large and small endowments stands at a striking 300 basis point. [3]

Impact of Allocation and Selection on Returns

Endowment return benefits may stem from allocating more to an asset class with higher returns and/or by selecting high performing managers within an asset class. To distinguish between these effects, we decompose returns based on the endowment's allocation choices and benchmark returns for asset classes. Often applied to institutional investors, return decomposition (e.g Brinson et al. (1986), Brinson et al. (1991), and Daniel et al. (1997)) identifies three components of returns due to (1) asset allocation policy, (2) market timing (temporary deviations from policy allocations) and (3) selection. The sum of timing and selection can be viewed as an active return over and above passive index investing. A similar procedure in the context of university endowments can be found in Brown et al. (2010). Equation (1) shows the decomposition:

$$\begin{aligned} R_{i,t} &= \sum_{j=1}^{N} w_{i,j,t} r_{i,j,t} \\ &= \sum_{j=1}^{N} w^{B}_{i,j,t-1} r^{B}_{j,t} + \sum_{j=1}^{N} \left(w_{i,j,t} - w^{B}_{i,j,t-1} \right) r^{B}_{i,j,t} + \sum_{j=1}^{N} w_{i,j,t} \left(r_{i,j,t} - r^{B}_{j,t} \right) \\ &\equiv R^{B}_{i,t} + R^{T}_{i,t} + R^{S}_{i,t} \end{aligned} \tag{1}$$

where $R_{i,t}$ is total return (net of fees) for fund i at time t, $w_{i,j,t}$ and $w^{B}_{i,j,t-1}$ are actual and policy weights for endowment i and asset class j, $r_{i,j,t}$ is total return for asset class j for endowment i at time t, and $r^{B}_{j,t}$ is the return on a commonly used benchmark for asset class j at time t. For asset class benchmark returns we use public equity (SP500), fixed income (JP Morgan Bond Index), International Equity (MSCI ACWI), Real Estate (NCREIF), Hedge Funds (HFRI), Private Equity (Cambridge Associates PE), Venture Capital (Cambridge Associates VC), Commodities (GSCI)

[3] The decrease in the number of funds that report return figures is explained by the fact that (a) many endowments have simply a zero-asset allocation to certain type of investments (private equity and venture capital for instance), and hence there is no return for these asset classes; and (b) institutions selectively do not report return figures (although less likely), or simply do not know the return breakdown. However, approximately 60 percent of endowments that have positive asset allocation to private equity or venture capital report return figures too, and three-fifth report hedge fund returns.

and Cash (30-day treasury bill).

Unlike prior research by Barber and Wang (2013), who employ a form of multi-factor attribution, our approach takes advantage of endowments' actual allocation decisions. They regress endowment returns on time series of up to five indices (factors) representing returns on public equity, bonds, international equity, hedge funds and private equity. Regression coefficients on the indices are constrained to sum to one and can be interpreted as allocations to passive investments in each index and hence exposures to the risk of the asset class. A positive intercept in the regression would thus provide an estimate of the excess return ("alpha") the investor earned due to active management (such as picking high performing funds). Barber and Wang (2013) implement this approach for average returns across sets of endowments (e.g. all endowments, Ivy League). Unlike our approach, this multi-factor attribution does not use data on actual allocations and thus implicitly benchmarks performance based on what allocations could have been to explain returns. But those implied allocations are only known ex-post (after estimating the regression coefficients) thus are not investable strategies. These allocations also assumed stable over time and equal for all endowments in the regression, inconsistent with observed patterns in allocations (e.g. see Table 2 and Figure 2).

Like other approaches such as multi-factor attribution analysis, a return decomposition was originally developed to analyze sources of performance from investments in liquid assets where managers could often find a passive index fund and readily adjust asset weights if they felt timing benefits possible. Timing adjustments are much more difficult, and often not practical, in private assets such as venture capital and private equity which are not actively traded and involve capital commitments on the endowment's part (e.g. see Brown et al. (2018)). Moreover, estimation of timing effects requires policy weights which are not always available from NACUBO, especially within alternative asset classes. While we do estimate timing using lagged values of actual weights as proxies for policy weights, we focus on the selection component in most of the paper. Selection can be calculated directly using only actual allocations and return benchmarks (hence combining the first two components of equation 1 and then subtracting from total returns). Moreover, as mentioned earlier, selection may be particularly important in alternative asset classes where frictions inhibit

timing.

Table 3 reports results on total returns and the selection component across our sample and by endowment size. Column 1 shows that larger endowments have higher total returns than their smaller contemporaries over our sample period. This echoes earlier summary statistics. Column 2 reports the selection component's contribution based on the return decomposition. The mean selection component is 1.06%, suggesting that selection contributed just over 1% per year to returns for the average endowment. This is significantly different from zero with a t-value of 2.08. Thus our results suggest that, on average, endowments have been able to earn higher than benchmark returns. Moreover, Table 3 shows that selection's effect on returns is positive across all three endowment size groupings, but makes a higher contribution for large endowments. In column 2 the mean selection return for large endowments is 1.70% (t-value of 2.95) compared to .94% (t-value of 1.87) for small endowments. Large endowments' selection advantage of .76% over small endowments (.76=1.70-.94) does not, however, fully explain the almost 3% advantage larger endowments have in total returns (column 1). These patterns are consistent with larger endowments gaining return advantages from both higher allocations to alternatives (e.g., harvesting illiquidity premia) and from investing with good managers within asset classes.

A word of caution is in order when interpreting return decompositions in a setting where investors have large allocations to illiquid assets. Indices used for private assets are not investable as a passive (and diversified) strategy. Thus earning average index returns in the asset class may itself involve some selection skills. [4] Moreover, returns on the index may reflect returns for bearing illiquidity and commitment risks in private assets that are not fully revealed in observed returns.

Summary on Patterns in Allocations and Returns

There are striking differences in allocations and returns across endowment size. A natural question is how large endowments differ from smaller ones and what drives these differences. The scale of investing itself may be an advantage. But one suspects that scale is not the only determinant of differences in allocations and returns. We study whether governance, especially the investment

[4]For instance, evidence in Harris et al. (2016) and Harris et al. (2018) is consistent with barriers to achieving even average returns in an asset class like venture capital where the performance of a few funds has out-sized effects.

expertise and networks related to governing bodies, provides insights into endowment investment.

3 Endowment Governance, Expertise, and Networks

3.1 Investment Committee Structure

NACUBO provides data on the characteristics of endowment ICs. Panel A of Table 4 shows average IC size is about 8 members. Larger funds have larger committees as indicated by the asset-weighted size of 9.58. This may be related to larger Boards of Trustees from which the investment committee draw candidates, as well as to larger pools of suitable financial experts and alumni with investment knowledge. ICs are comprised largely of trustees and have large representations from the school's alumni. Across ICs, the number of members who are investment professionals is 3.92, with 2.40 having expertise in alternative investments. These figures are higher for larger endowments as shown in the asset-weighted means. Panel B of Table 4 recasts data in terms of fractions. On average, investment professionals make up about half of the typical IC and alternative specialists almost a third. Moreover, 24 percent of endowment - year observations have a CIO, while three-quarters do on an asset-weighted basis. The percentile values in Table 4 reflect substantial differences in investment expertise across endowment ICs.

3.2 Trustee Backgrounds and Expertise

Data

While NACUBO gathers summary data on the financial expertise of an endowment's investment committee, they do not record individual names, provide a granular breakout of alternative asset specialties (e.g. hedge funds versus venture capital), or give information on the larger Board of Trustees. To develop additional and more granular information we use our second and third data sources: Guidestar and BoardEx. GuideStar provides information on nonprofit organizations, including the individual names and titles of trustees and officers. The data are collected from copies

of Form 990 filed with the IRS. We match Guidestar and NACUBO data using an endowment's IRS Employee Identifier Number (EIN). The result is a listing of individual names associated with each endowment for each year. We then create detailed measures of expertise and networks by matching these individual names with BoardEx, our third primary data source. BoardEx (provided by Management Diagnostics Limited, a research company) includes comprehensive biographical data on business leaders (from top executives and board directors to mid-level managers) and supplies a wide range of variables on each person's individual profile, employment history, education, awards, and affiliations with nonprofit organizations. BoardEx variables include name, age, date of birth, gender, nationality, education (including degrees and award dates), professional certifications (such as CPA), employment history (current and past, including board positions and industry sector), recognitions (such as prizes awarded), and other activities (such as roles in nonprofits, clubs and other organizations). While BoardEx does not directly dis-aggregate experience into subcategories of alternative assets (e.g., venture capital, private equity, hedge funds), we are able to create these granular classifications based on specific company names recorded in BoardEx's history of an individual. BoardEx classifies the sector of a company under FTSE international classification (ICB). [5] We augment it with the more granular dis-aggregation of the finance sector described above. For instance, if BoardEx recorded that an individual worked for Sequoia Capital (a venture capital firm), we code that individual as having expertise in venture capital. In addition, we investigated each instance in which BoardEx used the category of "Specialty and other finance". This category frequently includes affiliations to hedge funds, venture capital funds or private equity funds which we could then code into our more granular scheme. The result of this process is a set of codes identifying whether each individual has expertise in venture capital, in hedge funds or in private equity.

We also develop measures of each individual's network. For each individual (e.g. a trustee of Ohio State), we search BoardEx to find the number of persons with whom the individual shares a common employment, educational, or social history. Following Faleye et al. (2014), we measure

[5] Industry Classification Benchmark (ICB) is a globally recognized standard, operated and managed by FTSE Russell for categorizing companies and securities across four levels of classification. See FTSE Russell.

four different types of connections: past employment, current employment, education and other activities. Past employment is the sum of all first order connections through past employment (as identified by the name of the company in BoardEx). For instance, if a trustee for Ohio State had at one time worked for Microsoft, the trustee would be matched with all individuals in BoardEx who had worked for Microsoft. Current employment is the sum of all first order connections through current employment. Education is the sum of all first order connections through higher education. [6] The fourth measure is the sum of all first order connections through other organizations such as social clubs, charities, or other nonprofits. Since networks are likely especially important in investments such as private equity and venture capital, we construct measures for these areas by aggregating an individual's connections (through education, employment or social history) to organizations and people in venture capital and private equity. For these measures we exclude connections to trustees of the same university or to individuals working for the same alternative asset firm. To account for trends over time, we create a de-trended measure by first regressing the count of all connections on a time trend. We then use the residuals to create a de-trended network measure of networks which is the natural logarithm of 1 plus the residual and the absolute value of its sample minimum.[7]

The resulting panel of data based on NACUBO, Guidestar and BoardEx covers 579 endowments. There are 11,019 unique individuals in governance roles at those endowments and 55,446 individual-year observations (over the years 2007-2015 for which BoardEx-Guidestar data are available). To develop measures at the endowment level we aggregate across individuals that serve in governance roles at the endowment (e.g. summing over individuals to represent expertise or networks available to the endowment).

Issues in Data Construction

Developing our data requires that we match across data sets on individual names. To minimize possible mismatches, we take several steps. We search for similar individual names and exact

[6] We follow Cohen et al. (2008) and consider individuals who graduated from the same school, within 2 years, and with a similar type of degree

[7] See Faleye et al. (2014)

matches of university identifiers (EINs). We use different combinations of first name, last name, forenames, prefix and suffix to avoid errors due to two or more individuals having the same name. To minimize the likelihood of including an individual other than the one reported by GuideStar, we only retain individuals with unique names in BoardEx. While BoardEx does not designate whether a person sits on the endowment's investment committee, it is highly likely that there is very high correlation between investment expertise and connections for the trustee group (which we do know from BoardEx) and the investment committee, especially when it comes to alternative assets. NACUBO data reveals that over two thirds of all endowment investment committees are composed entirely of trustees; and, that even large endowments (greater than $1 billion) typically have few non-trustee members (median value of 1.0 across large endowments). Data from BoardEx and Guidestar are only available from 2007. Since an endowment's governing board tends to be quite stable over time, our measures of expertise and networks are typically fairly constant over the years. As part of our analysis, we also assumed that 2007 values would also be true for earlier years. The empirical findings from this assumption are similar to those using the 2007-2015 period and change none of our conclusions. We also compare university endowments whose board members appear in BoardEx versus those that do not, and confirm that the two samples are similar along several dimensions (e.g. size, total gifts, spending).

Trustee Expertise and Networks

Panel A of Table 5 shows that 9% of trustees have backgrounds in asset management (public securities) and 24% in alternative assets. Within alternative assets, the largest trustee representations are in private equity (10% of all trustees), real estate (8%), commodities (7%) and venture capital (6%). Trustees of larger endowments are more often drawn from the alternative asset space as reflected in higher asset-weighted means. This is perhaps not surprising given the higher allocations to alternatives by large endowments. Panel B of Table 5 provides general trustee background. Over three-fourths of trustees are men and the average age is 66 years. The average time on the board is 8 years and over half of trustees have been on the board for at least 6 years. On average, 17 percent of trustees have an MBA and another 7 percent have legal degrees. Table 6 recasts trustee backgrounds

at the endowment level. Panel A shows that 60% of endowments have at least one trustee with a background in asset management and 83% have at least one expert in alternative strategies. Within alternatives, the biggest representations are in real estate, private equity, commodities and venture capital. Perhaps surprisingly, only a third of boards have someone with hedge fund background even though hedge fund allocations by endowments are much larger than for other alternatives as illustrated in Tables 1 and 2.

A channel for effective investing may come from trustees' network connections to industry professionals. Panel B of Table 6 reports trustee connections (measured by the count of individuals) estimated from Boardex. The average endowment has over 500 connections through trustees' past employment, current employment, education or other activities. This figure and its components are all higher for larger endowments as reflected in higher asset-weighted means. Looking at connections in alternative assets, the average endowment has 31 connections in private equity, 11 in venture capital and 13 in hedge funds. Again, there is substantial variation across endowments with larger endowments having many more connections in each alternative space. The bottom rows of Panel B show connections by industry.

3.3 Summary

Overall, endowments have considerable investment expertise resident in their governing bodies and this is especially true for larger endowments. Large endowments also typically have a full-time CIO as an investment professional on staff. Expertise in alternative assets is especially prevalent, particularly in larger endowments. Moreover, many endowments are connected to a wide-array of investment professionals through their networks.

4 Empirical Methodology and Main Results

To investigate endowments' asset allocations we use a pooled regression with fixed effects for time and geography as given below:

$$y_{it} = \beta_0 + \beta_1 Expertise_{it} + \beta_2 Network_{it} + \Lambda Controls_{it} + FEs + \epsilon_{it} \quad (2)$$

y_{it} represents the allocation to an asset class expressed as a percentage of total assets (e.g., to domestic equity or to hedge funds) by endowment i at time t. Expertise and network are measures of the financial expertise and networks resident in the endowment's governing board.

In our baseline specification, we measure expertise as the fraction of trustees with relevant experience in finance, asset management and alternatives. We also look at more granular definitions within the categories of hedge funds, private equity, and venture capital. Similarly, we construct a measure of the networks trustee members possess. Network measures are aggregated at the endowment level in each year.

We also include a dummy variable takes on the value of 1 if the endowment has a full time CIO. Having a CIO may create a different division of responsibilities between the governing body and staff and adds an investment professional. To account for the endowment's size we include the natural logarithm of endowment assets. This captures the role of the endowment's scale on the ability to invest in asset classes not easily accessible to smaller funds. Since public and private institutions may have different roles for governing bodies, different risk limits and different constraints on asset classes, we add a dummy variable that takes a value of 1 if the institution is public, 0 otherwise. We include a fixed effect for each year since there are market-wide macroeconomic shocks to all endowments. We also include a fixed effect for an endowment's state since location may affect endowment behavior through unobserved time-invariant factors. For example, endowments in California may invest more in venture capital given the long history of angel investing and innovation in the Silicon Valley area. State fixed effects will then capture the importance of the financial industry, the regulatory environment, and other state-specific factors. We cluster standard errors at the endowment level to allow for correlation in the error term over time for a given fund.

4.1 Endowment Allocations: Effect of Governance, Expertise, and Networks

Effects of Expertise

The first three regressions in table 7 examine asset allocations to domestic equity, fixed-income, and alternative strategies, in that order. Columns (4) to (6) take a deeper dive into subsets of alternative assets: hedge funds, venture capital and private equity. All models include year and state fixed effects. Columns (1) and (2) show that larger endowments allocate significantly less to domestic equity and fixed income as shown by the significant negative coefficients on size (total assets). None of the other coefficients are statistically significant with one exception. The exception is that public institutions allocate more to fixed income (1.68 percent more) than do privates. This higher allocation may reflect more constraints on investment alternatives or on risk taking behavior. Column (3) shows clearly how larger institutions have shifted allocations to alternative assets away from traditional investments in public equities and debt. The coefficient on size is positive and significant at the 1% level. This is consistent with previous research on institutional investors; larger funds invest in alternative strategies often not accessible to smaller peers.

Column (3) results also show that the shift to alternatives is not linked to size alone. The expertise of the governing body and the presence of a CIO are also important in explaining shifts to alternatives. Endowments with more board expertise in alternative investments allocate more to alternatives. A 10% increase in the proportion of alternative specialists on the board is associated with a 62 basis points increase in the allocation to alternatives. The presence of a CIO is associated with an almost 4% increase in allocation to alternatives. Taken together these effects show that expertise resident in both the governing board and in the staff (as reflected in the presence of a CIO) goes hand in hand with moves to alternative assets. This expertise is specific to alternative assets, not just experience in finance or asset management more generally. These links are consistent with the increased complexity of analyzing and accessing alternative assets compared to public markets.

We look at key subsets of alternatives in the last three columns of table 7. In these specifications, we replace our measure of alternatives expertise with the more granular definition of expertise

related specifically to hedge funds, venture capital, and private equity. In all three regressions, the size effect is present as it was across alternatives. Moreover, the nature of expertise related to allocations is granular and appears tailored to each of the three subsets for alternatives. For hedge fund allocations, for instance, column 4 shows that expertise in hedge funds matters. A 10% increase in the proportion of members with hedge fund experience is associated with a 1.8% increase in the allocation to hedge funds. This implies that endowments in the top quartile of hedge fund expertise allocate 4% more than endowments in the bottom quartile of the distribution. Similarly, column (5) shows that experience in venture capital is linked to higher venture capital allocations, and column (6) shows that it is private equity expertise that matters in private equity. Moreover, in none of the three regressions is expertise in another segment related to asset allocation; for instance, expertise in hedge funds is not significantly related to allocations in venture capital or private equity. These patterns suggest that expertise does not always readily travel across different types of alternative asset classes; rather, investment expertise has elements unique to the particulars of the type of investment.

The last three columns of table 7 also reveal an interesting pattern on the presence of a CIO and allocations. While the presence of a CIO is significantly positively related to allocations to venture capital and private equity, this is not the case for hedge funds. For instance, endowments with a CIO allocate 1.5% more to VC than endowments without a CIO. Moreover, a 10% increase in the proportion of members with expertise in VC is associated with a 0.27% larger allocation to VC. This is substantial and represents a 16% increase, given an unconditional mean of 1.57% of allocation to venture capital. In contrast, the presence of a CIO has essentially no effect on hedge fund allocations (column (4)). These patterns across hedge funds, venture capital, and private equity are consistent with the relative difficulty of managing and accessing these alternate asset classes. Recent trends in hedge fund investing show that allocations to hedge funds have increased across all endowments reflecting easier (and possibly cheaper) access to hedge fund managers. In contrast, private equity investments involve managing capital calls, substantial illiquidity, and assessing management teams who invest in real assets (companies). Venture capital shares the complexity of

private equity with the added challenges of the increased riskiness related to new businesses and sometimes restricted access to high performing funds. Our results suggest that having a CIO seems important in navigating the more complex arrangements with private equity and venture capital funds, as compared to hedge fund investing.

Since some endowments (often smaller amounts of assets) have little or no exposure to private equity and venture capital, we also performed regressions using only endowments that have a positive allocation to the three relevant asset groupings. Results are qualitatively similar to those reported in the last three columns of table 7. Our results thus are not driven simply by endowments that have zero allocation to the asset class.

Effects of Expertise and Networks

Table 8 parallels table 7 and adds a network measure. We focus on results using the endowment's network of venture capital and private equity professionals since these types of investments may be harder to access. Results are qualitatively similar if we use the total network through education, employment, and other activities. However, we also construct a measure of network to hedge fund managers. In untabulated results, we show that networks to hedge fund managers do not appear to matter for allocations to hedge funds, private equity, or venture capital. Therefore, we focus on network connections to VC and PE in the following tables.

Columns 1 and 2 indicate that measures of investment expertise and networks do not matter for allocations to traditional asset classes such as stocks and bonds. This is consistent with recent trends in investment strategies, whereby cheap and passive exposure to mutual fund managers or pooled investment vehicles can be easily obtained through ad hoc investment programs (e.g. TIAA-CREF).

Column 3 shows that aggregated measure of network and expertise do not have significant explanatory power in explaining the overall allocation to alternatives though the presence of a CIO does. When we examine hedge fund, private equity and venture capital allocations separately, however, the last three columns of Table 8 show effects of expertise and networks. For hedge fund allocations (column 4), trustees' expertise is associated with higher allocations though networks are

not. This suggests that exposure to marketable alternative strategies such as hedge funds is obtained through knowledge and expertise, rather than professional connections to managers. Network connections (in particular those to closed and restricted funds, e.g. private equity and venture capital) do not matter for hedge fund allocations.

On the other hand, network connections are correlated with a higher allocation to both venture capital (column 5) and private equity (column 6). This is consistent with the restricted and closed nature of this type of investment and the magnitude is significant. Endowments in the top connection quartile invest 0.23% more in venture capital then those in the bottom connection quartile. Given the unconditional mean VC allocation, this represents a 16% increase. Similarly, top connected boards invest 0.91% more in PE than those in the bottom connection quartile. This is an increase of about 19%.

To alleviate concerns about the endogeneity of networks, we estimate a 2SLS regression using the number of separate industries in which trustees work as an instrument for the network measure. While the number of industries is highly correlated with the number of connections (high F-statistic in the first stage), there is no ex-ante reason to believe that asset allocations across aggregate categories (such as hedge fund, private equity or venture capital) would be linked to trustee exposure across industry sectors in terms of executive or board positions held. Table 9 shows that we still find a positive and significant relationship between networks and allocations to venture capital and private equity.

4.2 Summary

Overall our results on allocation choices show important roles for the investment experience and networks of an endowment's governing body. These results are true even after controlling for the size of the endowment. Thus, it is not simply scale that seems at work as larger endowments allocate more to alternative assets. In a subsequent section we explore possible channels for these effects including evidence from a survey.

5 Endowment Returns: Effect of Governance, Expertise, and Networks

One source of higher returns can be allocation decisions - investing more in a high performing asset class. As shown earlier, endowments also seem to have some ability to earn extra returns from picking good managers and this is especially true for large endowments. In this section, we study the link between returns, expertise, and networks. We use the same regression approach as in our analysis of allocations but define the dependent variable as an annual percentage return. This return could be for the entire return or a component of that return (e.g., the selection or timing components).

Table 10 reports results from pooled regressions. Column (1) analyzes endowments' total returns and shows a significant positive relationship between returns and endowment size, echoing results reported earlier in Tables 7 and 8. The second column of Table 10 again displays the important size effect on selection skills but no other variables are significant. Results for the timing component of returns in column 3 pose a puzzle. The significant coefficient on size suggests returns from timing are positively linked to size. In contrast, the presence of a CIO reduces timing benefits as shown by the negative coefficient. Perhaps CIOs are less willing to engage in timing and are associated with higher allocations to asset classes (such as private equity) for which timing is difficult if not impossible. Moreover, since we have to estimate policy weights the timing results may not detect patterns that would be shown if those policy weights were available. At this stage, we do not draw any strong conclusions based on the timing results . Overall, then at the total portfolio level our granular measures of expertise fail to show strong links to returns. We suspect this, in part, stems from the fact that total returns aggregate results across a range of asset classes, thus making it harder to pick up effects related to a specific asset class.

To provide a closer look at returns, we examine a sub-sample of endowments who provide returns on each category of assets in which they invest (e.g., the return on their hedge fund portfolio if they invest in hedge funds) in the NACUBO survey. These data allow us to look directly at the

total return on an endowment's portfolio of alternative assets and also decompose that alternative return into its timing and selection components. Table 11 displays results. Column 1 shows that the return that endowments' earn on alternatives is strongly positively related to size. In addition, expertise in venture is associated with higher returns (coefficient significant at the 5% level). The same pattern shows up for selection returns in column 2, both size and VC expertise seemed linked to the ability to invest with high-performing managers in the alternatives space. This is consistent with Sensoy et al. (2014) findings on private equity returns. They find that the superior performance of endowment investors in the 1991-1998 period is mostly due to their greater access to the top-performing venture capital partnerships. The timing component of alternative returns (column 3) is not significantly linked to any of the variables. This is not surprising given that timing in alternatives such as VC and private equity is difficult if not impossible.

To explore separate categories of alternative assets, we further winnowed our sample by requiring that the endowment have a positive allocation to an asset class (e.g., a positive allocation to VC) and report the return on that asset class. This allows us to examine the variation across endowments in term of returns for that asset class. Table 12 reports the results. Returns on hedge funds (column 1) are not linked to any of the variables, including size. In contrast, VC returns (column 2) are strongly positively linked to size and the presence of a CIO. Surprisingly, the effect of VC expertise on VC returns appears negative in column 2 but not significantly so. Private equity returns (column 3) show no size effect but seem positively related to networks.

As discussed above, Table 11 shows that expertise in venture capital is associated with higher return on the alternative asset portfolio, and on selection in particular. However, there is substantial heterogeneity among endowments' performance. In particular, a sophisticated and investment-savvy board might be more relevant for endowments without a CIO, and where Trustees drive most of the investment program. Therefore, in the absence of a CIO, expertise within the governance body might matter more. Table 13 splits the sample by the presence of a CIO. Institutions without a CIO seem to benefit the most from the presence of a sophisticated board with extensive expertise in venture capital and private equity. On the other hand, networks are significantly positively correlated

with returns among endowments that use a CIO. In unreported results we also show that these effects are more pronounced for private universities. This is consistent with the survey we conduct, where larger endowments benefit the most from Trustees' connections and alumni networks to access restricted funds.

6 Channels of Effect on the Investment Process

Endowment governance covers the larger system by which the endowment is managed, directed, controlled and monitored. We examine possible channels by which the endowment's investment process may benefit from the financial expertise and networks resident in governing bodies.

6.1 Use of Funds

One potential benefit of expertise and networks would be to avoid extra fees from using additional layers of financial intermediation. For instance, investments in direct private equity funds (which own private companies) are illiquid, relatively undiversified, not easily scaled, and have high search and monitoring costs. Given the costs and frictions in direct fund investment, funds of funds (FoFs) provide a second level of intermediation with specialized expertise and services for investing in direct funds. But these benefits come at the cost of an additional fees paid to FoFs. In alternative assets such as private equity, FoF fees can be substantial, unlike the low cost alternatives for index funds in public securities (see Harris et al. (2018)).

We hypothesize that an endowment with extensive expertise and networks would be better able to navigate direct fund investing in alternative assets and hence avoid the extra fees from FoFs. To examine this possibility, we take advantage of NACUBO data which reports the number of separate direct funds and FoFs an endowment uses to invest in alternative strategies. The count is across all alternative strategies, and, unfortunately, does not distinguish between marketable alternatives (such as hedge funds) and non-marketable alternatives (such as private equity, venture capital, and real assets). We regress the number of funds (separately for direct funds and FoFs) on the natural

logarithm of total assets, networks, experience and all the controls used in section 4. Since we have count data and the distribution is highly right-skewed, we use a negative binomial regression. [8] The first regression in Table 14 shows that the number of direct funds is positively and significantly related to an endowment's size, expertise in alternatives on its board and the presence of a CIO. The second regression splits out expertise in the more granular fashion and suggests that the effect of expertise in VC and private equity is most pronounced on the use of direct funds. In particular, a 10% increase in the proportion of trustees with relevant experience in VC is associated to an increase in the number of direct alternative funds by four. The third and fourth regressions use FoFs as the dependent variable. They show limited evidence that expertise is negatively linked to the use of FoFs. In regression 4, for instance, the coefficients on expertise in VC and PE are negatively related to the use of FoFs (significant at the 5% level). Moreover, having a CIO goes hand in hand with fewer FoFs, with the coefficient significant at the 5% level. Overall, the results in Table 14 support our conjecture: more expertise seems to give endowments an edge is accessing direct funds. This, in turn, relieves the need to invest in FoFs and pay the extra fees that FoFs charge. The finding that expertise in VC and PE matters more in the regressions is consistent with needed skills to navigate investing in these non-marketable assets compared to marketable alternatives such as hedge funds.

6.2 Survey Evidence

To shed additional light on the investment process, we surveyed endowment boards and managers. The 132 responding institutions represent almost 20% of university endowments surveyed in the NACUBO-Commonfund Study, and collectively manage more than 60% of total market value as of 2015. About three-fifths of the respondents are CIOs, CFOs, or senior investment directors. Over a third of respondents had 15 or more years of service with the current endowment fund, and over 70 percent of respondents had five or more years of service. We asked a variety of questions (both quantitative and qualitative) related to the investment process.

Overwhelmingly, respondents felt that expertise on the investment committee was useful for

[8] Results are robust to different econometric specifications such as Poisson and simple OLS where we use the natural logarithm of one plus the number of funds used.

the endowment. When asked about the following statement, "the fund's investment process and decisions benefit substantially from the expertise of the committee", 83 percent somewhat or strongly agreed and almost half strongly agreed. Moreover, committee members with investment management experience play a key role; over 71 percent of respondents somewhat or strongly agreed with the statement, "investment committee members with the most investment management experience have a large influence on committee decisions and interactions with investment staff". Less than 10 percent disagreed (the remainder neither agreeing nor disagreeing). Our survey also confirmed the crucial role that IC members play in an endowment's asset allocation. 90 percent of respondents said the committee was important in setting the fund's strategic asset allocation policy, with over 70 percent strongly agreeing. For two-thirds of the endowments, the committee was also important in determining tactical asset allocation (e.g., specific allocations within a policy range). Turning to manager selection, the survey revealed a range of approaches with nuances related to individual circumstances. In terms of formal process, 66 percent report that the IC approves managers, but in only 27 percent of cases did the IC interview them. More typically, the IC, based on recommendations made by consultants or staff, approves who conducts the interviews. In some (typically larger) endowments, staff has full discretion to hire managers, often within guidelines. Most respondents agree that the investment committee is not involved in the day-to-day investment management process. This is especially true for larger endowments with full time staff. That said, there is substantial interaction with staff. Asked the question "how often do committee members interact with senior investment staff (including CIO) outside of regularly scheduled meetings?", over 60 percent of respondents reported that it happened once or more a month; 47 percent cited one to three times monthly, 10 percent said four to nine times, and four percent said more than ten times monthly. Further, the larger the fund, the more frequent this interaction. Endowments with one to three interactions per month had median assets of $286 million, compared to only $60 million for those with less than one interaction per month. Almost all respondents (93.5%) felt that the level of interaction was appropriate and none thought it too much. 6% of respondents consider the level of interaction as too little.

In tandem with the formal committee process for manager selection, many endowments report roles for IC members in making recommendations. When asked the question, "how often do committee members provide information on potential investment recommendations to the investment staff and leave it up to staff to do due diligence and make decisions?", only 22 percent responded "never". For 43 percent the response was "rarely", 30 percent "occasionally", and 6 percent "frequently". Most of the time, IC members only suggest a recommendation and leave discretion to follow the recommendation. 74 percent responded that IC members never make recommendations that staff is mandated to accept.

Another channel through which IC members affect the investment process is via networks and connections. 56 percent of respondents reported the "committee members facilitate access to investment opportunities that would otherwise be difficult to identify or undertake (e.g., closed or restricted funds)". This help with access is fairly infrequent, however. 34 percent said it happened rarely (less than once a year) and only four percent said it happened more than twice a year.

Overall, then our survey shows that members of endowments' governing bodies affect the investment process through a number of channels. In addition to formal policies on asset allocation determined by a board, IC members (especially those with investment expertise) provide advice and contacts in many endowments. This includes roles in manager selection as well as in establishing contacts with funds that may be hard to access. Such closed or restricted funds are most prevalent in alternative assets such as venture capital or private equity. This contribution of expertise is consistent with our prior empirical findings on asset allocation and the use of funds of funds in alternative assets. We note, however, that there is considerable variation across endowments, often related to size.

Finally, To probe more deeply into our survey responses, we create a regression framework to analyze our results. We focus on two questions; the first on "facilitating access" to investments that are hard to access, the second on "providing information on potential investments"' to staff. Each question had four possible answers which we coded one through four based on the response (4 being the most frequent occurrence of IC members providing assistance). Table 15 reports results

from an order probit model on the impact of size, network and expertise on IC member assistance with fund access and recommendations. The measures of network and expertise are in alternative assets since these are the hardest to analyze and access. For both help with access (column 1) and recommendations (column 3), there is a strong and significantly positive relationship (5% level) between IC networks and the frequency with which the IC provides assistance. Expertise has a positive but insignificant coefficient. These results are consistent with patterns highlighted earlier and illustrate key roles IC members often play in the investment process.

7 Conclusions

University endowments provide an especially good laboratory to study how financial expertise and networks affect choices made by and returns to an institutional investor. These endowments often have the institutional flexibility to pursue fairly unrestricted investment opportunities, have a favorable tax status which may reduce frictions in investing and have a long term (infinite) investment horizon. Moreover, endowments are more likely to be free from external political influence and other constraints facing some large institutional investors.

We find notable difference across endowments in the expertise and networks resident in their governing bodies. Moreover, differences in expertise and networks affect endowment choices about asset allocation; more expertise goes with higher allocations. These effects are concentrated in alternative assets (such as venture capital, private equity and hedge funds) to which many endowments have large allocations. Since alternative assets, by their very nature, are likely harder to analyze, manage and access than traded public securities, there is an enhanced role for expertise and networks in alternative assets. The nature of relevant expertise appears to be geared to subsets of alternative assets. Expertise in hedge funds matters for allocations to hedge funds but it is expertise in private equity that matters for private equity and expertise in venture capital that matters for venture capital. Consistent with this pattern, we find that having a CIO is positively linked to allocations in private equity and venture capital, both of which involve complexities such as

managing capital calls and dealing with illiquidity. These findings suggest that some elements of expertise do not readily travel across different types of alternative assets but are unique to the type of investment. This has broad implications for forming governing bodies and creating staff capabilities for endowments.

Our findings on networks also highlight complexities of investing in some types of assets. We find that connections to investment professionals (networks) matter especially for allocations to private equity and venture capital. This is consistent with networks helping facilitate ways to overcome restrictions or barriers to investing in funds that might otherwise be difficult or impossible to access. Finally, beyond effects on allocation, we document that more expertise is associated with higher total returns on an endowment's portfolio. Moreover, this higher return is not simply the result of decisions about asset allocation. Even controlling for benchmarks of average performance in alternative assets, higher expertise produces higher returns. The effects are particularly notable in venture capital and consistent with the nature of venture capital where fund selection and access are especially important due to the out-sized performance of a limited number of venture capital funds. Overall, our findings indicate that endowments likely benefit from seeking out investment experts to serve on their governing bodies. The potential benefits seem highest in areas such as private equity and venture capital.

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Figure 1: Endowment Returns -One, Three and Five Year Averages

This figure shows 1-, 3-, and 5-years total net return (in %) for U.S. university endowments from 2004 to 2015 from NACUBO.

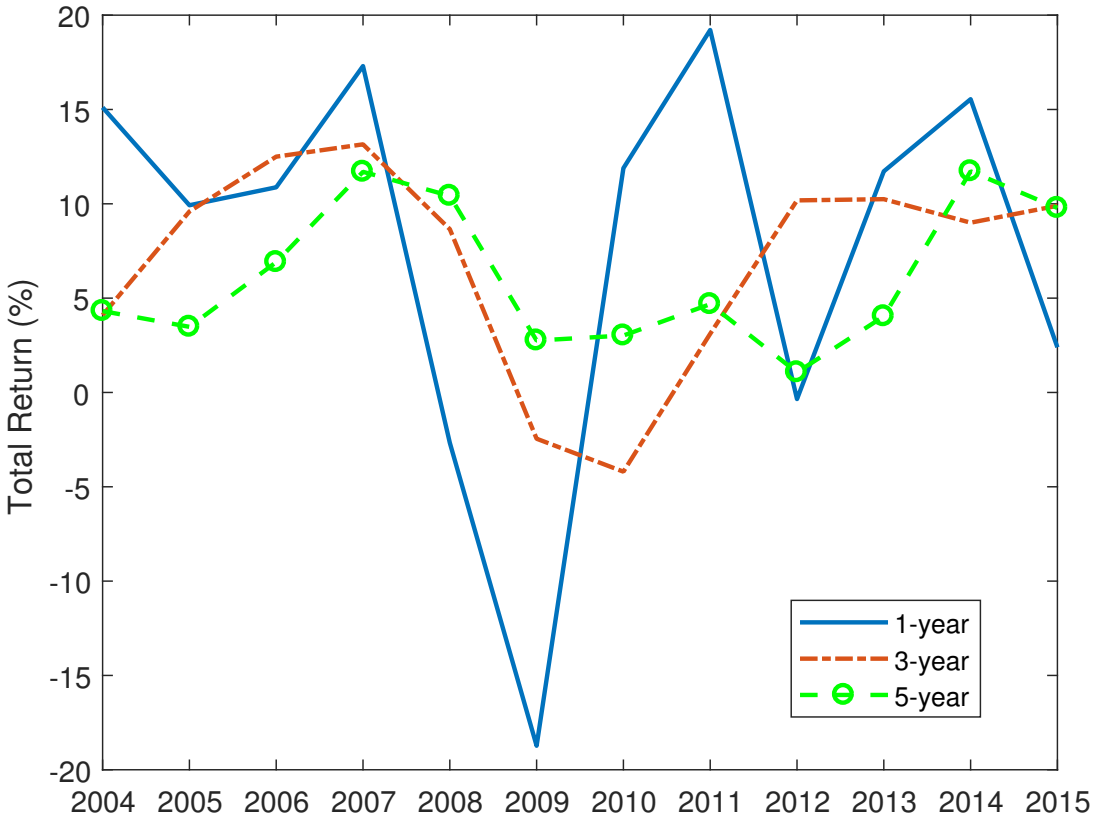

Figure 2: Asset Allocations to Alternative Investments by Endowment Size

This figure shows the proportion of total asset allocated to alternative investments for U.S. university endowments from 2004 to 2015 by size. These includes real estate, private equity, venture capital funds, commodities, and hedge funds. Large endowments have more than $1 billion of total assets, medium between $250 millions and $1 billion, small less than $250 millions.

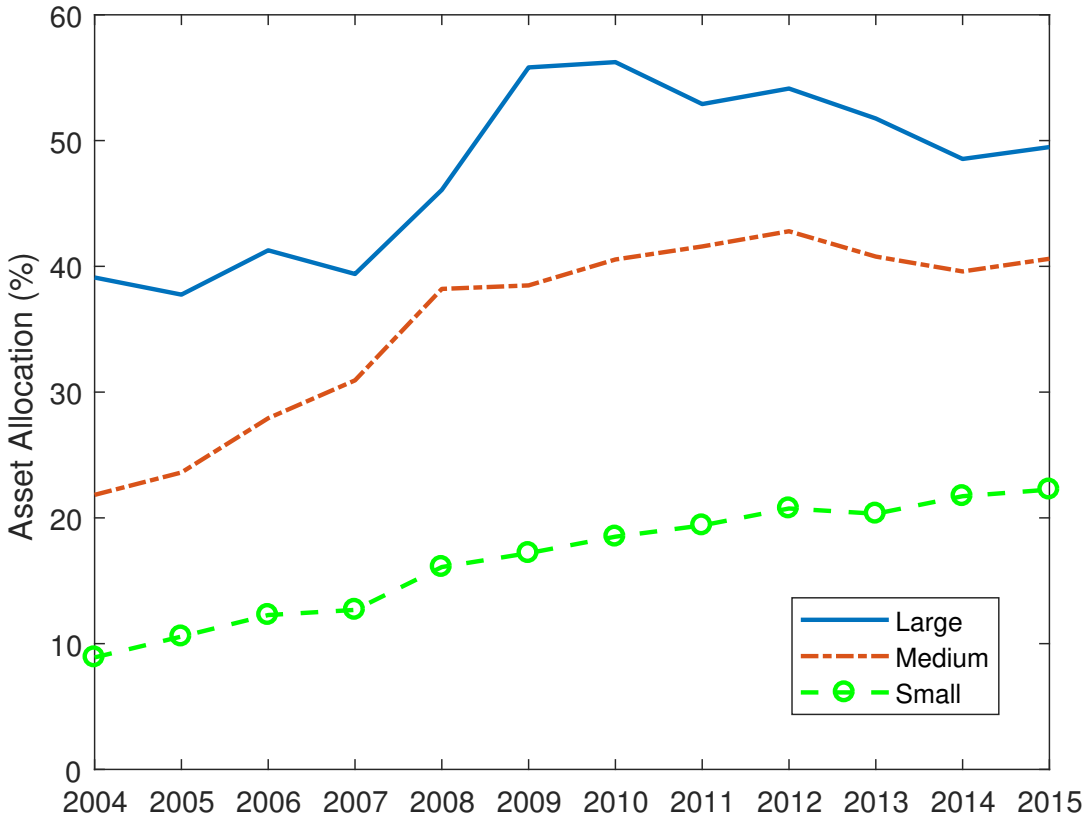

Table 1: Endowment Characteristics and Asset Allocations

This table reports summary statistics for all endowments covered in NACUBO data for the years 2004 through 2015. Entries summarize data points across all endowments and years and report the number (N) of data points, mean value, standard deviation, percentile values (25^{th}, 50^{th} and 75^{th}), and the asset weighted mean (weighted by the dollar ($) value of the endowment). Panel A covers basic endowment characteristics and total return: Size is total endowment assets (in millions of dollars, $M), Annual gifts is the sum of gifts and bequests (in $M). Spending rates are the total spending from the endowment as a percentage of the institution's annual budget (or its total assets). Total net return is an annual figure in percent. Panel B shows asset allocations (in percent) to domestic equity, fixed income, international equity and alternative assets (as well as subsets of alternatives).

	N	Mean	SD	P25	Median	P75	Mean ($W)
Panel A: Endowment Characteristics							
Asset Size ($M)	7960	501.21	1925.33	37.22	96.49	301.24	7896.13
Annual Gifts ($M)	7960	86.67	241.27	5.24	20.00	62.23	543.59
Spending as % of Budget	6328	9.91	16.65	1.00	3.84	10.57	18.04
Spending as % of Assets	7729	4.45	2.00	3.82	4.50	5.00	4.76
Annual Total Net Return	6259	7.39	11.48	0.80	10.90	15.60	9.74
Panel B: Asset Allocations (% of total assets)							
Domestic Equity	7960	35.63	16.99	22.70	33.53	48.07	19.84
Fixed-Income	7960	18.93	10.55	11.60	17.80	25.00	11.30
International Equity	7960	15.82	8.71	10.80	16.70	21.30	17.44
Alternative Investments	7960	24.30	19.57	7.63	21.68	37.30	47.94
Real Estate	6362	2.85	3.97	0.00	1.50	4.46	5.95
Venture Capital	6361	1.57	2.85	0.00	0.00	2.10	3.76
Private Equity	6361	4.41	5.72	0.00	2.60	7.00	10.54
Commodities	6361	3.62	4.63	0.00	2.40	5.92	6.72
Hedge Funds	6361	15.75	12.05	6.90	15.00	23.00	21.68

Table 2: Endowment Asset Allocations and Returns by Size

This table reports asset allocations and total net returns covered in NACUBO data for the years 2004-2015, segmented by endowment size. Entries summarize data points across all endowments and years and report the number of observations (N) and the mean values. Large funds have total assets greater than $ 1 billion, medium funds between $ 1 billion and $ 250 millions, and small funds have less than $ 250 millions. Panel A shows asset allocations (percentage of total assets). Panel B reports the annual percentage total returns.

	Large		Medium		Small	
	N	Mean	N	Mean	N	Mean
	Panel A: Asset Allocations (% of total assets)					
Domestic Equity	694	19.20	1566	26.82	5700	40.05
Fixed Income	694	10.58	1566	13.65	5700	21.40
International Equity	694	17.61	1566	18.07	5700	14.98
Alternative Investments	694	48.79	1566	36.86	5700	17.86
Real Estate	663	5.14	1485	3.01	4214	2.43
Venture Capital	663	4.52	1485	2.23	4213	0.88
Private Equity	663	9.99	1485	6.69	4213	2.73
Commodities	663	6.09	1485	4.91	4213	2.77
Hedge Funds	663	23.26	1485	20.47	4213	12.91
	Panel B: Total Net Returns (annual %)					
Annual Total Net Return	659	9.68	1481	7.85	4119	6.86

Table 3:

Selection Skills Revealed by Return Decomposition versus Multi-factor Approach

This table reports mean values (t-statistics) for annual total net returns and the selection component from the return decomposition of Equation 1. Data on return and weights is from NACUBO and cover the years 2004-2015. Large funds have total assets greater than $ 1 billion, medium funds between $ 1 billion and $ 250 millions, and small funds have less than $ 250 millions. For asset class benchmark returns we use public equity (SP500), fixed income (JP Morgan Bond Index), International Equity (MSCI ACWI), Real Estate (NCREIF), Hedge Funds (HFRI), Private Equity (Cambridge Associates PE), Venture Capital (Cambridge Associates VC), Commodities (GSCI) and Cash (30-day treasury bill). Standard errors are clustered at the year level. Significance levels are denoted by a ***, **, and *, which corresponds to the 1%, 5%, and 10% levels, respectively.

	Annual Total Net Return	Selection Component
	Mean (%)	Mean (%) (t-stat)
All Endowments	7.39	1.06* (2.08)
Large Endowments (greater than $1 billion)	9.68	1.70** (2.95)
Medium Endowments	7.85	1.12* (1.94)
Small Endowments (less than $250 million)	6.86	0.94* (1.87)

Table 4: Characteristics of Endowment Investment Committees

This table reports summary statistics for all endowments covered in NCSE data for the years 2004 through 2015. Entries summarize data points across all endowments and years and report the number (N) of data points, mean value, standard deviation, percentile values (25^{th}, 50^{th} and 75^{th}), and the asset weighted mean (weighted by the dollar ($) value of the endowment). Panel A shows the number of members on the investment committee (IC), as well as the number with specific backgrounds. Panel B shows the fraction of investment committee members with general investment expertise and specific alternative investment expertise, as well as the fraction of endowment-year observations that have a Chief Investment Officer (CIO).

	N	Mean	SD	P25	Median	P75	Mean ($W)
Panel A: Investment Committee (IC) Characteristics (number of members)							
Size - Total Members	7264	8.14	3.39	6.00	8.00	10.00	9.58
Non-Trustees	6105	1.37	2.33	0.00	0.00	2.00	2.73
Investment Professionals	7255	3.92	3.06	2.00	3.00	6.00	6.45
Alternative Specialists	5969	2.40	2.47	1.00	2.00	3.00	4.48
Alumni	4899	4.26	3.52	1.00	4.00	6.00	6.22
Panel B: Presence of Investment Committee Expertise and CIO)							
Experience in Investments	6780	0.51	0.29	0.29	0.50	0.75	0.70
Experience in Alternatives	5502	0.32	0.27	0.13	0.29	0.50	0.49
Endowment CIO	7960	0.24	0.43	0.00	0.00	0.00	0.74

Table 5: Backgrounds of University Trustees

This table reports summary statistics for all trustees covered in BoardEx and Guidestar for the years 2007 through 2015. Entries summarize data points across all endowments and years and report the number (N) of data points, mean value, standard deviation, percentile values (25^{th}, 50^{th} and 75^{th}), and the asset weighted mean (weighted by the dollar ($) value of the endowment). Panel A shows trustee background and education attainments. Panel B shows trustee expertise, i.e. the fraction of trustee-year that have relevant experience in finance (general banking or insurance), asset management, hedge funds, global alternatives, private equity, venture capital, real estate and commodity. The table reads this way: 37% of individual members have general finance experience

	N	Mean	SD	P25	Median	P75	Mean ($W)
				Panel A: Trustee Expertise			
Finance (Non-Investments)	44581	0.37	0.48	0.00	0.00	1.00	0.36
Asset Management	44581	0.09	0.28	0.00	0.00	0.00	0.11
Alternatives	44581	0.24	0.43	0.00	0.00	0.00	0.35
Hedge Funds	44581	0.04	0.19	0.00	0.00	0.00	0.08
Global Alternatives	44581	0.02	0.13	0.00	0.00	0.00	0.02
Private Equity	44581	0.10	0.30	0.00	0.00	0.00	0.17
Venture Capital	44581	0.06	0.24	0.00	0.00	0.00	0.09
Real Estate	44581	0.08	0.28	0.00	0.00	0.00	0.12
Commodities	44581	0.07	0.25	0.00	0.00	0.00	0.09
				Panel B: Trustee Background			
Age	31872	66.20	9.84	60.00	66.00	73.00	65.87
Gender (% male)	44581	0.78	0.41	1.00	1.00	1.00	0.76
Tenure (years as trustee)	15732	8.07	8.45	2.00	6.00	11.00	8.74
MBA	44581	0.17	0.38	0.00	0.00	0.00	0.26
CFA	44581	0.01	0.09	0.00	0.00	0.00	0.01
CPA	44581	0.05	0.21	0.00	0.00	0.00	0.03
JD	44581	0.07	0.26	0.00	0.00	0.00	0.11

Table 6: Investment Expertise and Networks Resident in Trustee Boards

This table reports summary statistics for all trustees covered in BoardEx and Guidestar for the years 2007 through 2015. Entries summarize data points across all endowments and years and report the number (N) of data points, mean value, standard deviation, percentile values (25^{th}, 50^{th} and 75^{th}), and the asset weighted mean (weighted by the dollar ($) value of the endowment).Panel A shows the fraction of endowments that have at least one members with relevant experience in finance (general banking or insurance), asset management, hedge funds, global alternatives, private equity, venture capital, real estate and commodity. Panel B shows our network measures. Total connections is the total count of individuals to which a member is connected via past and current employment, education, and other activities. Private equity, venture capital, PE & VC and hedge fund networks relate to the total count of connections of a member to individuals with private equity, venture capital or hedge fund expertise. Total industries relate to the total number of separate industries a member has had expertise in. The table reads this way: 33% of endowments have at least one member with experience in hedge funds.

	N	Mean	SD	P25	Median	P75	Mean ($W)
				Panel A: Endowment Expertise			
Finance (Non-Investments)	4076	0.96	0.19	1.00	1.00	1.00	0.99
Asset Management	4035	0.60	0.49	0.00	1.00	1.00	0.91
Alternatives	4076	0.83	0.37	1.00	1.00	1.00	0.97
Hedge Fund	4035	0.33	0.47	0.00	0.00	1.00	0.78
Global Alternatives	4035	0.18	0.38	0.00	0.00	0.00	0.44
Private Equity	4035	0.61	0.49	0.00	1.00	1.00	0.88
Venture Capital	4035	0.50	0.50	0.00	0.00	1.00	0.78
Real Estate	4035	0.65	0.48	0.00	1.00	1.00	0.91
Commodities	4076	0.60	0.49	0.00	1.00	1.00	0.88
				Panel B: Measures of Network			
Total Connections	3899	532.45	318.08	300.64	486.80	697.06	848.90
Past Employment	3899	283.83	211.59	118.50	246.60	396.50	416.04
Current Employment	3781	61.56	46.02	29.83	50.63	81.86	91.11
Education	3803	230.39	169.10	119.44	201.00	296.00	347.63
Other Activities	3304	77.30	97.47	14.00	44.00	103.29	107.91
Private Equity Network	3846	31.43	27.50	13.00	23.30	40.57	60.14
Venture Capital Network	3784	10.70	7.86	5.50	9.00	13.63	19.46
PE &VC Network	3846	38.54	31.89	16.67	29.71	50.60	73.86
Hedge Fund Network	3737	13.18	14.74	5.00	8.67	16.29	22.48
Total Industries	3899	7.19	2.55	5.46	7.00	8.56	9.22
Private Equity	3846	3.88	1.85	2.55	3.56	4.96	5.68
Venture Capital	3784	3.00	1.47	2.00	2.75	3.71	4.30
PE & VC	3846	4.26	1.98	2.88	4.00	5.38	6.13
Hedge Fund	3737	2.73	1.31	1.85	2.50	3.40	3.93

Table 7: Asset Allocations and Investment Expertise

This table reports OLS regression results of the relationship between the share allocated to domestic equity, fixed income, alternative investment strategies, hedge funds, venture capital funds, private equity funds, and some university endowment specific variables. Independent variables are the natural logarithm of total assets, board size, the proportion of trustees with experience in finance (banking & insurance), asset management, alternative investments, hedge funds, venture capital, and private equity, whether the endowment uses a CIO, and a dummy indicating whether the university is public or private. Year and state FEs are included. Standard errors are clustered at the endowment level. Significance levels are denoted by a ***, **, and *, which corresponds to the 1%, 5%, and 10% levels, respectively.

	Domestic Equity	Fixed-Income	Alternatives	Hedge Funds	Venture Capital	Private Equity
Size	-5.20***	-2.95***	8.04***	3.20***	0.60***	2.01***
	(0.35)	(0.28)	(0.43)	(0.34)	(0.15)	(0.24)
Board Size	-0.64	0.01	0.01	0.36	0.20	0.14
	(0.78)	(0.50)	(0.88)	(0.69)	(0.24)	(0.31)
Finance (Non-Investments)	3.20	2.01	-4.67	-2.34	0.14	-2.97***
	(2.37)	(1.67)	(2.84)	(2.36)	(0.57)	(0.94)
Asset Management	-2.23	2.18	0.64	6.28	-0.74	-2.03
	(4.67)	(3.21)	(5.64)	(4.72)	(1.15)	(2.54)
Alternatives	-2.77	-0.80	6.20*			
	(2.72)	(1.91)	(3.60)			
Hedge Funds				18.21***	-1.13	-1.46
				(6.02)	(1.77)	(3.61)
Venture Capital				6.86	2.67**	-4.18
				(6.11)	(1.33)	(3.00)
Private Equity				-2.80	0.22	4.65**
				(4.06)	(1.10)	(2.27)
CIO = 1	-1.21	-1.15	3.77***	-0.54	1.39***	2.03***
	(1.08)	(0.75)	(1.37)	(0.95)	(0.35)	(0.62)
Public = 1	1.08	1.68**	-1.11	1.62	-0.28	-0.69
	(1.10)	(0.77)	(1.45)	(1.21)	(0.27)	(0.51)
Observations	3,121	3,121	3,121	2,688	2,688	2,688
R-squared	0.42	0.36	0.58	0.35	0.31	0.40
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 8: Asset Allocations, Expertise and Networks

This table reports OLS regression results of the relationship between the share allocated to domestic equity, fixed income, alternative investment strategies, hedge funds, venture capital funds, private equity funds, and some university endowment specific variables. Independent variables are the natural logarithm of total assets, board size, the de-trended measure of network to private equity and venture capital professionals, the proportion of trustees with experience in finance (banking & insurance), asset management, alternative investments, hedge funds, venture capital, and private equity, whether the endowment uses a CIO, and a dummy indicating whether the university is public or private. Year and state FEs are included. Standard errors are clustered at the endowment level. Significance levels are denoted by a ***, **, and *, which corresponds to the 1%, 5%, and 10% levels, respectively.

	Domestic Equity	Fixed-Income	Alternatives	Hedge Funds	Venture Capital	Private Equity
Size	-5.22***	-2.90***	8.06***	3.22***	0.58***	1.97***
	(0.35)	(0.28)	(0.43)	(0.34)	(0.15)	(0.24)
Board Size	-0.33	-0.08	-0.18	0.33	0.18	-0.17
	(0.79)	(0.51)	(0.92)	(0.72)	(0.25)	(0.32)
Network	-0.31	-0.09	0.29	-0.28	0.21**	0.82***
	(0.51)	(0.35)	(0.58)	(0.50)	(0.10)	(0.23)
Finance (Non-Investments)	2.60	2.58	-4.55	-2.40	0.16	-2.71***
	(2.39)	(1.65)	(2.86)	(2.36)	(0.57)	(0.95)
Asset Management	-1.97	1.78	0.43	6.61	-0.90	-2.54
	(4.72)	(3.19)	(5.65)	(4.75)	(1.12)	(2.50)
Alternatives	-2.59	-0.99	5.87			
	(2.78)	(1.95)	(3.67)			
Hedge Funds				18.15***	-1.21	-2.35
				(5.99)	(1.79)	(3.56)
Venture Capital				6.33	2.58*	-4.59
				(6.12)	(1.36)	(3.03)
Private Equity				-1.89	-0.15	2.96
				(4.23)	(1.12)	(2.22)
CIO = 1	-1.16	-1.12	3.72***	-0.49	1.34***	1.97***
	(1.08)	(0.76)	(1.38)	(0.95)	(0.34)	(0.62)
Public = 1	1.22	1.59**	-1.13	1.45	-0.21	-0.63
	(1.11)	(0.76)	(1.47)	(1.21)	(0.27)	(0.51)
Observations	3,088	3,088	3,088	2,664	2,664	2,664
R-squared	0.42	0.36	0.58	0.35	0.31	0.41
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 9: Asset Allocation, Expertise and Networks: Two stage least squares tests

This table reports IV 2SLS regression results of the relationship between the share allocated to venture capital funds and private equity funds, and some university endowment specific variables. The first stage uses the total number of separate firm a member has worked in as an instrument for his/her total network to private equity and venture capital professionals. Independent variables are the natural logarithm of total assets, board size, the proportion of trustees with experience in finance (banking & insurance), asset management, alternative investments, hedge funds, venture capital, and private equity, whether the endowment uses a CIO, and a dummy indicating whether the university is public or private. Year and state FEs are included. Standard errors are clustered at the endowment level. Significance levels are denoted by a ***, **, and *, which corresponds to the 1%, 5%, and 10% levels, respectively.

	First Stage	Second Stage	
	Network	Venture Capital	Private Equity
# Industries	0.24***		
	(0.01)		
Network		0.74***	2.11***
		(0.27)	(0.60)
Size	0.02	0.55***	1.89***
	(0.02)	(0.14)	(0.24)
Board Size	0.18***	0.03	-0.53
	(0.04)	(0.27)	(0.37)
Finance (Non-Investments)	-0.06	0.27	-2.42**
	(0.13)	(0.56)	(0.96)
Asset Management	-0.39	-1.08	-2.97
	(0.26)	(1.13)	(2.44)
Hedge Funds	0.35	-1.61	-3.32
	(0.33)	(1.80)	(3.51)
Venture Capital	-0.58*	2.31*	-5.26*
	(0.31)	(1.36)	(3.04)
Private Equity	0.63**	-1.15	0.52
	(0.25)	(1.18)	(2.08)
CIO = 1	0.02	1.28***	1.82***
	(0.05)	(0.33)	(0.61)
Public = 1	-0.05	-0.18	-0.54
	(0.06)	(0.27)	(0.50)
Controls	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
First Stage F-stat	341.15		
Observations	3,088	2,664	2,664
R-squared	0.54	0.29	0.39

Table 10: Returns, Expertise and Networks: Overall Portfolio

This table reports OLS regression results of the relationship between total net return, selection and market timing return for the overall endowment portfolio, and some university endowment specific variables. Independent variables are the natural logarithm of total assets, board size, the de-trended measure of network to private equity and venture capital professionals, the proportion of trustees with experience in finance (banking & insurance), asset management, hedge funds, venture capital, and private equity, whether the endowment uses a CIO, and a dummy indicating whether the university is public or private. Year and state FEs are included. Standard errors are clustered at the endowment level. Significance levels are denoted by a ***, **, and *, which corresponds to the 1%, 5%, and 10% levels, respectively.

	Total Net Return	Selection	Timing
Size	0.34***	0.15**	0.08***
	(0.06)	(0.06)	(0.03)
Board Size	-0.16	-0.13	-0.04
	(0.14)	(0.12)	(0.07)
Network	0.04	-0.07	0.02
	(0.11)	(0.11)	(0.04)
Finance (Non-Investments)	0.41	0.36	0.48**
	(0.46)	(0.45)	(0.19)
Asset Management	0.29	0.52	0.05
	(0.92)	(0.93)	(0.43)
Hedge Funds	1.30	0.58	1.05*
	(1.15)	(1.09)	(0.56)
Venture Capital	0.76	0.90	0.27
	(0.87)	(0.98)	(0.49)
Private Equity	-0.43	-0.68	-0.16
	(0.81)	(0.82)	(0.40)
CIO = 1	0.11	0.09	-0.21***
	(0.17)	(0.18)	(0.08)
Public = 1	-0.04	-0.16	0.01
	(0.21)	(0.19)	(0.08)
Observations	2,636	2,636	2,327
R-squared	0.94	0.24	0.21
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Table 11: Returns, Expertise and Network: Alternative Asset Portfolio

This table reports OLS regression results of the relationship between total net return, selection and market timing return for the alternative asset endowment portfolio, and some university endowment specific variables. Independent variables are the natural logarithm of total assets, board size, the de-trended measure of network to private equity and venture capital professionals, the proportion of trustees with experience in finance (banking & insurance), asset management, hedge funds, venture capital, and private equity, whether the endowment uses a CIO, and a dummy indicating whether the university is public or private. Year and state FEs are included. Standard errors are clustered at the endowment level. Significance levels are denoted by a ***, **, and *, which corresponds to the 1%, 5%, and 10% levels, respectively.

	Total Alternative Return	Selection	Timing
Size	1.42***	0.95***	0.03
	(0.33)	(0.33)	(0.03)
Board Size	-0.00	0.17	0.02
	(0.53)	(0.54)	(0.07)
Network	0.11	-0.15	0.04
	(0.39)	(0.39)	(0.05)
Finance (Non-Investments)	-2.36	-2.04	0.24
	(1.64)	(1.58)	(0.20)
Asset Management	-5.44*	-3.74	0.19
	(3.15)	(3.04)	(0.31)
Hedge Funds	-3.32	-4.54	1.45*
	(10.28)	(10.27)	(0.74)
Venture Capital	10.44**	11.31**	0.48
	(4.97)	(5.10)	(0.50)
Private Equity	4.91	5.22	-0.13
	(3.36)	(3.22)	(0.37)
CIO = 1	-0.36	-0.64	-0.05
	(0.74)	(0.73)	(0.09)
Public = 1	-0.78	-0.56	0.04
	(0.67)	(0.67)	(0.07)
Observations	1,129	1,129	982
R-squared	0.68	0.51	0.16
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Table 12: Returns, Expertise and Networks: Alternative Sub-Asset Class

This table reports OLS regression results of the relationship between hedge fund return, venture capital return, and private equity return for the overall endowment portfolio, and some university endowment specific variables. Independent variables are the natural logarithm of total assets, board size, the de-trended measure of network to private equity and venture capital professionals, the proportion of trustees with experience in finance (banking & insurance), asset management, hedge funds, venture capital, and private equity, whether the endowment uses a CIO, and a dummy indicating whether the university is public or private. Year and state FEs are included. Standard errors are clustered at the endowment level. Significance levels are denoted by a ***, **, and *, which corresponds to the 1%, 5%, and 10% levels, respectively.

	Hedge Funds	Venture Capital	Private Equity
Size	0.22	1.34**	0.55
	(0.23)	(0.52)	(0.34)
Board Size	0.34	-1.04	0.83
	(0.36)	(1.00)	(0.65)
Network	0.20	0.99	1.03**
	(0.25)	(0.88)	(0.47)
Finance (Non-Investments)	-1.60*	-2.33	-0.54
	(0.93)	(4.40)	(1.90)
Asset Management	-2.39	-9.40	-8.01**
	(2.22)	(6.33)	(3.71)
Hedge Funds	1.80	-1.01	-4.97
	(3.92)	(10.04)	(6.52)
Venture Capital	3.11	-8.45	1.77
	(2.82)	(10.03)	(4.61)
Private Equity	2.24	-7.30	0.38
	(1.97)	(5.54)	(3.97)
CIO = 1	0.31	4.13**	0.58
	(0.51)	(1.86)	(0.78)
Public = 1	0.20	-0.99	0.19
	(0.47)	(1.60)	(0.83)
Observations	1,519	645	1,055
R-squared	0.61	0.46	0.67
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Table 13: Returns, Expertise and Networks: Investment Staff

This table reports OLS regression results of the relationship between total net return, selection and market timing return for the alternative asset endowment portfolio, and some university endowment specific variables for endowments with and without a professional investment staff (CIO). Independent variables are the natural logarithm of total assets, board size, the de-trended measure of network to private equity and venture capital professionals, the proportion of trustees with experience in finance (banking & insurance), asset management, hedge funds, venture capital, and private equity, whether the endowment uses a CIO, and a dummy indicating whether the university is public or private. Year and state FEs are included. Standard errors are clustered at the endowment level. Significance levels are denoted by a ***, **, and *, which corresponds to the 1%, 5%, and 10% levels, respectively.

	Total Alternative Return		Selection		Timing	
	CIO	NO CIO	CIO	NO CIO	CIO	NO CIO
Size	0.78	1.60***	0.32	1.11***	-0.02	0.05
	(0.69)	(0.40)	(0.65)	(0.43)	(0.12)	(0.04)
Board Size	-1.13	0.19	-0.37	0.33	-0.03	0.05
	(1.02)	(0.67)	(1.00)	(0.70)	(0.20)	(0.07)
Network	2.36**	-0.17	1.59*	-0.40	0.20	0.01
	(0.98)	(0.43)	(0.93)	(0.45)	(0.23)	(0.05)
Finance (Non-Investments)	-0.93	-1.76	-2.60	-1.48	0.09	0.41**
	(3.40)	(1.90)	(3.16)	(1.90)	(0.90)	(0.20)
Asset Management	-5.03	-5.01	2.17	-3.96	-1.36	0.42
	(8.34)	(3.48)	(7.35)	(3.47)	(1.18)	(0.38)
Hedge Funds	13.32	-12.33	9.99	-14.45	2.21	1.04
	(12.57)	(12.73)	(11.58)	(12.35)	(1.98)	(0.83)
Venture Capital	2.25	12.20**	1.16	13.65**	0.43	0.44
	(8.78)	(6.01)	(7.68)	(6.36)	(1.28)	(0.49)
Private Equity	-7.93	6.69*	-9.67	7.32**	-0.18	-0.09
	(9.87)	(3.54)	(9.45)	(3.52)	(1.34)	(0.38)
Public = 1	-1.65	-0.25	-0.21	-0.22	-0.25	0.15*
	(1.13)	(0.89)	(1.13)	(0.91)	(0.20)	(0.08)
Observations	289	836	289	836	268	710
R-squared	0.80	0.66	0.60	0.51	0.34	0.15
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 14: Expertise and Use of Funds of Funds

This table reports marginal coefficients from negative binomial regression results of the relationship between the number of direct alternative funds and alternative funds of funds used, and some university endowment specific variables. Independent variables are the natural logarithm of total assets, board size, the de-trended measure of network to private equity and venture capital professionals, the proportion of trustees with experience in finance (banking & insurance), asset management, alternative investments, hedge funds, venture capital, and private equity, whether the endowment uses a CIO, and a dummy indicating whether the university is public or private. Year and state FEs are included. Standard errors are clustered at the endowment level. Significance levels are denoted by a ***, **, and *, which corresponds to the 1%, 5%, and 10% levels, respectively.

	Direct Alternatives		Fund of Funds	
	(1)	(2)	(3)	(4)
Size	19.03***	18.82***	1.04***	1.07***
	(2.43)	(2.29)	(0.18)	(0.18)
Board Size	0.65	0.57	0.07	0.09
	(1.74)	(1.68)	(0.26)	(0.27)
Alternatives	22.40***		-2.84***	
	(7.31)		(1.01)	
Network	-0.32	-0.02	0.16	0.20
	(1.24)	(1.24)	(0.18)	(0.18)
Finance (Non-Investments)		-0.60		-0.47
		(5.00)		(0.72)
Asset Management		1.78		-0.44
		(10.45)		(1.62)
Hedge Funds		-10.97		-3.35
		(15.35)		(2.18)
Venture Capital		35.85***		-4.14**
		(13.48)		(1.85)
Private Equity		11.89		-3.22**
		(8.44)		(1.47)
CIO = 1	5.71***	5.60***	-0.82**	-0.80**
	(1.85)	(1.82)	(0.38)	(0.37)
Public = 1	-3.26	-3.09	-0.37	-0.35
	(2.11)	(2.07)	(0.37)	(0.37)
Observations	2,804	2,804	2,810	2,810
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Pseudo R-squared	0.14	0.14	0.04	0.04

Table 15: Survey Evidence on Impacts of Expertise and Networks

This table reports order probit regression results of the relationship between access to investment opportunities difficult to undertake or identify (never, rarely, occasionally and frequently), beneficial effect of the investment committee (strongly disagree, somewhat disagree, neither agree or disagree, somewhat agree, strongly agree), impact on investment performance (very negative, negative, no impact, positive and very positive) and the some endowment specific variables. Independent variables are the natural logarithm of total assets, fraction of trustees with alternative investment expertise, and the de-trending network measure described above. Standard errors are robust to heteroskedasticity. Significance levels are denoted by a ***, **, and *, which corresponds to the 1%, 5%, and 10% levels, respectively.

	Access		Recommend		Benefit		Impact	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Size)	0.294**	0.358***	-0.083	0.001	-0.165	-0.160	-0.133	-0.102
	(0.126)	(0.133)	(0.102)	(0.099)	(0.125)	(0.133)	(0.101)	(0.101)
Network (PE)	0.435**		0.368**		0.161		0.162	
	(0.186)		(0.167)		(0.196)		(0.175)	
IC Expertise		1.347		0.511		0.771		0.419
		(0.942)		(0.673)		(1.222)		(0.841)
Observations	64	64	69	69	63	63	63	63
Pseudo R-squared	0.1267	0.1113	0.0243	0.0026	0.0152	0.0147	0.009	0.06