Employee Ownership and Private Firm Returns*

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Abstract

This paper examines the return properties of private employee stock ownership plans (ESOPs). Most ESOP plans are sponsored by small private firms, whose valuations are determined annually by a valuation specialist. Our evidence suggests that private ESOP returns exhibit characteristics that are difficult to justify with underlying firm fundamentals. Relative to public ESOP plans, private ESOP plans appear to sustain very high risk-adjusted returns. We also note stark discontinuities in the distribution of private ESOP returns that suggest a bias toward positive reported performance. Interestingly, our tests suggest that a mandatory independent CPA audit appears to *reduce* reported return volatility, and has little effect on the apparent preference for positive returns. Recent government initiatives aim to increase the prevalence of ESOPs as a path to building retirement wealth for rank-and-file employees. Our descriptive results suggest that employees who are owners of their employer firms may not always receive accurate information with regard to the performance of their investment.

1. Introduction

This paper examines the quality of the information given to employees regarding their holdings of employer stock. Recently, there has been a bi-partisan push to increase the extent of broad-based employee ownership of U.S. firms.[1] Employee ownership initiatives are seen as a way to increase profits through enhanced employee engagement and reduced turnover, all while building retirement wealth for employee investors. Advocates of employee ownership plans often point to the favorable returns these plans tend to yield (Rosen, 2015). While some public firms have these plans, the vast majority of employee stock ownership plans (ESOPs) are at closely held firms. For private firms, there is no objective, easy-to-acquire share price which can be used by employee investors to learn about or monitor plan performance over time.

Prior research notes that determining the appropriate equity value for private firms is difficult (Gupta et al., 2021). The valuation process includes a number of subjective inputs, such as projected cash flows, discount rates, comparable companies, and appropriate multiples, that are difficult to verify and likely subject to management influence. In order to protect employee interests and provide them with information on their investment, the Department of Labor (DOL) requires fair market valuations of private firm ESOP plans to be conducted by independent valuation specialists and reported to participants on an annual basis. However, given the lack of publicly available data on these firms, it is likely difficult for employees to assess the accuracy of the information they receive regarding the performance of their investment.

Our evidence in this paper suggests that private ESOP returns exhibit unique characteristics that are hard to explain by fundamentals alone. Using employee benefit plan annual reports publicly available through the Department of Labor (DOL) website, we create a large-sample

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[1] The bi-partisan SECURE 2.0 Act in 2022 and the bi-partisan Employee Equity Investment Act in 2023 are in part aimed at increasing equity ownership by employees.

dataset of reported ESOP returns spanning the years 2000 to 2022.[2] In general, economic returns to private equity investments are believed to come with higher risk than public equity (Moskowitz and Vissing-Jorgensen, 2002). To assess whether this general pattern applies to private ESOP returns, we use the set of Form 5500 filings to create a value-weighted portfolio of private ESOP returns, which we compare to a similarly-constructed portfolio of public ESOP returns, as well as the Vanguard Small Cap and S&P 500 indices, over our sample period. We find that both private and public ESOP returns closely track market indices; however, the volatility of the private ESOP portfolio is much lower than that of comparable public investments. While the raw returns are comparable, we find the lower volatility results in private ESOP risk-adjusted returns that are much larger than the other portfolios.

Consistent with the portfolio-level findings, we further find that plan-level Sharpe ratios of private firm ESOP investments are significantly higher than those of comparable public firm ESOPs. The Sharpe ratios for private ESOPs are, on average, 50% higher than the ratios for the public ESOPs. More specifically, our univariate analysis finds that on-average return volatility for a private ESOP firm is significantly lower than that of a public ESOP firm, even as annual return averages for private and public ESOPs do not significantly differ. Our regression results control for observable differences in public and private ESOP plans and also find private plans have lower volatility and higher risk-adjusted returns. While one might not expect private ESOP return characteristics to perfectly mimic the returns of firms traded on public exchanges, it is hard to imagine a scenario where such vast differences in risk-adjusted returns are allowed to persist.

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[2] We restrict our analysis to "returns," or year-to-year changes in private ESOP equity investments. The value of the equity investment itself is not interpretable, both because it only represents the portion of total equity that is owned by employees and there is no other accounting information to which we can benchmark it.

To characterize private ESOP returns in more detail, we analyze the distributions of reported private ESOP returns over our sample period. Our charts of return frequencies, displayed in 1 percent increments, show a statistically significant discontinuity around the zero percent threshold. Specifically, returns around this threshold are positive with a frequency above what a normal distribution would predict. We do not find a similar discontinuity within the publicly-traded ESOP return distribution. Private ESOP firms differ from other firms along factors such as employee engagement and investment in ESG. While it is difficult to argue that such differences would result in discontinuities around the zero percent threshold, they could explain differences in return volatility.

To consider the possibility that the return characteristics are driven by differences in the risk profiles of these private firms, we examine whether these characteristics vary with the plan's monitoring environment. Specifically, we exploit a unique institutional feature wherein benefit plans are required to be audited by a Certified Public Accountant (CPA) once they reach a threshold level of participants. To the extent that less volatile ESOP returns represents differences in firm fundamentals, we would not expect the presence of an independent audit to have an impact on the within-plan standard deviation of ESOP returns. However, our analysis finds that volatility measures differ significantly for audited and non-audited plan-years. Surprisingly, ESOP plan-years that are subject to mandatory audits appear to exhibit *less* volatile returns than non-audited plan-years. Our univariate and regression results further suggest that plans that cross above the audit threshold during their life cycle experience stark decreases in both raw returns and raw volatility in years with audits, and those who cross below the threshold experience increases in these measures in years without audits. Moreover, we find no apparent decrease in the tendency

towards positive returns (i.e., the discontinuity around zero percent) for the audited relative to the non-audited plan-years.

Altogether, our descriptive results suggest that the information employees receive about their private ESOP returns may not accurately reflect year-to-year changes in true underlying fair values of ESOP equity. Moreover, our initial findings do not immediately indicate that an independent audit improves the quality of the valuation information. Managers and auditors alike may desire stable, non-zero ESOP returns in order to avoid litigation or attention from governmental auditors. Anecdotal evidence suggests negative ESOP returns are used to bolster participant lawsuits.[3] Moreover, participant complaints are believed to be a common trigger of Department of Labor audits.[4] It is further possible that ESOP returns may be determined in an effort to satisfy risk- and loss-averse employee preferences. Indeed, it is not altogether clear to what extent employees who hold investments in their private employer shares will be exposed to the risk of private ESOP plan losses. Upon separation, most ESOP employees will liquidate their employer share holdings at the reported, specialist-determined fair market value. Given relatively stable, non-zero return patterns, most employees will not "lose" in nominal value, especially if they liquidate in the near term. Longer time horizons, however, present a significant loss exposure. For plans that eventually terminate, we find that 22 percent lose 25 percent or more of their value, and 14 percent lose over half their value in their final year.

Regardless of the actual payouts, however, it is likely that the poor quality of private ESOP return information imposes a cost onto employees. Our preliminary findings suggest that

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[3] See the AICPA White Paper, "What every valuation analyst should know about employee stock ownership plans (ESOPs)" at:
https://assets.ctfassets.net/rb9cdnjh59cm/4mZhfrKxbFdnmlLjxiqNdC/6e5048fc4ad44a970215cf62a9eba027/esop-white-paper.pdf
[4] See "Current Trends in DOL and IRS Investigations" at: https://www.employeebenefitsblog.com/2021/09/current-trends-in-dol-and-irs-investigations/

employee's individual employment decisions are sensitive to the return characteristics of their ESOP holdings. Using aggregate turnover rates that are mandated in the plan's annual reports, we find a strong positive relation between ESOP return volatility and employee turnover. We further explore this connection using granular resume data from Revelio Labs. Specifically, in untabulated results, we find that in instances where individual employees join an ESOP firm after working at a non-ESOP firm are associated with periods of higher market volatility relative to instances where employees leave an ESOP firm for a non-ESOP firm. Consistent with individuals valuing the returns from ESOPs as part of their overall compensation, we find that ESOP-to-non-ESOP job switches are associated with higher salary increases than switches from non-ESOP firms to ESOP firms. These findings can only speak to correlations. However, it is possible that the unique characteristics of ESOP returns may act as an additional factor in determining individuals' employment choices.

Our study provides a preliminary but needed contribution on a timely and important topic; namely, the potential information risks associated with employee stock ownership in a private firm setting. Advocates of ESOPs claim that they benefit both firms and employees.[5] While it may be the case that the return characteristics we document satisfy employee preferences for low risk returns with a low loss probability, our findings suggest that reported returns may pose an information risk for employees. In general, small private firms carry greater risk than larger firms, and the terminated plans in our sample experiences losses with an economically significant frequency. This potential for loss is only compounded by the lack of diversification between employment and investment risk that is inherent to these plans (Anderson and Morrison Stumpff,

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[5] For instance, see The ESOP Association at claims ESOP formations carry benefits for founders, employees, firms, and surrounding communities: https://www.esopassociation.org/what-is-an-esop

2018). Even without catastrophic losses, the potential for low-quality wealth information may lead employees to make employment or savings decisions that are less-than optimal.[6]

A second contribution of our study is to bring attention to the role of independent audit engagements in private firms. Prior work on private firm audits find that auditor independence is uncompromised by factors such as fee dependence (Hope and Langli, 2010) and that private firm audit quality varies with the agency environment of the firm (Hope et al., 2012). We believe the mandatory nature of the ESOP audit, along with an observable valuation outcome, is an advantage of our setting, even as it may not be generalizable to other private firm audit outcomes. We do not find clear evidence that mandatory audits improve ESOP information quality for employees. However, a full understanding of our findings will require further evidence on where and when the ESOP return preferences of firms, employees, and auditors are likely to align or differ.

2. Institutional Background

2.1 EMPLOYEE BENEFIT PLANS

Private and public companies alike offer their employees, as part of their compensation packages, the opportunity to participate in one of a number of types of retirement or benefit plans. Broadly, these plans take one of two forms: 1) defined benefit or 2) defined contribution. Under defined benefit (DB) plans, the employer makes contributions to the plan in an effort to provide their employees with a "specified monthly benefit at retirement."[7] Conversely, a defined contribution (DC) plan is funded by both individual contributions from the employee and contributions from the employer, and the ultimate employee distribution at retirement is a function of the amounts contributed, and the accumulated returns on those contributions, over the life of

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[6] For instance, the value of accumulated savings is likely an important factor in determining when to retire (Sevak, 2008).

[7] https://www.dol.gov/general/topic/retirement/typesofplans

participation in the plan. Examples of these types of plans include 401(k)s, profit sharing plans, and employee stock ownership plans (ESOPs). In order to generate these accumulated returns for future distributions, the contributed funds are invested in a variety of investment vehicles, including publicly traded stocks, government and corporate bonds, real estate, and shares of the company's own stock, the focus of this paper.

2.2 EMPLOYEE STOCK OWNERSHIP PLANS

We focus on a particular defined contribution plan – employee stock ownership plans (ESOPs). ESOPs are broad-based retirement benefit plans where the company contributes its own stock, or cash to buy its own stock, to an ESOP trust that purchases and manages the shares on behalf of the employees. The number of shares granted is based on the employee's relative salary and tenure at the company. A plan administrator maintains an account for each participant and notifies the participants about how much their shares are worth. When the participant retires, leaves the firm or becomes disabled or dies, their shares are either bought by the company all at once or over time with the duration varying by plan, value of shares, age of the participant, and the reason for leaving (NCEO, 2016).

Each year when there is a transaction (i.e. disbursements or grants of shares), the firm is required to value the employer shares held in the ESOP trust, which should represent "the amount the seller could reasonably expect to receive … in a current sale between a willing buyer and a willing seller" (SOP 93-6). For publicly-traded companies, it's relatively easy to determine the fair value of shares owned since the value is determined through trading in a public market. For private firms, which account for over 90% of all ESOPs, both the Department of Labor (DOL) and the

IRS require an independent appraiser to determine the fair market value of the shares.[8] The specialists select from various valuation methods which include the income-based (discounted cash flow analysis, earnings multiples), market-based (comparable company analysis), and asset-based (net asset value) approaches. They then apply discounts and premiums (i.e. lack of marketability, control, minority interest, put option), prepare the valuation report, and review and update the valuations.

2.3 DISCLOSURE AND AUDIT REQUIREMENTS

2.3.1 Disclosure Requirements

ESOPs are governed by the Employee Retirement Income Security Act of 1974 (ERISA), the monitoring of which falls under the purview of the Department of Labor. Under ERISA, companies are subject to annual reporting requirements, which are fulfilled through filing a Form 5500 jointly with the Department of Labor, the IRS, and the Pension Benefit Guaranty Corporation. The Form 5500 includes high level information about the plan, such as the plan name, plan sponsor (company), type of plan, and number of participants. On an additional schedule (Schedule H or I, depending on the number of plan participants), the company is required to report detailed financial information about the plan, including a summary of assets and liabilities, and a summary of income and expenses. Detailed information on the assets of the plan includes the beginning- and end-of-period balances of all asset types held by the plan, including any employer securities. Items recorded as income on the Statement of Income and Expense include contributions received by the plan during the year and earnings on investments held by the plans

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[8] Department of Labor requires the "fair market value of the asset [to be] determined in good faith by the trustee or named fiduciary" and the IRS further requires the determination of fair value of "employer securities which are not readily tradeable" to be made by an "independent appraiser." See ERISA 402 (3)(18) and IRS 401(28)(C).

(e.g., interest, dividends, gains or losses on sales). Expenses incurred by the plan during a plan year include benefit payments, interest expenses, and administrative expenses.

2.3.2 Audit Requirements

ERISA also requires the plan information to be audited by a Certified Public Accountant (CPA) once the plan crosses over a certain number of plan participants. Plans with less than 100 participants are not required to be audited while plans with 100 or more participants are. However, an exception to this rule, known as the "80-120" rule, allows for slight changes in the participant count around 100 participants and effectively puts the cutoff at 120 participants (Instructions for Form 5500, 2021 pg. 8). Plans are required to indicate on their Form 5500 the type of opinion obtained over the benefit plan report, the name of the audit firm who completed the work, and attach the audit opinion with their 5500 filing.

3. Data and Sample Selection

The purpose of this paper is to analyze the characteristics of the information provided to employees regarding returns on their holdings in employee stock ownership plans. To construct the sample of employee stock ownership plans, we download all the benefit plan filings, which are known as Form 5500s for large plans (i.e. 100 or more participants) and Form 5500-SFs for small plans (i.e. less than 100 participants) from 1999 to 2022.[9] We merge each plan's filing with corresponding financial information from Schedule H (large plan) and Schedule I (small plan) filings. Together, this provides detailed annual financial and operational information about each plan.

We then take the following steps to prepare the data for analysis (see Table 1 for a summary of these steps). We first require plans to have non-missing or non-blank Sponsor names. We restrict

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[9] The reports are publicly available from the DOL's website.

the sample to only ESOPs by requiring the plan to have the following benefits codes: "2O" or "2P." "2P" refers to levered ESOPs which acquire shares with borrowed money and "2O" refers to unlevered ESOPs. We then ensure each plan has one unique employer identification number (EIN). When there are overlapping filings, we give priority to the most recent filing that covers a longer period of time. To eliminate duplicate filings, we identify plans with annual filings that have the same year-end assets and year-end liabilities. We then manually check the filings and remove duplicates. We also exclude any observations with missing participant information or where the total assets or the total number of participants is zero. We exclude plans with less than 10 employees to ensure that the unique characteristics of ultra-small firms do not affect our inferences.[10] As we focus on the return on shares held in the ESOP, we exclude non-consecutive plan-year observations. We also exclude observations where there is no change in the value of the employer shares, as this indicates a valuation did not occur in that year.[11] Along with this, we exclude plans where i) the beginning value of the assets plus employer contributions plus non-cash contributions plus participant contributions minus total distributions is equal to the ending value of total assets or ii) the beginning value of total assets is equal to the ending value of total assets. These steps result in a main sample of 109,951 plan-year observations.

[TABLE 1]

Table 2 presents summary statistics on the plans in our main sample. ESOPs are held in publicly-traded companies (i.e. Public ESOPs) and privately-held companies (i.e. Private ESOPs). We identify publicly-traded companies through a fuzzy name match and then hand collect to verify the public status. After following the sample selection process outlined in Table 1, as of 2022 we have close to 4,500 ESOPs in our sample with over 8 million participants holding over $275 billion

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[10] In sensitivity analyses, we include these small p and are our results are unchanged.
[11] Plans are not required to have an annual appraisal if there is no transaction in the year.

in employer securities.[12] While there are more private than public plans, public ESOPs account for the majority of employees and hold a majority of the total value of employer securities. The number of ESOPs has remained fairly consistent throughout the sample period while the number of participants and the value of employer securities has increased. Over the last 20+ years, the number of participants has doubled from 4.28 million to over 8 million and the value of employer securities has doubled from $134 billion to over $275 billion. As of 2022, the average ESOP participant across the public and private ESOPs has approximately $37 thousand held in employer securities.

[TABLE 2]

Table 3 presents descriptive statistics. Panel A presents the statistics for our main sample. There are 109,951 plan-year observations with employer shares held in ESOPs, earning an average annual return of 12% and a median return of 6%. We measure returns as the share's unrealized gains and losses scaled by the beginning value of the shares. The plans hold a mean (median) value of employer shares of $115 million ($4.0 million) and have 1,496 (86) plan participants. Around 40% of the plans are audited and a little more than half are considered levered ESOPs (i.e. where the ESOP borrows money to purchase the shares). The average (median) age of the plans is 23 (21) years. Private firm ESOPs make up the majority of our sample (93%), with the remaining 7% of ESOPs belonging to public firms. Panel B presents statistics on the sample of ESOPs in private firms (102,222 plan-year observations) and Panel C presents statistics for ESOPs in public firms (7,629 plan-year observations). On average, public firm plans have more participants (16,586 participant vs. 352 participants), a higher value of employer securities ($1.3 billion vs. $28 million) and have existed for a longer period of time (36 years vs. 22 years).

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[12] The DOL releases benefit plan financial information as the files are received. The slight decline in employee stock ownership plans in 2022 is due to some plans not filing by the time we pulled the data.

[TABLE 3]

4. Main Analysis

4.1 RETURN CHARACTERISTICS

4.1.1 Returns by Year

To better understand the returns and risk characteristics of shares held in ESOPs, we first present annual returns and summary statistics for select portfolios from 2000 to 2022. We compare portfolio returns for shares held in private firm ESOPs, public firm ESOPs, and equity market indices. The goal is to understand the relative performance and risk characteristics of the different types of ESOPs. In columns (1) and (2) we examine the returns of shares in private ESOPs and in columns (3) and (4) we examine the returns of shares in public ESOPs. For each, we calculate the returns on an equally- and value-weighted basis, with weights based on the total value of the shares. Columns (5) and (6) present the annual returns for the S&P 500 Index and the Vanguard Small Cap Index Fund.[13] In addition to returns, we calculate summary statistics on each portfolio including the average return, standard deviation, and Sharpe ratio.

We find private ESOP portfolio returns are less volatile than the other portfolios. Column (1) shows the average return for the equally-weighted private ESOP portfolio is 12%, with a volatility of 8%. The portfolios only negative return came in 2008 during the financial crisis when it had a return of -9%. The limited volatility of this portfolio results in a Sharpe ratio of over 1.5x. Column (2) shows similar results when the portfolio is constructed using value-based weights.

Columns (3) and (4) show the annual returns for the equally- and value-weighted portfolios of shares held in the ESOPs of public firms. While the average portfolio returns are similar to the private ESOP returns, the volatility is 2x larger. This results in a Sharpe ratio for private ESOPs

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[13] The Vanguard Small Cap Index Fund tracks the returns of the CRSP US Small Cap Index, which represents small-capitalization U.S. equities. The first full year of return information is for 2001.

2x larger that of the public ESOPs. Also, while the private ESOP portfolio declined by 9% in 2008, the public ESOP portfolio declined by 30% and recorded four years of negative returns over the sample period. Columns (5) and (6) show the returns for the S&P 500 Index and Vanguard Small Cap Index Fund. Again, the relative stability of the private ESOP returns is striking. The volatility for the private ESOPs is half that of the public indexes, and the Sharpe ratios 4x and 2x larger.

Across the portfolios, the shares held in private firms have much lower volatility and few years of negative returns. This results in returns, adjusted for volatility, that are much higher than the other portfolios. One can argue these small private firms should have even greater volatility because the shares are less liquid (Mramor and Valentincic, 2003), and small firms face substantial business risks including a higher rate of defaults than larger firms (Lui, 2021). However, we see the opposite pattern in the return characteristics. The shares have consistent and relatively high returns when adjusted for the volatility of the shares.

[TABLE 4]

Figure 1 shows the returns by year for the private and public ESOP value-weighted portfolios, as well as the equity market indices. The figure underscores the lack of volatility in the private ESOP returns shown in Table 4. The solid black line shows the private ESOP returns. There is notably lower annual volatility compared to the other portfolios. Even during periods of negative returns, like in 2002 or 2008, the declines for the private plans are substantially less severe compared to the other portfolios. Again, this highlights the stability of the private firm ESOP shares.

[FIGURE 1]

4.1.2 Comparing Public and Private Returns

Building upon the observations of the lower volatility and higher risk-adjusted returns associated with private plan shares, Figure 2 shows the different return distributions for private and public firm ESOPs. Unlike the prior results, which focus on portfolio returns, we focus on annual returns of individual plans between -50% and +50%. We randomly sample 6,500 plan-year observations of public ESOPs and private ESOPs.[14] Consistent with the previous results, the private firm plan returns are less volatile. Notably, the returns for private plans exhibit a concentration between 0% and 20%, while the public plan returns are more widely dispersed. We confirm the significant differences between these distributions (p-value <0.01) using the Kolmogorov-Smirnov test. These findings corroborate our previous tests showing the lower volatility of shares in private plans. Despite expectations of potentially greater volatility due to factors such as limited liquidity and increased business risks associated with smaller firms, our analysis reveals evidence counter to this expectation.

[FIGURE 2]

Continuing our analysis of the relative performance and risk characteristics between private and public firm ESOPs, we turn our attention to the volatility of returns in Figure 3. We look at the standard deviation of returns calculated over a three-year rolling period. We randomly sample 4,500 observations from the private and public ESOP samples.[15] The two distributions are statistically different (p-value < 0.01). The public plan volatility is widely dispersed, while the private plan volatility is concentrated between 0% and 10%. In contrast, most of the public plan returns have a standard deviation between 10% and 30%.

[FIGURE 3]

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[14] In untabulated figures, the distributions have similar shapes using alternative sample sizes.
[15] In untabulated figures, the distributions have similar shapes using alternative sample sizes.

Lastly, in Figure 4 we repeat the analysis looking at the Sharpe ratios for private and public plans. The Sharpe ratio, calculated as the average return divided by the return's standard deviation, offers a measure of risk-adjusted performance. We calculate the measure using the three-year rolling average of returns and standard deviation and randomly sample 4,500 observations from the private and public ESOP samples. The two distributions are statistically (p-value < 0.01) different. The public ESOP distribution is skewed to the right with many plans registering Sharpe ratios in excess of 1.0. In contrast, most of the public plan ratios are between 0 and 1. The private plans have an on-average risk-adjusted return 50% larger than the public plans.

[FIGURE 4]

These comparisons of portfolio returns and plan-level return distributions suggest shares held in private firms have statistically different return properties than those held in public firms. Notably the private plan returns are less volatility and have higher volatility-adjusted returns. One concern of these tests is that the public and private firms are systematically different and those differences may cause these results. To help mitigate this, we run a regression controlling for observable differences. The results are presented in Table 5. We first calculate the average return, standard deviation and Sharpe ratio for each private and public plan in our sample. The return characteristics are calculated over a three-year rolling basis. We regress the characteristic on an indicator variable equal to one (zero) if the shares belong to a private (public) firm (*Private*). We use both matched and unmatched control and treatment groups, and control for several plan-level factors including the plan's leverage (*Leverage*), total value of employer securities (*Assets*), number of active participants (*Employees*), and the age of the plan (*Age*). We also include industry and year fixed effects to control for both time-invariant unobservable differences in industry characteristics and time-varying unobservable factors. We cluster standard errors at the firm-level.

Columns (1) through (3) present the results for the unmatched sample, and columns (4) through (6) present the results using entropy-balanced matching which ensures there are equal covariate balances based on observable characteristics (Hainmueller, 2012). We match on the value of employer securities (*Assets*), number of active participants (*Employees*) and industry (NAICS) classification.

Columns (1) and (4) show the raw returns on private shares are not statistically different from the returns of publicly-valued shares. Columns (2) and (5) show the private plans have lower volatility (p-value < 0.01) where volatility is measured by the standard deviation of the returns. And columns (3) and (6) show the Sharpe ratio is statistically higher for the private plans (p-value < 0.01). In the Online Appendix, we calculate the return characteristics on a five-year rolling basis, and find similar results. These results support our earlier analysis and underscore the lower volatility in the private firm ESOPs that leads to higher volatility-adjusted returns.

[TABLE 5]

4.1.3 Returns around the 0% threshold

Given the significant discretion in the value of shares held in private firms and the results above that suggest private ESOP returns have much lower volatility and few years of negative returns, we next look at returns right around the 0% annual return threshold. Employees typically prefer positive annual changes in their shares. In Figure 5 we analyze the distribution of private plan returns around 0%. We find a statistically significant (p-value < 0.01) discontinuity in the distribution at the 0% threshold with a significant mass of observations with slightly positive returns and a "missing mass" of slightly negative returns. Such patterns have been previously discussed in the accounting literature (Burgstahler and Dichev, 1997) and can be indicative of bias in reported performance. As mentioned, for private firms there is no objective, easy-to-acquire

share price which can be used to value ESOP shares. Instead the valuation includes a number of subjective inputs from management itself, such as projected cash flows, discount rates, comparable companies, and appropriate multiples. The discontinuity may suggest some degree of management of private plan returns.

[FIGURE 5]

Building upon our observation of a significant discontinuity around the 0% return threshold in private plan returns, we extend this analysis to examine the returns of public shares in Figure 6. Unlike the sharp and statistically significant discontinuity observed in private returns, the distribution of public shares appears normally distributed, and shows no statistically significant discontinuity at the 0% threshold. The difference in distributions suggests that the observed discontinuity is not inherent to employer shares held in ESOPs but rather a result of the valuation process. The absence of a similar pattern in public shares lends further credence to the notion that management discretion in the valuation of private firm shares plays a pivotal role in shaping the observed discontinuity.

[FIGURE 6]

4.2 EFFECT OF AUDITORS

Having shown unique return characteristics of private firm shares held in ESOPs, we turn our attention to the effect auditors have on these characteristics. For this analysis, we use the requirement that plans need to be audited if they cross over a certain size. As mentioned in the background section, plans above 100 participants are required to be audited, however an exception to this rule makes 120 participants the effective cutoff. To show the effect this requirement has on plans, we first graph the percentage of audited plans by the number of plan participants in Figure 7. The percentage of plans audited increases the closer the plan is to the 120-participant threshold.

Few firms voluntarily chose to be audited below the threshold, approaching 0%. And most of those audited plans between 100 and 120 participants belong to firms that crossed over the audit threshold triggering the mandatory audit and now need to shrink in size to below 100 participants to avail themselves of the audit requirement.

[FIGURE 7]

4.2.1 Returns Around the Audit Participant Threshold

To see whether the oversight of auditors has any effect on the private ESOP returns, we compare the return distributions for audited and non-audited plans around the 120-participant audit threshold. Figure 8a compares the two distributions while restricting the sample to plan-year observations where plans have between 75 and 175 participants. While both audit and non-audit return distributions have discontinuities at the 0% threshold, the audited plans show less volatility with returns concentrated between 0% and 15%. The audited plan returns also show fewer large negative or positive annual returns.

We find similar results analyzing returns around the audit threshold with more restrictive sample requirements. For example, in Figure 8b we narrow the window around the 120-participant threshold to include only plans with between 100 to 140 participants. Again, the audited plans have a narrower return distribution with returns concentrated between 0% and 15%.

Lastly, a concern with these figures is the plans on either side of the audit participant threshold may be different in fundamental ways and those differences may cause the different return distributions. To mitigate this concern, in Figure 8c we restrict the sample to plans with between 75 and 175 participants that have observations on either side of the audit participant threshold. In other words, we only include plans with both audited and non-audited returns. Again, the audited returns have less volatility with returns concentrated between 0% and 15% and less

large positive or negative returns. These results suggest auditors have a moderating effect on return volatility.

[FIGURE 8]

Table 6 further examines the return differences between audited and non-audited plans. We take Figures 8a through 8c and present the average return, standard deviation and the percentage of plans in key return ranges. Panel A restricts the sample to audited and non-audited plans between 75 to 175 participants.[16] While the mean returns are not statistically different (p-value = 0.28), the volatility of the returns for the audited plans is lower and the two distributions are statistically different (p-value < 0.01). This confirms one of the main findings from Figure 8a, the returns for the audited plans are more concentrated in the range from 0% to +15%. Close to 42% of all audited observations are in that range, while just 35% of the non-audited observations are in that range. There are also fewer large declines and increases for the audited plans.

Panel B restricts the sample to observations between 100 to 140 participants. Notably, the audited plans have statistically lower mean returns (p-value < 0.01), lower volatility and a higher concentration of returns within the 0% to 15% range. Specifically, 37% of audited observations fall within that range, compared to just 30% of non-audited observations. The audited returns also have fewer instances of large increases compared to non-audited returns.

Lastly, panel C restricts the sample to plans with between 75 and 175 participants that have both audited and non-audited observations. Once more, we find audited returns are lower (p-value < 0.01), less volatile, have a greater concentration of returns within the 0% to 15% range, and have fewer instances of large negative or positive returns. Together with Figures 8a through 8c, these results show the moderating effect auditors have on private plan return volatility.

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[16] This is the same sample as Figure 8a, with the exception that in the figure we showed the distribution from -50% to +50%.

[TABLE 6]

Building upon the result that audited plans have lower return volatility than non-audited plan in Figure 9, we show the annual returns by year for equally-weighted portfolios of audited and non-audited plans from 2000 to 2022. Notably, the portfolios mirror each other, although the audit plan portfolio has less volatility. While the portfolio declines to the same extent as the non-audited portfolio in 2008, it does not rise to the same extent in the 2017 to 2022 period. Again, this underscores the less volatile returns for audited private plans.

[FIGURE 9]

4.2.2 Returns Around the 0% threshold

Along with differences in the volatility of audited and non-audited plans, we examine differences in the returns around the 0% threshold. Previously, in Figure 5 we showed a significant discontinuity in the return distribution right at the threshold with more plan-years showing returns that are slightly positive compared to slightly negative. In this section, we explore whether the discontinuity persists among audited plans. Figure 10a shows the returns on shares held in private plans subject to an audit. There is a sharp and statistically significant (p-value < 0.01) discontinuity at 0% with a significant mass of slightly positive returns and a "missing mass" of slightly negative returns. In Figure 10b we show the returns on shares held in private firms where the plan is not audited. While there is still a statistically significant (p-value < 0.01) discontinuity at 0% the difference is not as significant as the discontinuity for audited plans. The onset of the audit does not seem to attenuate the discontinuity.

[FIGURE 10]

4.2.3 Returns Leading up to and After Crossing the Audit Threshold

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To better understand the effect of audits on returns, we further track plans as they approach and cross over the participant threshold. Figure 11a shows the average return on private shares for these crossing plans in the pre-audit and audit years. There is a noticeable decline in returns from approximately 20% pre-audit to 10% with the onset of the audit. A similar pattern occurs with the volatility of returns. Figure 11b shows the change in the standard deviation of returns. The volatility declines significantly when the shares are audited. We further find the decrease in extreme positive returns appears to be a contributing factor to the lower returns and reduced volatility. Figures 11c and 11d present the change in the percentage of plans with returns of +25% or greater and +50% or greater, respectively. Both show a marked decline in the percentages immediately with the onset of the audit and the pattern persists. Along with the audit and non-audit distributions results, these alternative tests suggest there are significant return changes with the onset of the audit.

[FIGURE 11]

A concern of the figures mentioned above is the mix of plans in the pre-audit and audit years may change. To help address this, we run a regression tracking plans over time as they cross above or below the audit participant threshold. Holding firm characteristics constant, we see whether returns on the shares change with the onset of the audit. The results are presented in Table 7. The main dependent variable *Returns* is the annual return on the private firm shares. In columns (1) and (2) we specifically focus on plans that move from below the audit threshold of 120 participants to above (i.e. Crossing Above). *Audit* is an indicator variable equal to one for observations above 120 participants and zero otherwise. We include a host of control variables including firm fixed effects to control for time-invariant unobservable differences in firm characteristics. In column (1) we include a *Time Trend* dummy equal to the number of years since

2000 to help rule out the concern that returns naturally change as time transpires. We substitute this *Time Trend* control for year fixed effects in column (2). Across both specifications, we find a statistically significant negative association between audits and returns.

To help deal with the concern that the negative association between audits and returns is due to a natural time trend, we add size-based and time trend controls and year fixed effects. In columns (3) and (4) we also we restrict the sample to only those plans that move from above the audit threshold to below (i.e. Cross Below). If returns decline with the presence of an auditor, we should see the opposite effect when plans cross below 100 participants and are no longer required to be audited. Returns should increase. *No Audit* is an indicator variable equal to one for observations below 100 participants and zero otherwise. We find a positive and significant coefficient on *No Audit* indicating plans have higher returns once the audit requirement is released. For all these tests, we include a host of control variables and various fixed effect structures. The results provide some evidence the association between returns and audits is not driven by natural time trend, but by the presence or absence of auditors.

[TABLE 7]

4.3 EMPLOYEE TURNOVER AND RETURN CHARACTERISTICS

Having established there are distinct return characteristics of private plans, this section examines the relation between employee turnover and returns. More specifically we investigate whether return characteristics influence employee's stay or leave decisions. One of the reasons why firms may want the specialist to provide stable returns is to help retain existing employees and attract new ones (Dou et al., 2016; Gao et al., 2018). As mentioned earlier, ESOPs are often a large part of a participating employee's retirement and compensation package. Employees may

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value the stability these returns provide and therefore employment may be sensitive to changes in the value.

We focus on whether employee turnover varies with return characteristics including average returns, volatility and Sharpe ratios. The results are presented in Table 8. We measure employee turnover using the percentage of employees who depart the firm during the year before their benefits are fully vested (*Partially Vested Turnover*). Column (1) assesses the relation between average returns and volatility with employee turnover. We find a significant negative association with average returns and a positive correlation with return volatility, both statistically significant. We include a host of control variables include firm and year fixed effects. In column (2), we look at the association between the Sharpe ratio and employee turnover and, similar to the average returns, find a statistically significant negative association. Columns (1) and (2) calculate the measures on a three-year rolling average and columns (3) and (4) use a five-year rolling average. Both measures yield similar results. This table offers preliminary evidence suggesting that employee turnover is influenced by private firm return characteristics. We find turnover is higher with greater volatility, and lower when raw and volatility-adjusted returns are higher.

[TABLE 8]

5. **Additional Analyses**

5.1 PLAN TERMINATIONS

To the extent that actual changes in the firm's value are not accurately represented in the annual report, the *true* value may eventually come out with a sudden revision and increased volatility. To test this, we look at the returns of plans that eventually terminate. Companies terminate their ESOPs when they are acquired, or when facing financial difficulties. These events

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are an opportunity for an outside party to come and evaluate the shares, and may precipitate a sudden change in the valuation.

We examine the returns for the first few years leading up to a plan's termination and find there is a marked change in returns. The results are presented in Figure 12. Panel A shows the percentage of plans that experience a return of -25% or greater by the year leading up to termination. There is a marked increase in the percentage of plans with such a large drop in the few years immediately before termination. Panel B shows a similar result for plans experiencing a return of -50% or greater. This shows for some plans the low volatility may mask the actual changes in the value of the company, and eventually the low volatility is reconciled.

[FIGURE 12]

5.2 EFFECT OF THIRD-PARTY INVESTORS

In previous sections, we showed how the presence or absence of auditors has an effect on the private plan returns. In this section, we explore what, if any, effect the presence of third-party investors has on private plan returns. To understand this, we find those private firms with a listed investment in PitchBook. We first examine whether there are any changes in the return characteristics leading up to an investment by a third-party investor. *Lead Up to Investment* is an indicator variable equal to one if the plan-year observation is within two years of the outside investment and zero otherwise. Column (1) through (3) show the results for the average returns, the volatility of returns and the Sharpe ratio over a three-year rolling average. We find the volatility of returns is statistically higher (t-stat = 4.23) and Sharpe ratios statistically lower (t-stat = -1.88) immediately before the investment.

[TABLE 9]

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Next, we examine whether there are changes in returns prior to and after the third-party investment. The results are presented in Table 10. *Post* is an indicator variable equal to one for observations once the investment has been recorded. Column (1) through (3) show the results for the average returns, the volatility of returns and the Sharpe ratio over a three-year rolling average. We find the volatility of returns, which we measure as the standard deviation of returns, is statistically higher (t-stat = 2.46) and Sharpe ratios statistically lower (t-stat = -4.54) after the investment than before. The raw returns are not statistically different.

[TABLE 10]

6. Conclusion

Our study finds that private ESOP plans consistently report higher-than-expected risk-adjusted returns, and more positive returns than a normal distribution would suggest. The apparent positive return bias seems to persist despite an independent CPA audit. Our findings suggest that the information employees receive with regard to their investment in their employer firm may understate risks and overstate instances of positive returns. Future iterations of this paper will likely explore the degree to which this information risk may lead to suboptimal decisions by firm employees.

In the U.S., recently there has been bi-partisan support for more broad-based equity ownership. The launch of the Employee Ownership Initiative by the Department of Labor intends to further use employee ownership as a means to combat rising wealth inequality (Dudley and Rouen, 2021) and secure retirements (Garbinsky, 2023) while achieving better incentive alignment (Coburn and Liberson, 2022) and performance improvements for the firm (Stretcher et al., 2006; Henry et al., 2007; Blasi et al., 2013). For publicly-traded companies, its relatively easy to determine the fair value of shares owned since the value is determined through trading in a public

market, but for private companies, which account for 99% of all firms in the U.S., determining the appropriate equity value is much more difficult (Gupta et al., 2021). The information problems that may accompany large-scale adoption of private equity employee ownership raise potential concerns.

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Appendix A – Variable Definitions

Age   Age of the plan

Assets   Value of employer securities

Audit   Indicator variable equal to one for observations where the plan is audited and zero otherwise

Audit ESOP   Equally-weighted portfolio of audited employer securities held in private firm ESOPs

Employees   Number of active participants in the plan

Lead Up to Investment   Indicator variable equal to one if the plan-year observation is within two years of the investment and zero otherwise

                                         Total liabilities of the plan divided by the total assets
Leverage

Levered ESOP   Indicator variable equal to one if the plan is a levered ESOP and zero if it is an unlevered ESOP

NAICS   North American Industry Classification system industry code

No Audit   Indicator variable equal to one for observations below 100 participants and zero otherwise

Non-Audit ESOP   Equally-weighted portfolio of non-audited employer securities held in ESOPs

Participants   Total number of participants in the plan

Partially Vested Turnover   Number of participants that leave the plan without their balance fully vested divided by the beginning of the year number of total participants

Post   Indicator variable equal to one for observations once the investment has been recorded

Private   Indicator variable equal to one for private firms and zero for public firms

Public   Indicator variable equal to one for public firms and zero for private firms

Returns   Unrealized gains and losses scaled by the beginning value of employer securities

SD   Standard deviation of the returns on the company shares

S&P 500   Standard & Poor's 500 stock market index

Sharpe   Average returns divided by the standard deviation of those returns

Time Trend   Year minus 2000

Value-weighted Private ESOP   Value-weighted portfolio of employer shares held in private firm employee stock ownership plans (ESOPs). The weight is based on the total value of the employer securities

Value-weighted Public ESOP Portfolio of employer securities held in public firm ESOPs weighted by the total value of the employer securities

Vanguard Small Cap Index Fund Portfolio that tracks small-capitalization U.S. equities

Figure 1

Returns by Year
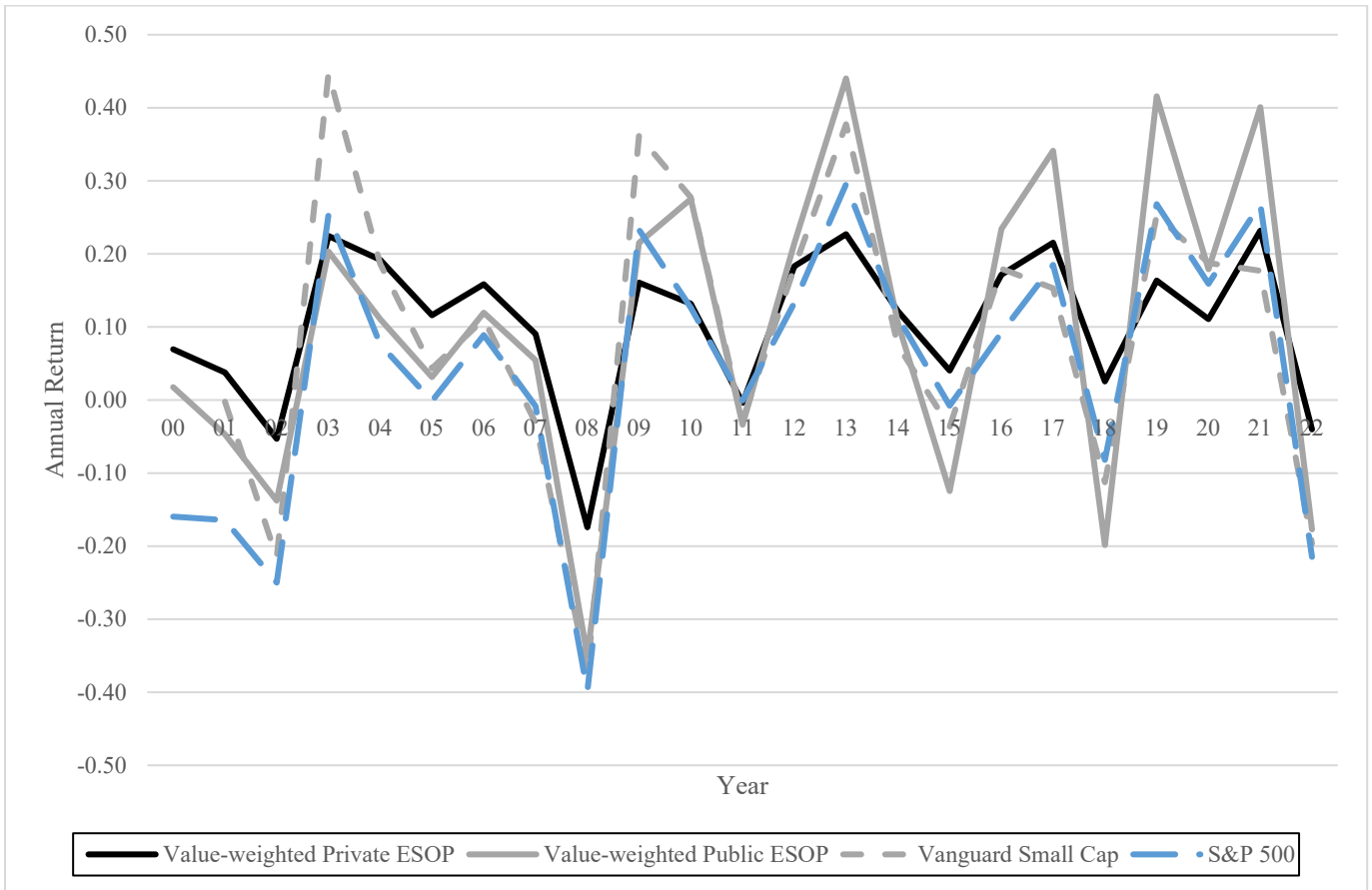
Notes. This figure shows the annual returns of portfolios from 2000 to 2022. *Value-weighted Private ESOP* is a value-weighted portfolio of employer shares held in private firm ESOPs. The weight is based on the total value of the employer securities. *Value-weighted Public ESOP* is a portfolio of employer securities held in public firm ESOPs weighted by the total value of the employer securities. *S&P 500* is the Standard & Poor's 500 stock market index, and the *Vanguard Small Cap Index Fund* which tracks small-capitalization U.S. equities.

Figure 2

Raw Returns for Private and Public Valued ESOPs
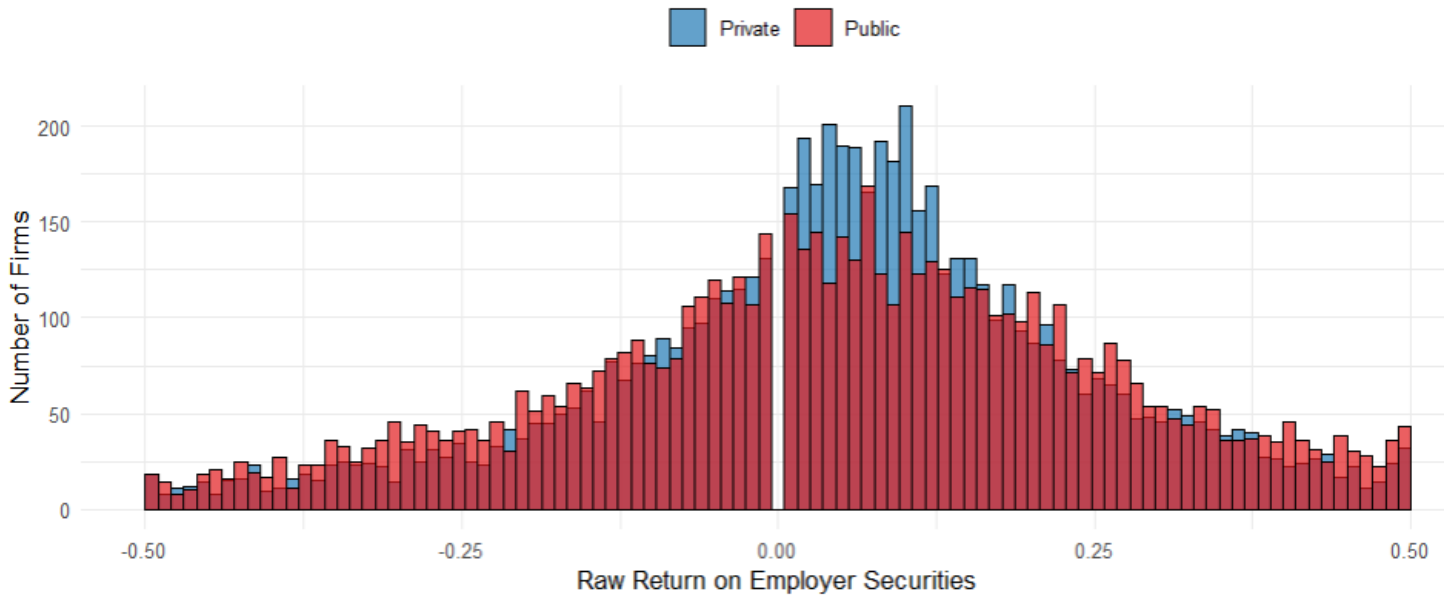
Notes. This figure shows the raw returns on employer securities for privately and publicly valued firms between 2000 and 2022. We ensure an equal number of private and public firms by randomly sampling 6,500 observations from each group.

Figure 3

Volatility of Returns for Private and Public Valued ESOPs
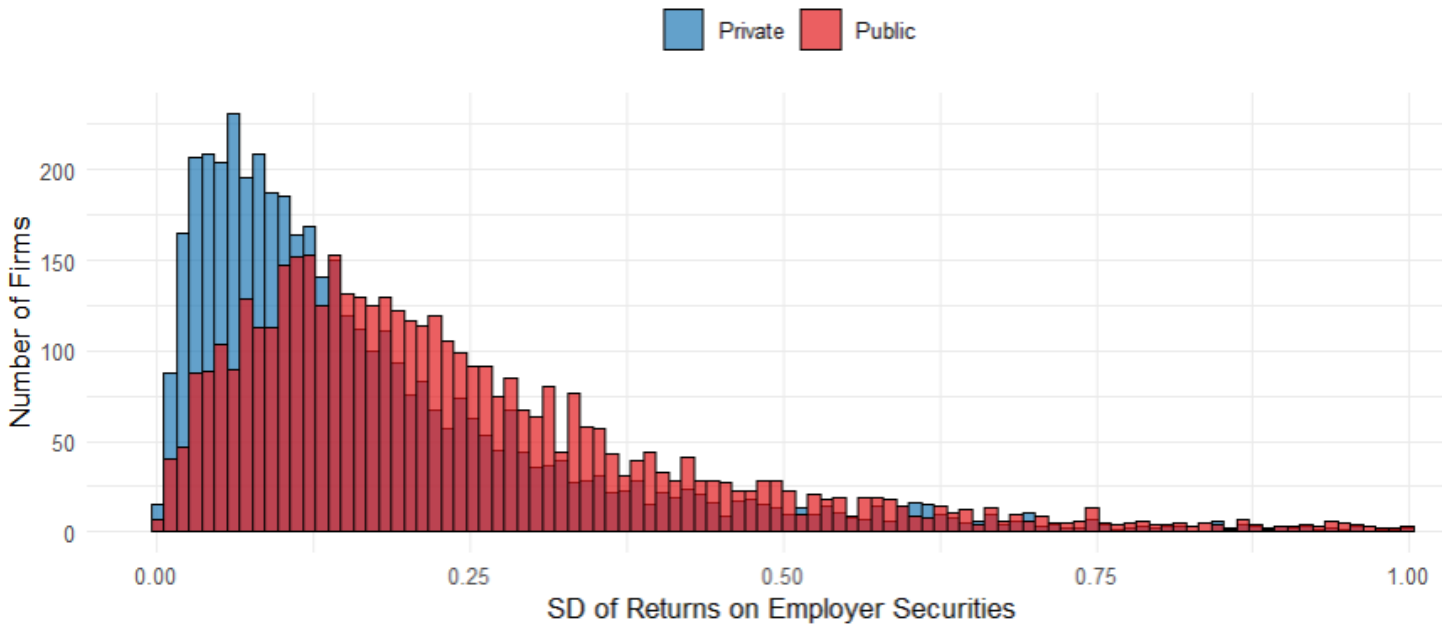
Notes. This figure displays the standard deviation of returns for private and public firm plans from 2000 to 2022. The measure is based on a three-year rolling period. To ensure balance, we randomly sample 4,500 observations from each private and public plan sample.

Figure 4

Sharpe Ratio for Private and Public Valued ESOPs

Notes. This figure displays the Sharpe ratio for private and public ESOPs from 2000 to 2022. The measure is based on a three-year rolling period. To ensure balance, we randomly sample 4,500 observations from each private and public ESOP sample.

Figure 5

Raw Returns on Private Firm ESOPs Around 0%
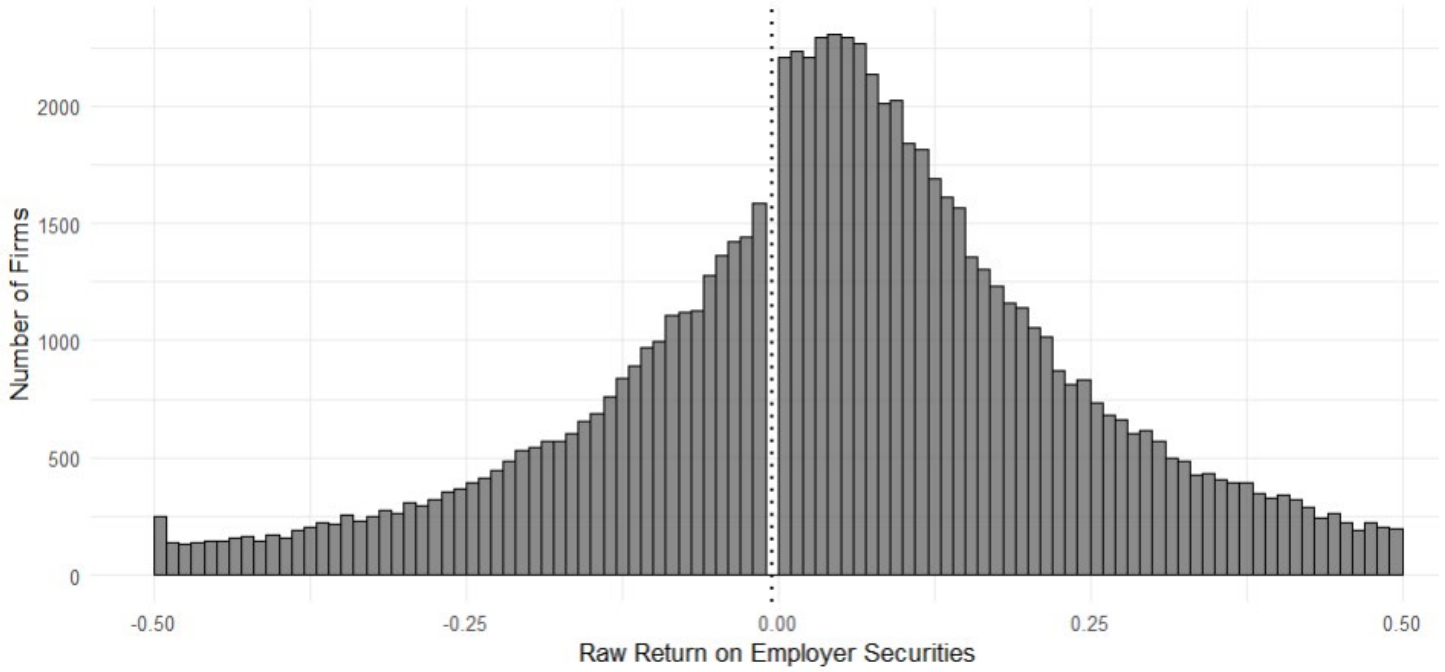
Notes. This figure shows the raw returns on shares for private ESOPs from 2000 to 2022. Returns are shown in buckets with a size of 0.01.

Figure 6

Raw Returns on Public Firm ESOPs Around 0%
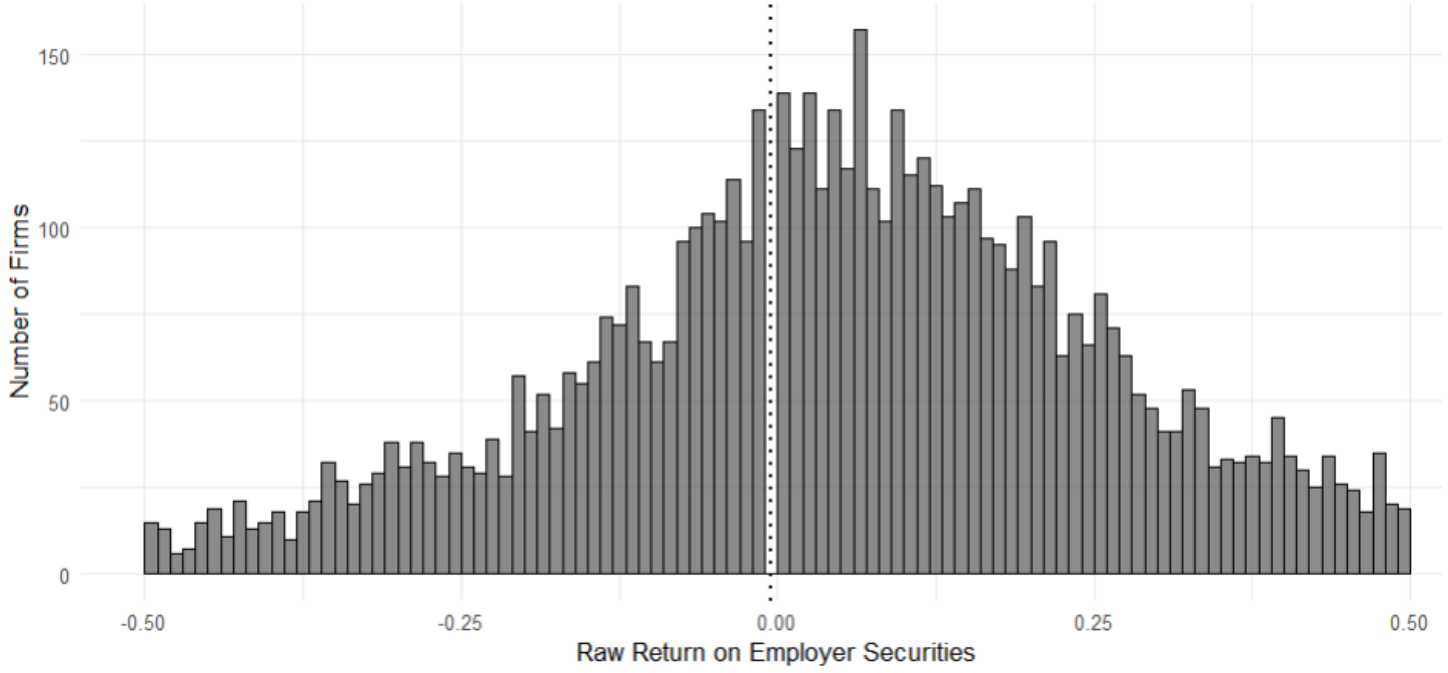
Notes. This figure shows the raw returns on shares for public ESOPs from 2000 to 2022. Returns are shown in buckets with a size of 0.01.

Figure 7

Percentage of Audited Plans
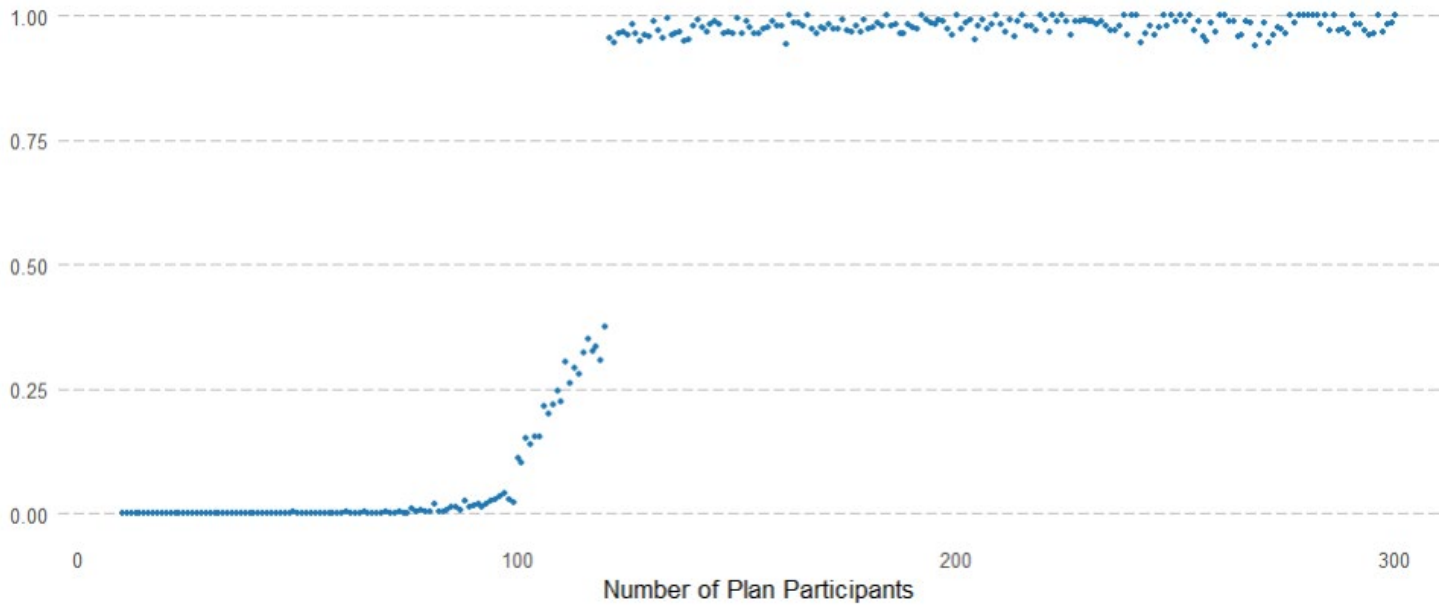
Notes. This figure shows the percentage of audited plans by the number of plan participants.

Figure 8a

Returns Around the Audit Threshold (75 to 175 participants)
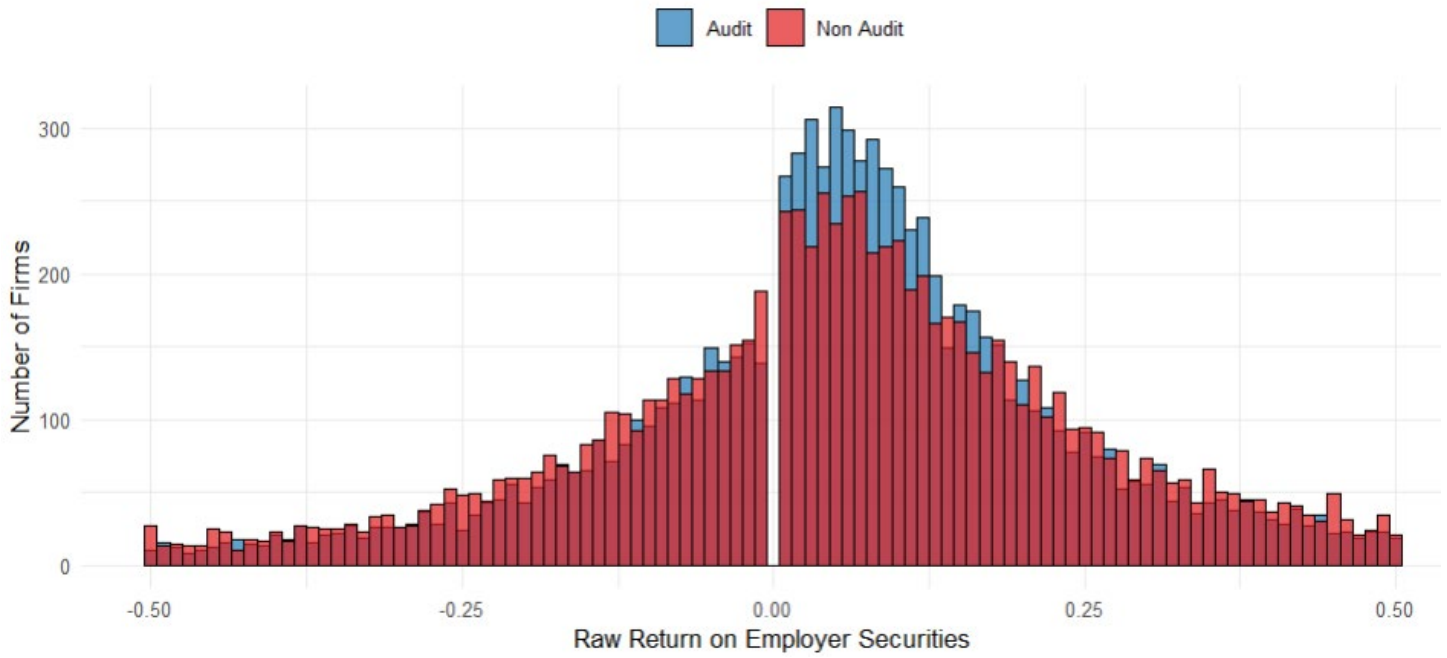
Notes. This figure shows the return distribution for audited and non-audited plans around the audit participant threshold of 120 participants. We restrict the sample to plan-year observations with between 75 and 175 participants.

Figure 8b

Returns Around the Audit Threshold (100 to 140 participants)
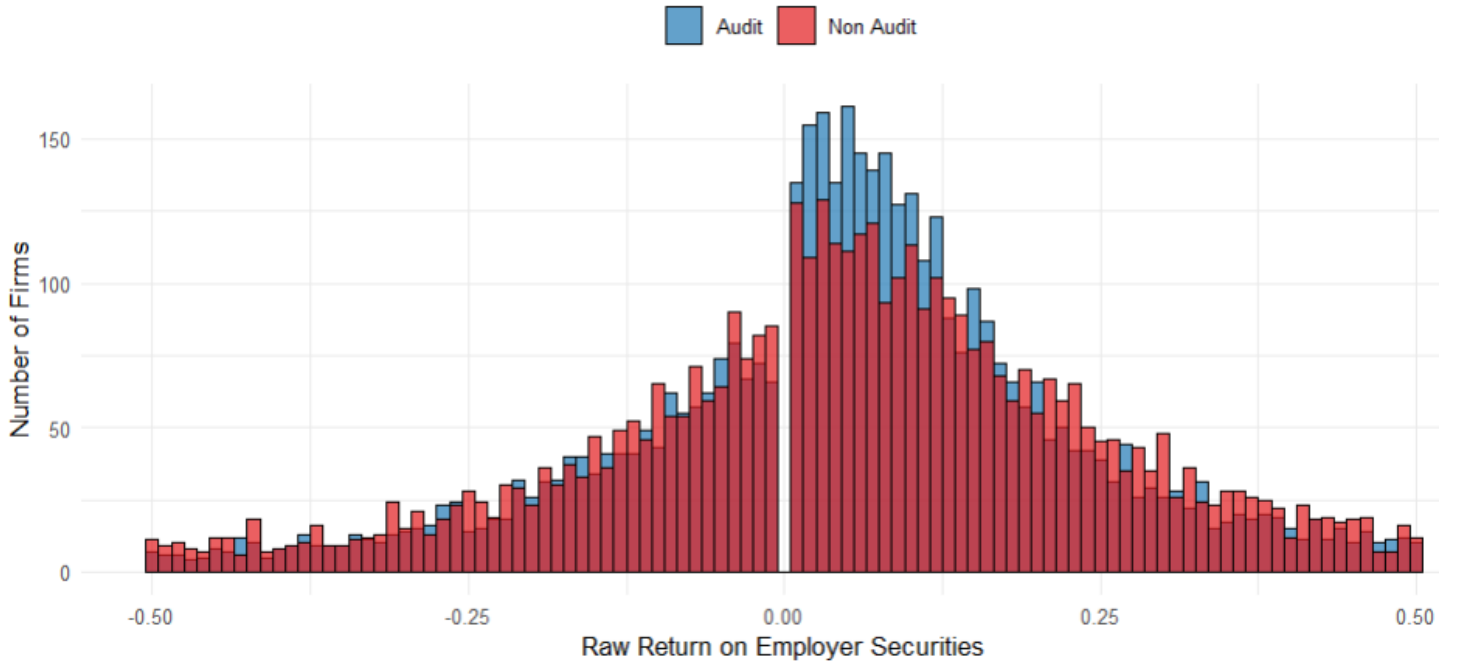
Notes. This figure compares the return distributions for audited and non-audited plans around the audit participant threshold of 120 participants. We restrict the sample to plan-year observations with between 100 and 140 participants.

Figure 8c

Returns Around the Audit Threshold – Same Plans
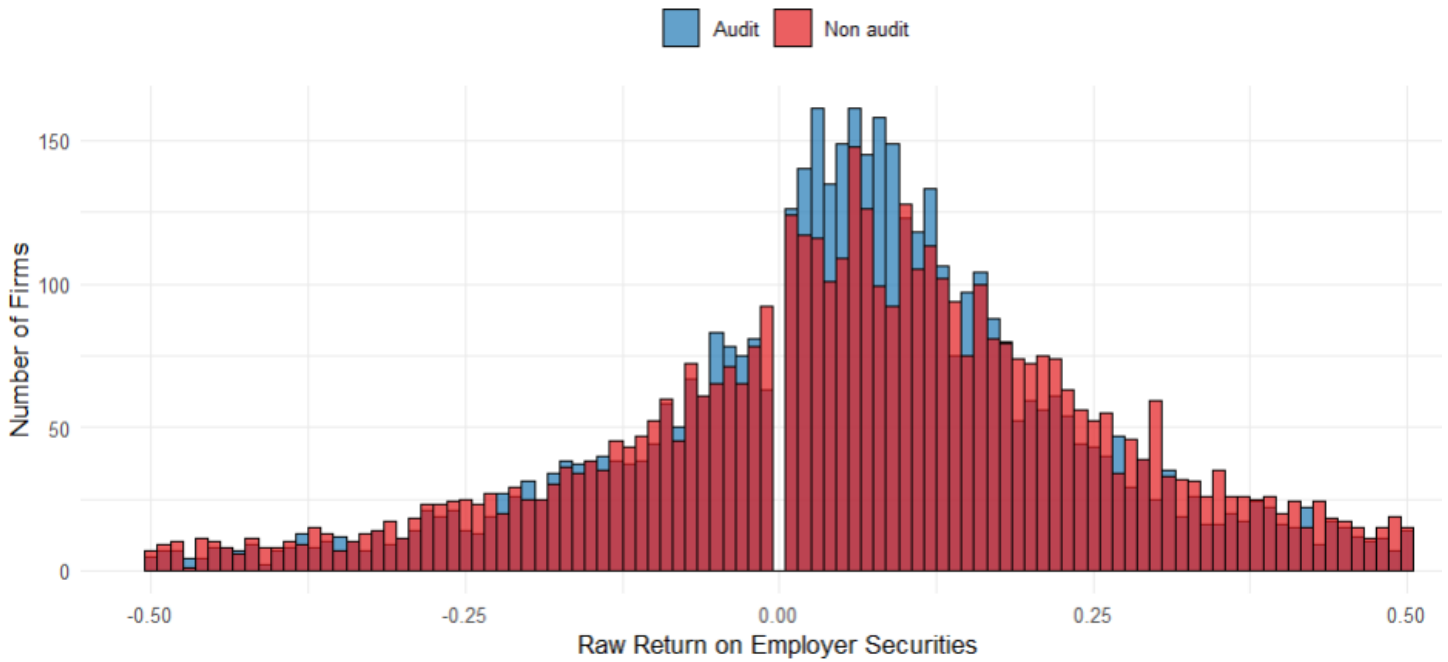
Notes. This figure shows the return distributions for audited and non-audited plans around the audit participant threshold of 120 participants. We restrict the sample to plan-year observations with between 75 and 175 participants and only include plans that have both audited and non-audited observations.

Figure 9

Returns by Year – Audited and Non-Audited

Notes. This figure shows the annual returns of portfolios from 2000 to 2022. *Audit ESOP* is an equally-weighted portfolio of audited employer securities held in private firm ESOPs. *Non-Audit ESOP* is an equally-weighted portfolio of non-audited employer securities held in ESOPs.

Figure 10a

Returns Around 0% for Audited Plans
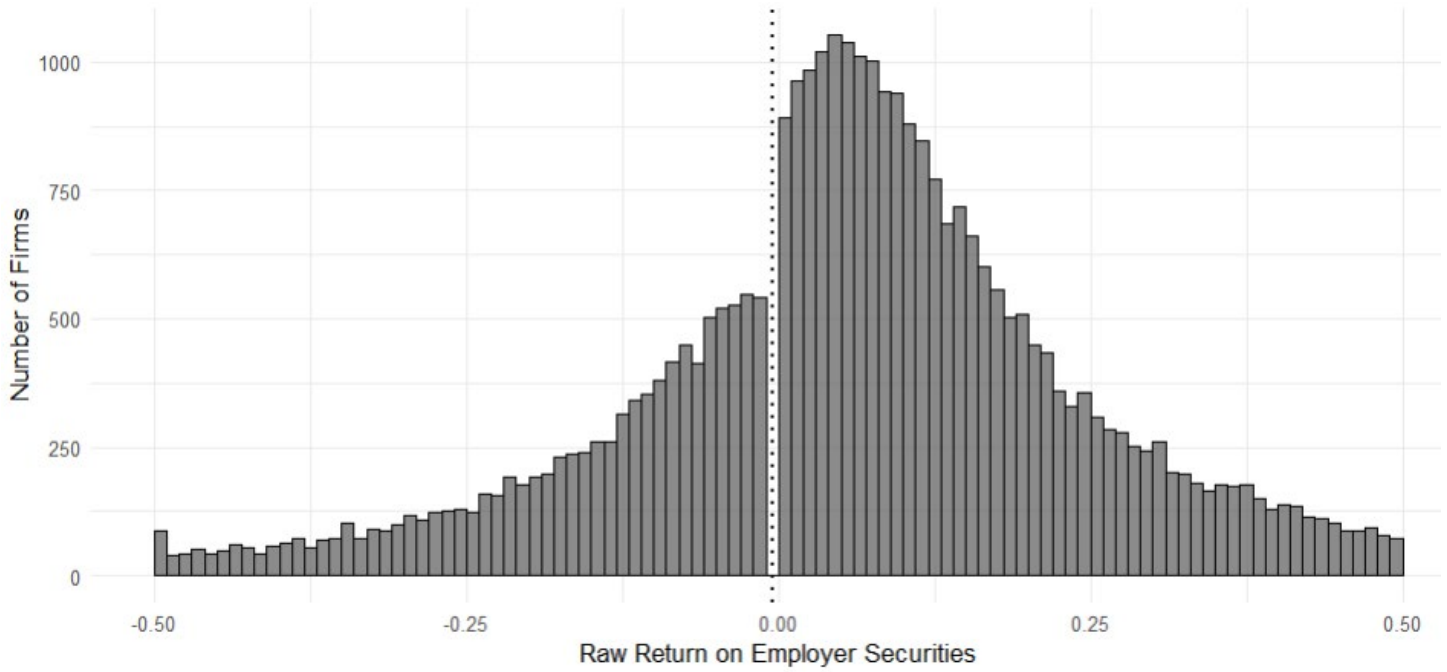
Notes. This figure shows the raw returns on employer securities for private ESOPs audited from 2000 to 2022. Returns are shown in buckets with a size of 0.01.

Figure 10b

Returns Around 0% for Non-Audited Plans
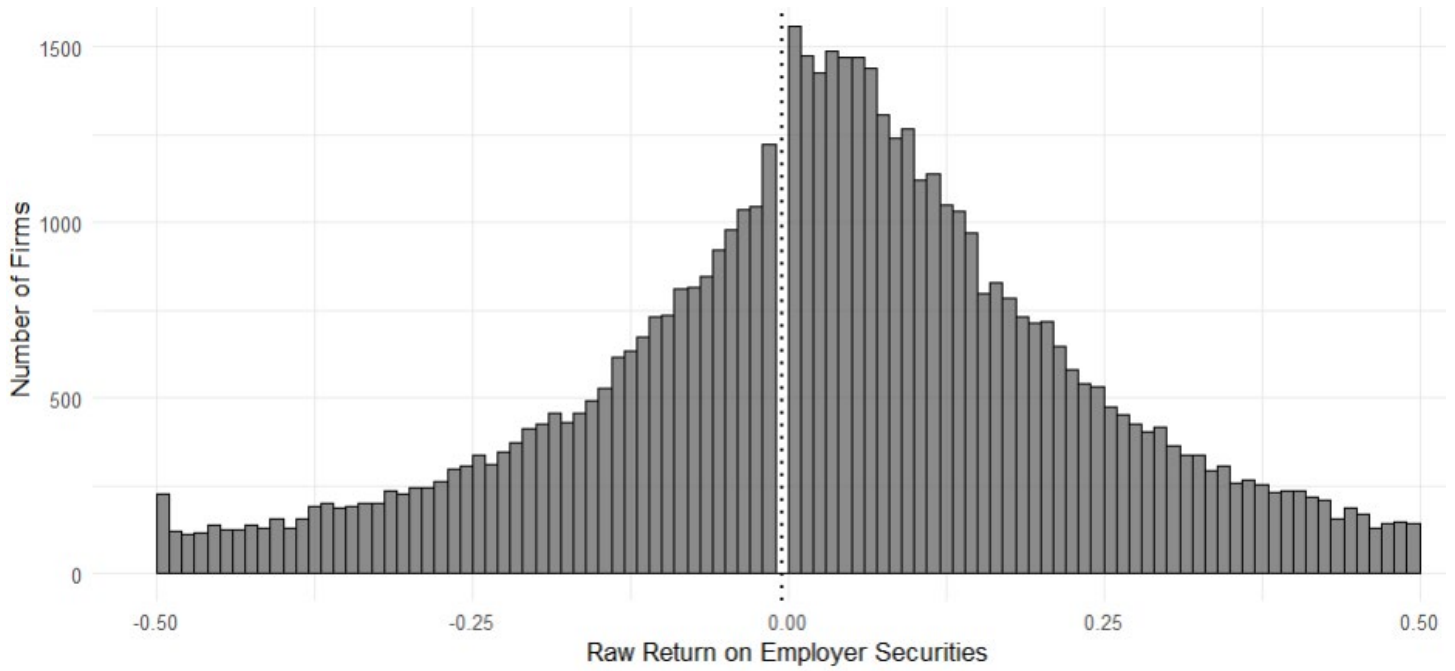
Notes. This figure shows the raw returns on employer securities for private ESOPs not audited from 2000 to 2022. Returns are shown in buckets with a size of 0.01.

Figure 11

Returns Leading up to and After Crossing the Audit Threshold

Figure 11a: Returns
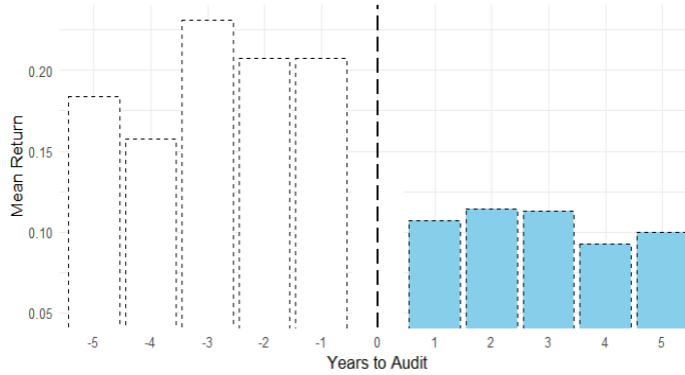
Figure 11b: Volatility of Returns
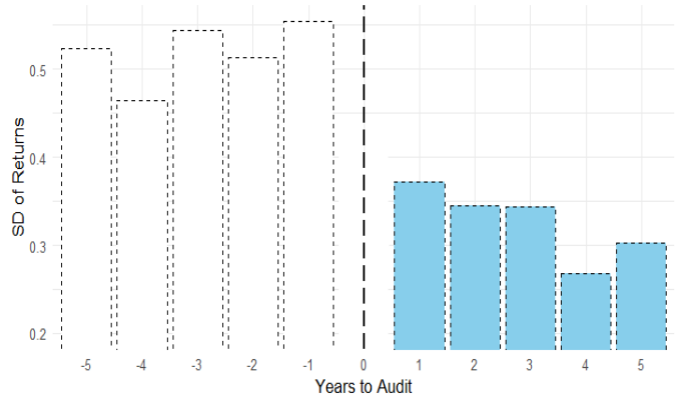
Figure 11c: Percentage of Plans with Returns of +25% or Greater
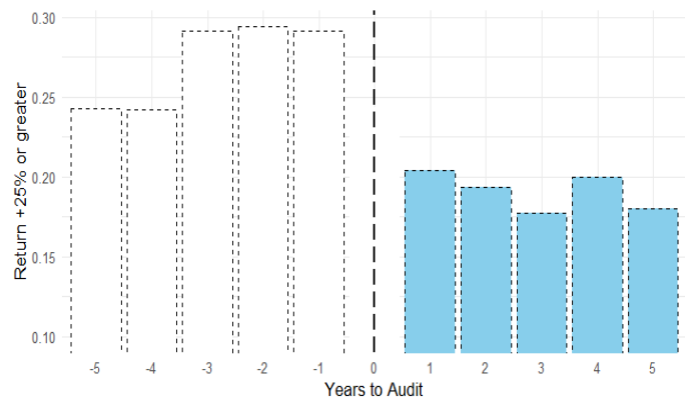
Figure 11d: Percentage of Plans with Returns of +50% or Greater
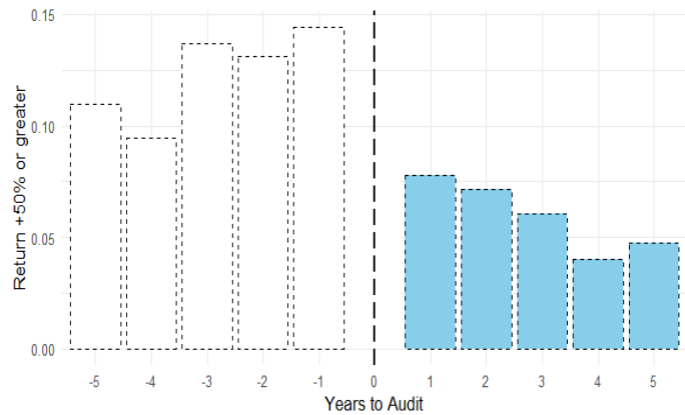
Notes. These figures show the return characteristics of private plan shares as plans approach and cross over the audit participant threshold of 120 participants. Figure 11a shows the average return for private. Figure 11b shows the standard deviation of returns. Figure 11c shows the percentage of private ESOPs with annual returns of +25% or greater. Figure 11d shows the percentage of private ESOPs with annual returns of +50% or greater. *Years to Audit* is the years leading up to the plan crossing the threshold.

Figure 12

Declines Prior to Plan Termination
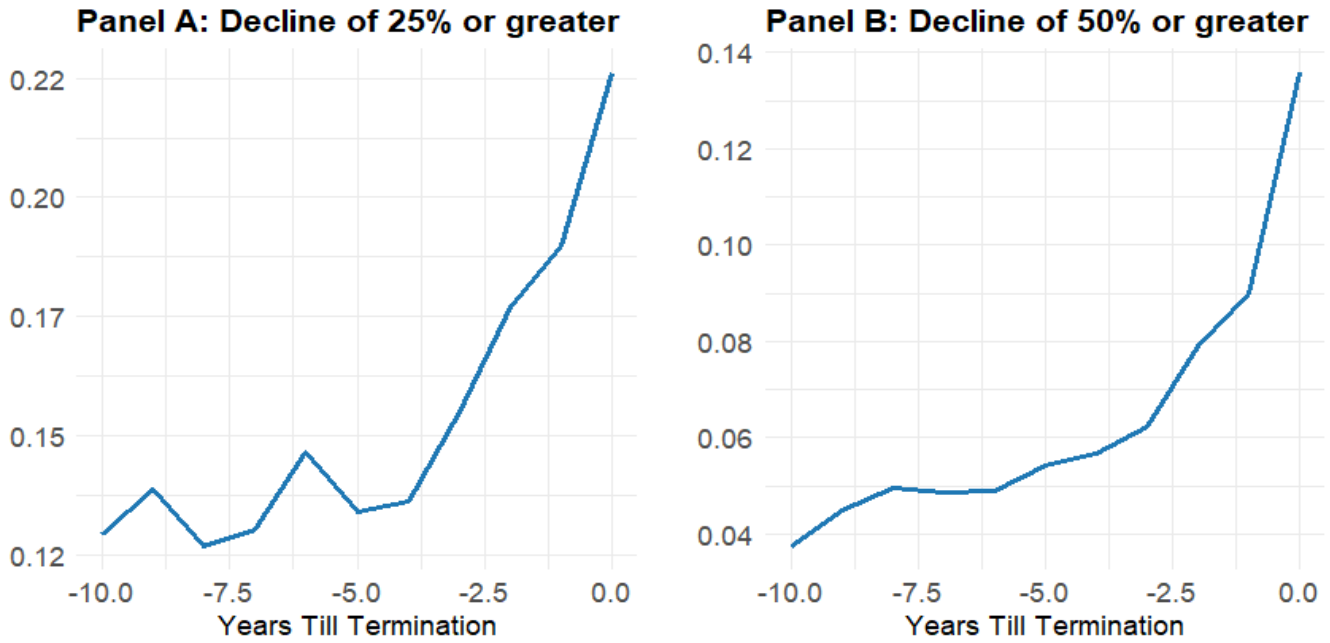
Notes. Panel A shows the percentage of plans experiencing a decline of 25% or greater in their employer securities leading up to the plan's termination. Panel B shows the percentage of plans that experience a decline of 50% or greater in their employer securities prior to the plan's termination.

Table 1
Sample Selection

Main Sample

Steps	Observations
All employee benefit plan observations covered by the DOL data from 2000 to 2022	447,277
Exclude observations with missing or blank Sponsor Names	(37)
Exclude non-employee stock ownership plans (ESOPs)	(295,598)
Exclude duplicate filings	(15,896)
Exclude observations with missing participant information	(43)
Exclude observations from plans with less than 10 plan participants	(11,927)
Exclude non-consecutive observations	(7,575)
Exclude observations with missing key information	(236)
Exclude observations with no change in their annual return	(6,014)
Total observations - main sample	109,951

Notes. This table outlines the selection process to arrive at our main sample.

Table 2
Summary Statistics

Year	Private ESOPs			Public ESOPs			Total		
	Plans	Participants (in millions)	Employer Securities ($B)	Plans	Participants (in millions)	Employer Securities ($B)	Plans	Participants (in millions)	Employer Securities ($B)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2000	3,709	1.19	34.31	354	3.09	100.15	4,063	4.28	134.46
2001	4,082	1.32	35.89	385	3.83	98.53	4,467	5.15	134.42
2002	4,138	1.35	37.29	378	4.42	98.54	4,516	5.77	135.83
2003	4,126	1.23	37.90	357	4.17	106.75	4,483	5.40	144.65
2004	4,177	1.41	48.47	352	3.36	111.30	4,529	4.77	159.77
2005	4,244	1.55	47.50	356	3.32	113.48	4,600	4.87	160.97
2006	4,339	1.51	52.79	354	4.69	127.20	4,693	6.21	179.99
2007	4,370	1.51	54.59	346	4.49	118.06	4,716	6.00	172.65
2008	4,227	1.37	46.81	318	4.23	84.26	4,545	5.60	131.07
2009	3,974	1.38	47.72	292	4.33	69.24	4,266	5.71	116.96
2010	4,078	1.43	55.49	313	5.50	105.68	4,391	6.94	161.18
2011	4,345	1.58	63.69	328	5.98	116.63	4,673	7.57	180.33
2012	4,512	1.60	72.96	343	5.10	126.62	4,855	6.69	199.58
2013	4,533	1.61	79.76	340	5.23	143.30	4,873	6.84	223.06
2014	4,573	1.59	83.01	331	4.98	142.59	4,904	6.57	225.61
2015	4,498	1.60	88.08	316	4.88	124.84	4,814	6.48	212.92
2016	4,570	1.65	97.14	304	5.04	126.34	4,874	6.69	223.48
2017	4,601	1.65	112.31	297	4.90	116.80	4,898	6.55	229.11
2018	4,623	1.69	121.01	281	6.47	111.08	4,904	8.16	232.10
2019	4,649	1.40	124.51	289	6.62	121.45	4,938	8.02	245.96
2020	4,694	1.74	141.16	278	6.40	117.73	4,972	8.14	258.88
2021	4,699	1.49	162.51	266	6.73	145.33	4,965	8.22	307.84
2022	4,178	1.71	153.30	248	6.80	132.83	4,426	8.50	286.12

Notes. This table presents summary statistics on the number of plans, total number of participants, and total value of employer securities for shares held in ESOPs of private and public companies from 2000 to 2022.

Table 3
Descriptive Statistics

Panel A: Full Sample

	Ind/Cont	N	mean	sd	p25	p50	75
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Returns	C	109,951	0.12	0.54	-0.07	0.06	0.20
Total Participants	C	109,951	1492.6	38335.8	42.0	86.0	224.0
Total Assets ($ in millions)	C	109,951	115.1	1170.7	1.4	4.0	12.9
Log Assets	C	109,951	15.4	2.0	14.1	15.2	16.4
Log Employees	C	109,951	4.45	1.56	3.47	4.17	5.11
Age	C	109,951	23.4	22.6	12.0	21.0	31.0
Audit	I	109,951	0.39	0.49	0.00	0.00	1.00
Levered ESOP	I	109,951	0.53	0.50	0.00	1.00	1.00
Public	I	109,951	0.07	0.26	0.00	0.00	0.00

Panel B: Private ESOPs

	Ind/Cont	N	mean	sd	p25	p50	75
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Returns	C	102,222	0.12	0.55	-0.07	0.06	0.20
Total Participants	C	102,222	351.5	4023.2	40.0	80.0	188.0
Total Assets ($ in millions)	C	102,222	27.8	333.0	1.3	3.7	10.9
Log Assets	C	102,222	15.2	1.7	14.1	15.1	16.2
Log Employees	C	102,222	4.26	1.27	3.40	4.11	4.94
Age	C	102,222	22.4	22.1	12.0	21.0	30.0

Panel C: Public ESOPs

	Ind/Cont	N	mean	sd	p25	p50	75
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Returns	C	7,729	0.10	0.46	-0.09	0.06	0.23
Total Participants	C	7,729	16585.5	143003.5	190.0	1569.0	11018.0
Total Assets ($ in millions)	C	7,729	1269.3	4074.3	5.8	65.6	701.1
Log Assets	C	7,729	18.0	3.0	15.6	18.0	20.4
Log Employees	C	7,729	6.98	2.49	4.95	7.08	9.04
Age	C	7,729	35.6	25.1	18.0	32.0	52.0

Notes. This table presents descriptive statistics on the samples used in our analyses. Panel A includes the full sample, while Panels B and C provide statistics for the company shares held in ESOPs of private and public companies, respectively. See the Appendix for variable definitions.

Table 4
Returns by Year

Year	Private ESOP	Value-weighted Private ESOP	Public ESOP	Value-weighted Public ESOP	S&P 500	Vanguard Small Cap Index Fund
	(1)	(2)	(3)	(4)	(5)	(6)
2000	0.08	0.07	0.06	0.02	-0.16	
2001	0.05	0.04	0.13	-0.05	-0.16	0.00
2002	0.03	-0.05	0.02	-0.14	-0.25	-0.22
2003	0.13	0.22	0.31	0.20	0.25	0.45
2004	0.13	0.19	0.21	0.11	0.08	0.19
2005	0.13	0.12	0.08	0.03	0.00	0.04
2006	0.16	0.16	0.14	0.12	0.09	0.11
2007	0.10	0.09	0.01	0.05	-0.01	-0.03
2008	-0.09	-0.17	-0.30	-0.35	-0.40	-0.37
2009	0.01	0.16	0.13	0.22	0.23	0.36
2010	0.10	0.13	0.20	0.28	0.13	0.28
2011	0.07	0.00	-0.03	-0.03	0.00	-0.03
2012	0.13	0.18	0.17	0.21	0.13	0.18
2013	0.14	0.23	0.36	0.44	0.30	0.38
2014	0.13	0.12	0.08	0.11	0.11	0.07
2015	0.12	0.04	0.01	-0.12	-0.01	-0.04
2016	0.14	0.17	0.20	0.23	0.09	0.18
2017	0.21	0.22	0.21	0.34	0.18	0.15
2018	0.13	0.03	-0.05	-0.20	-0.08	-0.11
2019	0.19	0.16	0.21	0.42	0.27	0.25
2020	0.22	0.11	0.04	0.18	0.16	0.19
2021	0.31	0.23	0.30	0.40	0.27	0.18
2022	0.14	-0.04	-0.05	-0.18	-0.21	-0.20
Average Return	0.12	0.10	0.11	0.10	0.04	0.09
Standard Dev.	0.08	0.10	0.14	0.21	0.18	0.20
Sharpe Ratio	1.58	1.03	0.75	0.48	0.24	0.46

Notes. This table presents the annual returns of portfolios spanning from 2000 to 2022. *Private ESOP* is an equally-weighted portfolio of employer shares held in private firm ESOPs, while *Value-weighted Private ESOP* is the same portfolio of private plans weighted by the total value of the employer securities. *Public ESOP* is an equally-weighted portfolio of employer shares held in public firm ESOPs, and *Value-weighted Public ESOP* comprises the same public ESOPs weighted by the total value of the employer securities. *S&P 500* is the Standard & Poor's 500 stock market index, and the *Vanguard Small Cap Index Fund* tracks the returns of small-capitalization U.S. equities. Summary statistics including the average return of the portfolio, the standard deviation and the Sharpe ratio are calculated for each portfolio.

Table 5
Returns for Private and Public Valued ESOPs

Matching =	Unadjusted			Entropy-Balanced		
DV =	*Returns*	*SD*	*Sharpe*	*Returns*	*SD*	*Sharpe*
	(1)	(2)	(3)	(4)	(5)	(6)
Private	0.00246	-0.0879***	0.831***	-0.0121	-0.0815***	0.576***
	(0.33)	(-7.82)	(10.20)	(-1.54)	(-7.02)	(6.81)
Leverage	0.00762	0.0975***	-0.215***	0.00138	0.0896***	-0.202***
	(1.09)	(12.75)	(-5.06)	(0.19)	(10.83)	(-4.37)
Assets	0.0187***	-0.0256***	0.348***	0.0103**	-0.0402***	0.279***
	(8.17)	(-8.01)	(9.85)	(1.96)	(-5.16)	(7.73)
Employees	-0.00486	0.0280***	-0.204***	0.00300	0.0389***	-0.141***
	(-1.46)	(6.12)	(-4.96)	(0.48)	(3.93)	(-3.25)
Age	-0.000833***	-0.000675***	0.00198	-0.000435**	-0.000517*	0.00168
	(-4.50)	(-3.52)	(1.23)	(-2.17)	(-1.93)	(0.85)
Constant	-0.159***	0.556***	-4.290***	-0.0605	0.738***	-3.255***
	(-5.60)	(13.44)	(-9.61)	(-0.98)	(8.44)	(-7.52)
Obs	31324	31324	31324	31324	31324	31324
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.093	0.166	0.031	0.175	0.302	0.040

Notes. This table presents the difference in returns between employer securities in private and public ESOPs from 2000 to 2022. Observations are at the plan-year level. *Private* equals one for private firms and zero for public firms. We restrict the sample to ESOPs with more than 120 plan participants to ensure a successful match between the private and public firm plans. *Returns* is the unrealized gains and losses scaled by the beginning value of employer securities. We calculate the measure as the average over a three-year rolling period. *SD* is the standard deviation of those returns and *Sharpe* is the risk-adjusted returns measured as the average returns divided by the standard deviation. Columns (1) through (3) display unadjusted results and columns (4) through (5) show the results after matching private and public ESOPs based on assets, number of employees and industry (NAICS) classification. In all specifications, industry and year fixed effects are applied, with standard errors clustered at the firm-level.

Table 6
Return Distributions Around the Audit Threshold

Panel A – Restricting observations to between 75 to 175 participants

	n	Mean	SD	Percentage with negative returns				Percentage with positive returns			
				< -50%	[-50% to -30%)	[-30% to -15%)	[-15% to -0%)	[0% to 15%)	[15% to 30%)	[30% to 50%)	> 50%
Audit	8,952	5.5%	17.9%	0.1%	4.2%	8.0%	18.5%	41.6%	18.9%	8.5%	0.2%
No Audit	13,560	5.2%	19.5%	0.3%	5.1%	9.5%	19.7%	35.0%	20.0%	10.2%	0.2%
Diff = Audit - No Audit		0.3%	p-value = 0.28								
Kolmogorov-Smirnov Test		p-value < 0.01									

Panel B – Restricting observations to between 100 to 140 participants

	n	Mean	SD	Percentage with negative returns				Percentage with positive returns			
				< -50%	[-50% to -30%)	[-30% to -15%)	[-15% to -0%)	[0% to 15%)	[15% to 30%)	[30% to 50%)	> 50%
Audit	4,962	10.3%	47.0%	4.4%	3.7%	7.7%	16.5%	37.0%	16.2%	6.9%	7.7%
No Audit	5,104	14.5%	54.3%	4.1%	4.4%	8.1%	17.6%	30.0%	16.9%	8.8%	10.1%
Diff = Audit - No Audit		-4.2%***	p-value < 0.01								
Kolmogorov-Smirnov Test		p-value < 0.01									

Panel C – Restricting observations to the same Plans

	n	Mean	SD	Percentage with negative returns				Percentage with positive returns			
				< -50%	[-50% to -30%)	[-30% to -15%)	[-15% to -0%)	[0% to 15%)	[15% to 30%)	[30% to 50%)	> 50%
Audit	7,094	9.9%	40.0%	3.4%	3.4%	7.3%	16.6%	37.9%	17.3%	7.3%	6.8%
No Audit	5,357	17.8%	57.5%	3.5%	3.8%	7.6%	15.8%	29.9%	18.6%	9.5%	11.4%
Diff = Audit - No Audit		-7.9%	p-value < 0.01								
Kolmogorov-Smirnov Test		p-value < 0.01									

Notes. These panels present the return distributions for audited and non-audited plans around the audit participant threshold of 120 participants. We present the average returns, standard deviation of the returns and the percentage of returns that are positive or negative. We calculate a difference in means test and a Kolmogorov-Smirnov Test to test the equality of the distributions. Panel A restricts the sample to plans with between 75 and 175 participants. Panel B restricts the sample to plans with between 100 and 140 participants. And Panel C restricts the sample to plans with between 75 and 175 participants and only plans that have both audited and non-audited observations.

Table 7
Effect of Audit – Crossing Above or Below the Audit Threshold

DV =	*Returns*			
Sample =	Cross Above		Cross Below	
	(1)	(2)	(3)	(4)
Audit	-0.105***	-0.100***		
	(-7.75)	(-7.40)		
No Audit			0.117***	0.118***
			(3.96)	(3.89)
Leverage	-0.0963***	-0.0951***	-0.104***	-0.0974***
	(-6.16)	(-6.18)	(-3.72)	(-3.42)
Assets	0.101***	0.0980***	0.100***	0.0997***
	(6.76)	(6.54)	(3.62)	(3.56)
Employees	-0.0628***	-0.0593***	-0.0457	-0.0459
	(-2.80)	(-2.63)	(-0.86)	(-0.89)
Age	-0.000374	-0.000338	-0.00254	-0.00260
	(-0.27)	(-0.25)	(-1.34)	(-1.49)
Time Trend	-0.00652***		0.00131	
	(-3.27)		(0.39)	
Constant	-0.977***	-1.039***	-1.182***	-1.155***
	(-5.08)	(-4.95)	(-3.82)	(-3.55)
Obs	10671	10671	2445	2445
Firm FE	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes
R-sq	0.173	0.188	0.246	0.269

Notes. This table shows the effect of audits on returns. The sample is composed only of plans that cross either above or below the participant audit threshold. *Audit* is an indicator variable equal to one for observations above 120 participants and zero otherwise. *No Audit* is an indicator variable equal to one for observations below 100 participants and zero otherwise. *Returns* is the unrealized gains and losses scaled by the beginning value of employer securities. Columns (1) and (2) restrict the sample to only plans that go from below the audit threshold to above and columns (3) and (4) restrict the sample to only plans that go from above the threshold to below.

Table 8

Relation between Employee Turnover and Return Characteristics

DV =	*Partially Vested Turnover*			
Measurement =	3-yr Rolling Average		5-yr Rolling Average	
	(1)	(2)	(3)	(4)
Returns	-0.753***		-0.831***	
	(-4.01)		(-2.78)	
SD	0.588***		0.663***	
	(3.71)		(2.84)	
Sharpe		-0.00896**		-0.112***
		(-2.10)		(-3.67)
Leverage	0.00504***	0.00589***	0.00701***	0.00772***
	(3.97)	(4.80)	(3.92)	(4.48)
Assets	0.00160	0.00117	0.00166	0.00151
	(1.58)	(1.16)	(1.43)	(1.31)
Employees	0.0141***	0.0141***	0.0148***	0.0148***
	(7.87)	(7.97)	(6.41)	(6.37)
Age	-0.0000538**	-0.0000534**	-0.0000807**	-0.0000792**
	(-2.21)	(-2.13)	(-2.07)	(-1.98)
Constant	-0.0513***	-0.0445***	-0.0593***	-0.0554***
	(-3.43)	(-2.99)	(-3.37)	(-3.18)
Obs	26396	26396	20031	20031
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R-sq	0.784	0.783	0.849	0.849

Notes. This table examines the relationship between employee turnover and returns for private plans from 2000 to 2022. *Partially Vested Turnover* is the percentage of employees who depart the plan during the year before their benefits are fully vested. To ensure comprehensive data, we focus on plans with over 120 plan participants. *Returns* is the unrealized gains and losses scaled by the beginning value of employer securities. We calculate the average of this figure over a three-year rolling period. *SD* is the standard deviation of those returns and *Sharpe* is the risk-adjusted returns measured as the average returns divided by the standard deviation. *Returns*, *SD*, and *Sharpe* have been scaled by dividing each by 100. Columns (1) and (2) use a three-year rolling average for the variables in the regression, whereas columns (3) and (4) use a five-year rolling average. Throughout all analyses, firm and year fixed effects are applied, with standard errors clustered at the firm-level.

Table 9

Return Characteristics Leading up to Third-Party Investment

DV =	Returns	SD	Sharpe
	(1)	(2)	(3)
Lead Up to Investment	0.0165	0.0493***	-0.198*
	(1.49)	(4.23)	(-1.88)
Leverage	-0.0351***	0.107***	-0.408***
	(-2.90)	(7.69)	(-7.55)
Assets	0.0453***	-0.00797	0.441***
	(8.95)	(-1.49)	(8.62)
Employees	-0.0473***	-0.0106	-0.237***
	(-6.54)	(-1.31)	(-2.85)
Age	-0.000648	-0.000563	0.00260
	(-1.55)	(-1.41)	(1.30)
Constant	-0.345***	0.384***	-4.652***
	(-6.39)	(6.24)	(-9.33)
Obs	9581	9581	9581
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
R-sq	0.153	0.175	0.053

Notes. This table examines the returns of private plans leading up to an investment per PitchBook. We restrict the sample to private ESOPs between 2000 and 2022. *Lead Up to Investment* is an indicator variable equal to one if the plan-year observation is within two years of the investment and zero otherwise. *Returns* is the average change in unrealized gains and losses over a three-year rolling period. *SD* is the standard deviation of those returns and *Sharpe* is the risk-adjusted returns measured as the average returns divided by the standard deviation.

Table 10
Effect of Investors on Return Characteristics

DV =	Returns	SD	Sharpe
	(1)	(2)	(3)
Post	-0.0193	0.0433**	-0.375***
	(-1.31)	(2.46)	(-4.54)
Leverage	-0.0188*	0.104***	-0.301***
	(-1.77)	(6.06)	(-6.35)
Assets	0.0306***	-0.0244***	0.346***
	(6.06)	(-3.19)	(10.41)
Employees	-0.0365***	0.00166	-0.201***
	(-5.26)	(0.16)	(-4.59)
Age	-0.000565	-0.000653	-0.000583
	(-1.10)	(-1.14)	(-0.42)
Constant	-0.158***	0.606***	-3.390***
	(-2.62)	(6.52)	(-8.08)
Obs	6930	6930	6930
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
R-sq	0.164	0.204	0.181

Notes. This table presents evidence on the effect investors have on returns. We restrict the sample to private firms with a listed investment in PitchBook to see how the returns, standard deviation and Sharpe ratio on shares differs before and after the investment. *Post* is an indicator variable equal to one for observations once the investment has been recorded. *Returns* is the average change in unrealized gains and losses over a three-year rolling period. *SD* is the standard deviation of those returns and *Sharpe* is the risk-adjusted returns measured as the average returns divided by the standard deviation.

Online Appendix

Returns for Private and Public Valued ESOPs (5-yr Rolling)

Matching =	Unadjusted			Entropy-Balanced		
DV =	*Returns*	*SD*	*Sharpe*	*Returns*	*SD*	*Sharpe*
	(1)	(2)	(3)	(4)	(5)	(6)
Private	0.00584	-0.0863***	0.475***	-0.00600	-0.0760***	0.289***
	(0.78)	(-6.71)	(9.99)	(-0.84)	(-5.73)	(5.57)
Leverage	0.0102	0.106***	-0.171***	0.0128*	0.102***	-0.134***
	(1.33)	(11.15)	(-7.98)	(1.78)	(8.50)	(-4.06)
Assets	0.0178***	-0.0254***	0.211***	0.00772	-0.0413***	0.184***
	(7.88)	(-6.91)	(13.85)	(1.34)	(-4.42)	(7.51)
Employees	-0.00382	0.0307***	-0.133***	0.00323	0.0441***	-0.107***
	(-1.14)	(5.88)	(-6.59)	(0.46)	(3.73)	(-3.51)
Age	-0.000763***	-0.000799***	0.0000539	-0.000213	-0.000621**	0.000476
	(-5.12)	(-3.96)	(0.07)	(-1.12)	(-2.04)	(0.31)
Constant	-0.162***	0.548***	-2.461***	-0.0341	0.735***	-1.987***
	(-5.54)	(11.40)	(-12.58)	(-0.52)	(7.15)	(-7.90)
Obs	23832	23832	23832	23832	23832	23832
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.121	0.197	0.190	0.262	0.421	0.202

Notes. This table illustrates the difference in returns between employer securities in private and public plans from 2000 to 2022. *Private* equals one for privately valued firms and zero for publicly valued firms. We restrict the sample to ESOPs with more than 120 plan participants to ensure a successful match between the private and public firms. *Returns* is the unrealized gains and losses scaled by the beginning value of employer securities. We calculate the measure as the average over a five-year rolling period. *SD* is the standard deviation of those returns and *Sharpe* is the risk-adjusted returns measured as the average returns divided by the standard deviation. Columns (1) through (3) display unadjusted results and columns (4) through (5) show the results after matching private and public ESOPs based on assets, number of employees and industry (NAICS) classification. In all specifications, industry and year fixed effects are applied, with standard errors clustered at the firm-level.