

# Private equity, disclosure quality, and audit quality

by

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## Abstract

I study the influence of disclosure/audit quality on private equity funds' investment decisions, and the relationship between private equity ownership and disclosure/audit quality. Using Prequin and FAME data, I find that PE funds are more likely to invest in firms with superior financial statement transparency (disclosure quality) and in firms that employ big 4 auditors (audit quality). Conversely, I find that PE ownership is associated with audit quality, but not for disclosure quality.

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# Contents

<b>1</b>	<b>Introduction</b>	<b>9</b>
<b>2</b>	<b>Hypothesis development</b>	<b>15</b>
2.1	H1: Disclosure/audit Quality and the Propensity of Private Equity firms to Invest . . . . .	16
2.2	H2: Private equity investment and disclosure/audit policies . . . . .	18
2.3	Relationship between H1 and H2 . . . . .	20
<b>3</b>	<b>Research design</b>	<b>23</b>
3.1	Testing H1: Disclosure Quality and the Propensity of Private Equity firms to Invest . . . . .	24
3.2	Testing H2: Private Equity Investment and Disclosure Policies . . . . .	26
3.3	Proxies of Disclosure and Audit Quality . . . . .	29
<b>4</b>	<b>Data and setting</b>	<b>33</b>
4.1	Preqin . . . . .	34
4.2	FAME . . . . .	35
4.3	Matching Preqin with FAME and additional adjustments . . . . .	35
<b>5</b>	<b>Empirical results</b>	<b>39</b>
5.1	H1 Results . . . . .	40
5.2	Additional tests . . . . .	41
5.3	H2 Results . . . . .	43

5.3.1	Univariate analysis . . . . .	43
5.3.2	Multivariate analysis . . . . .	44
5.3.3	Additional tests . . . . .	45
<b>6</b>	<b>Conclusion</b>	<b>47</b>
<b>A</b>	<b>Tables</b>	<b>55</b>
<b>B</b>	<b>Figures</b>	<b>69</b>
<b>C</b>	<b>Variable definitions</b>	<b>71</b>
<b>D</b>	<b>Calculating Disclosure Quality: An example</b>	<b>75</b>
<b>E</b>	<b>Probit results used for creating propensity score matching samples</b>	<b>77</b>



# Chapter 1

## Introduction

In this paper, I examine the relationship between disclosure/audit quality and private equity fund ("PE") ownership. In particular, I ask two questions: (1) Does disclosure/audit quality influence private equity funds' investment decisions? (2) Does PE fund ownership affect disclosure/audit quality?

Understanding PE funds' behavior is important for a number of reasons. Although PE funds are major players in the capital markets,<sup>1</sup> there are little studies on how these group of agents view and utilize disclosure and audit practices. Because PE funds are repeat players in the M&A market (Cao and Lerner, 2009; Cotter and Peck, 2001; Katz, 2009), and they constantly evaluate potential deal opportunities, the managers are generally sophisticated in terms of interpreting financial statements and disclosures. More importantly, PE funds invest in private firms, which can shed light on private firm disclosure and audit behavior.

For my first hypothesis, I hypothesize that both audit quality and disclosure quality would be positively associated with chances of receiving an investment, for three reasons. First, PE managers will use disclosed financial statement information and audit as a "resume screening" process, upon deciding which firms to make initial contact. Second, having better disclosure quality alleviates conditions for external financing by reducing information asymmetry and thus cost of capital. Finally, having higher financial statement transparency and audit quality contributes to better return and financial statement forecasts and provide enhanced valuation analysis for PE managers.

For my second hypothesis, I also hypothesize that PE ownership is associated with enhancing audit quality and disclosure quality, using two sources of motivation. One motivation comes from prior literature that having better disclosure and audit quality boosts M&A proceeds. As PE's objective function is to maximize exit proceeds upon exit of its portfolio companies, PE funds are motivated to increase disclosure and audit quality. The other motivation originates from the investors of the PE funds (called "Limited Partners" or "LPs"), from their demand for information of PE funds' portfolio companies.

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<sup>1</sup>In 2017 alone, there were 4,191 announced PE-backed buyout deals with an aggregate value of \$348 billion. If we include other forms of PE deals (such as growth equity) I project the value would be even larger.

It is important to note the interdependence between H1 and H2, in that these two hypotheses may not have uniform direction. If PE tends to select high disclosure and audit quality target firms, it may not have sufficient motivation for it to significantly increase disclosure and audit quality once it takes ownership in that firm. In this case, H1 would hold but H2 would not. Conversely, if PE funds do not select high disclosure and audit quality firms but are still acknowledge the importance of disclosure and audit quality to maximize exit proceeds, H1 would not hold whereas H2 would. Of course, I still may find both hypotheses to hold if PE funds decide to further up their disclosure and audit quality.

I use 1,232 deals and 11,068 firm years from Preqin and FAME datasets to test my hypotheses. Preqin is a dataset that archives PE transactions and PE fund data on a global scale, whereas FAME stores recent ten years of financial statement information for more than 11 million private and public firms registered in the UK and Ireland. To proxy for disclosure quality, I calculate S. Chen, Miao, et al. (2015)'s disclosure quality metric using the financial statement data obtained from FAME. Also from FAME, I use natural log of audit fees and big 4 dummy variable to proxy for audit quality.

To test hypothesis 1, I run logistic and linear probability model regressions using treatment samples and propensity-score-matched control firms from FAME. I use propensity score matching method to create control groups that have similar firm operating characteristics, industries, and years. <sup>2</sup>

The results from testing hypothesis 1 reveal that both disclosure quality and audit quality are positively associated with the propensity to receive investment from PE. I find significant difference in disclosure quality when compared to propensity-score matched control group. In addition to this baseline result, I show that for firms with top deciles of revenue growth/leverage in a given year, disclosure and audit quality becomes increasingly important.

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<sup>2</sup>As an additional analysis, I plan to utilize the German financial reporting enforcement regime initiated in 2006, as used in Breuer (2017) and Bernard (2016), to examine whether increased financial disclosure of the treatment group (limited liability firms) result in greater increase in PE investments compared to the control group (unlimited liability firms).

To validate hypothesis 2, I again use the propensity score matching procedure to match similar firms with the PE portfolio firms, and this time additionally controlling for disclosure quality. Then I run a difference-in-difference analysis (similar to Bernstein and Sheen (2016)). Additionally, I test whether PE owners switch auditors to their favorite ones, and subsequently test whether these switches lead to big 4 auditors.<sup>3</sup>

From the tests of my second hypothesis, I do not find evidence of disclosure quality improvements post PE ownership, whereas I do find evidence that PE ownership is associated with enhanced audit quality. Additional tests demonstrate that PE firms tend to switch auditors to their favorite auditors once they take over a firm, and more often to big 4 auditors. I do not find increases in audit fees.

This paper contributes to the accounting literature by touching upon financial reporting behavior of private firms through PE transactions, as studied in Gaver et al. (2017), Katz (2009), and Beuselinck et al., 2008. The reason why private firm behavior is important goes beyond the mere presence private firms take in the economy. Minnis and Shroff (2017) stress the importance of studying private firm disclosure behaviors, because we are still lengths away from fully understanding the costs and benefits of financial reporting regulation of these firms. Private equity is an important source of external capital that potentially can shape private firm disclosure behavior, and can help better understand private firm disclosure and audit policies.

The study also contributes to the private equity literature that has striven to answer the question from Jensen (1989), whether private equity is a superior organizational form. Prior research has found many but also conflicting pieces of evidence that PE indeed engenders positive changes to their portfolio companies (Acharya et al., 2013; Bernstein, Lerner, et al., 2017; Bernstein and Sheen, 2016; Beuselinck et al., 2008; Davis et al., 2014; Kaplan, 1989; Katz, 2009; Wilson et al., 2012), but I contribute by examining private equity through

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<sup>3</sup>On top of this procedure, I plan to conduct a two stage least squares (2SLS) instrumental variables regression using "dry powder" as an exogenous instrument. Dry powder refers to the amount of capital available for a PE, and I use this under the assumption that the higher dry powder PEs have, the more likely for a PE firm to invest in companies, but would not be necessarily correlated with disclosure and audit quality.

the lens of disclosure and auditing. So far, Katz (2009) and Beuselinck et al. (2008) are some of the rare papers to entertain from this angle.

This research is distinguished from Katz (2009)'s work, in that this paper explores the determinants of PE investment decisions through disclosure and audit quality, and deals with audit quality which has not been studied in Katz (2009). This paper is also different from Beuselinck et al. (2008), in that I find contrasting results and argue that disclosure quality and audit quality are indeed associated with higher chances of receiving PE investment. Finally, Gaver et al. (2017) is a different paper since they focus on private firms themselves rather than PE behavior.



## Chapter 2

### Hypothesis development

## 2.1 H1: Disclosure/audit Quality and the Propensity of Private Equity firms to Invest

Whereas the impact PE funds impose upon their target firms are discussed, little is known about what criteria PE funds use to make their decisions.<sup>1</sup> There are three themes as to why superior disclosure and audit quality can increase the chances of receiving investments from PE. First, in terms of assessing the attractiveness of a deal, PE funds treat disclosure and audit as a “resume screening process” of a target firm. PE managers and analysts evaluate numerous potential investment opportunities before approaching the target management. Gompers et al. (2016), from their survey of PE managers, show that PE uses IRR and comparable company analyses as its primary metric. All of these methods require granular financial statement data. Because of this reason it may be the case that PE managers can pass on firms that do not meet a certain threshold of financial transparency and audit quality. Naturally, firms that prepare finer and more transparent financial statements with higher audit quality have chances of “passing initial resume screening” and advance to the next stage of the deal evaluation process.

Second, having a higher degree of financial statement transparency and audit quality can grant easier access to external financing. The logic behind this is by reducing information asymmetry as shown in Akerlof (1970). A target company providing more detailed information reveals that it is not a “lemon” and thus increase the chances of receiving external capital. One form of evidence with regards to external financing is through cost of capital. Prior literature has documented the relationship between disclosure/audit quality and cost of capital. Easley and O’Hara (2004) derive that accuracy and the amount of accounting information can affect cost of capital. Empirically, Francis et al. (2008) demonstrate earnings quality is associated with a lower cost of capital. Sengupta (2018) shows that

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<sup>1</sup>An interview with a private equity professional nicely summarizes PE funds’ decision making criteria, which resonates with the importance of financial statements mentioned above. He explains that having a more detailed and disaggregated financial statements lets us to fully investigate the sources of revenue and profit. By analyzing these sources, PE funds can equip a better understanding of where the management should focus (strategically) after PE takes over. These projections also serve as a useful basis for price negotiations with the management. He goes on further to say, “having more transparent financial statements helps us to detect potential accounting frauds or contingent liabilities that can profoundly hurt our investment returns.”



higher disclosure quality ratings enjoy lower interest rates when issuing debt. Audit quality, on the contrary, may have different purposes to PE investors than disclosure quality does. The literature also ties audit quality with lower cost of capital. Theoretically, Booth (1992) shows the existence of external monitoring regime reduces lending costs, and leading to lower borrowing rates. Empirically, Minnis (2011) finds that the verification role of auditing leads to favorable loan financing terms (cost of debt) than a firm's non-audited peers. (Mansi et al., 2004; Pittman and Fortin, 2004) find lower cost of debt for larger auditors. Chang et al. (2009) provide evidence that auditor quality affects financing decisions of a firm, i.e. the firms with big 6 auditors issue more equity than debt, and are able to issue more equity than its peers without big 6 auditors. As PE by definition is one form of external financing, these studies support the argument that having better disclosure quality will allow target firms easier access to PE investments.

Finally, PE managers can make better valuation analyses and more accurate forecasts through transparent financial statements and better audit quality. As mentioned, majority of PE's investment evaluation and screening methods are accounting-based, thereby making financial statements and auditing quality important (Gompers et al., 2016; Hand, 2005).<sup>2</sup> For public firms, S. Chen, Miao, et al. (2015) have demonstrated that, by using the disclosure quality measure that I use in this paper, analyst forecast accuracy improves with better financial transparency. In addition to S. Chen, Miao, et al. (2015), disclosure quality in general is often positively associated with analyst forecast accuracy (Behn et al., 2008; Merkley et al., 2013). The key difference between PE analysts and equity analysts is that the majority of PE transactions occur with private companies. Hand (2005) shows that financial statement items of venture capital portfolio firms are associated with their pre-money valuations even before IPO, and this relationship becomes stronger as the portfolio firms mature. As PE firms generally invest in more mature firms than venture capital funds do (Katz, 2009), I conjecture that having more granular financial statement information enhances PE's return forecast accuracy.

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<sup>2</sup>Gompers et al. (2016) show IRR, MOIC, comparable company multiple method, and comparable transaction multiple method are the most popular deal evaluation metrics among PE managers. All of these analyses benefit from more transparent financial statement information.

Based on these three arguments, I hypothesize that disclosure quality and audit quality are positively associated with higher chances of a particular firm receiving private equity investment.

*H1. Better disclosure and audit quality is associated with higher propensity to receive investment from PE.*

While I predict the abovementioned hypothesis, there are some counterarguments against disclosure and audit quality being relevant to propensity to receive investment from PE, notably from the banking literature. Notably, A. N. Berger and Udell (2006) argues there are various sources of information (other transaction technologies) other than “hard” quantitative financial data, especially for SMEs. P. G. Berger et al. (2017) reports that banks tend to collect borrower’s financial statements more frequently if the bank has less expertise in a particular industry. Minnis and Sutherland (2017) finds decreasing financial statement requests from banks as the borrower-lender relationship continues further. Cassar et al. (2014) find that loan originations are determined less by accrual accounting if credit scores are present. These studies suggest alternative forms of information acquisition other than financial statements can deter the portfolio firm from increasing disclosure and audit quality.<sup>3</sup>

## 2.2 H2: Private equity investment and disclosure/audit policies

Recent accounting literature is beginning to link equity investors’ demands for information to audit and disclosure choices; Gaver et al. (2017) suggest private firms’ financial reporting choices to be associated with equity investments rather than debt or banks; they also find private fund ownership (venture capital, private equity, and hedge funds) is associated with GAAP reporting and big 4 auditor usage. Lisowsky and Minnis (2018) analyze the financial reporting choices medium and large private businesses, and also conclude that equity investments and trade credits are more important than demands from debt lenders. As PE funds by definition own equity stakes, these two papers descriptively support the

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<sup>3</sup>In future drafts, I plan to alleviate this concern by conducting a cross-sectional test.

notion that PE fund ownership is associated with better disclosure and audit quality.

There are two main reasons why PE would increase disclosure and audit quality. An obvious reason is to maximize PE's exit proceeds upon PE fund's exit of a portfolio firm. De Franco et al. (2011) find that private firms that hire big 4 auditors result in higher transaction proceeds, thereby reducing private company discount ("PCD") applied to valuations for private companies. Katz (2009) also suggests that PE-owned portfolio companies perform better in IPO exits compared to their peers, because PE owned portfolio firms better anticipate and prepare for IPOs by less earnings management. Both papers imply that As a large proportion of PE transactions consists of private companies, this reasoning provides one arm of motivation for PE funds to increase disclosure and audit quality.

However, the above logic also applies to private firms that seek external financing in general (without PE ownership) to increase their disclosure and audit quality. In this light, the second reason for the PE funds to increase disclosure and audit quality is to maximize their fundraising from Limited Partners ("LPs")<sup>4</sup> by reducing information asymmetry between PE funds and LPs. For example, Da Rin and Phalippou (2017) survey 249 LPs from 30 different countries and study how LPs monitor PE funds. They find that about half of the respondents monitor PE activities by sitting on fund advisory boards, which are designed to oversee fund operations and *portfolio company valuations*. In addition, more than half of the respondents track PE's portfolio mix (82%) and actually visit portfolio companies (65%). These pieces of evidence together reveal the potential benefits of PE portfolio firms having better disclosure and audit quality. More transparent financial statements audited by better quality auditors may provide LPs the confidence that the PE funds indeed are not "lemons." Eventually, this confidence can lead to the LPs participating in subsequent funds of that PE fund. Thus, I hypothesize that PE funds will increase audit and disclosure quality once they seize ownership of the portfolio firm.

*H2. A PE-owned firm is associated with higher disclosure and audit quality.*

Conversely, another school of evidence argues against improved disclosure quality post

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<sup>4</sup>Limited Partners. Defined as investors of PE funds, such as pension funds or endowments.

PE investment. Prior evidence finds that concentrated ownership structure is associated with lower quality disclosures (Burgstahler et al., 2006; S. Chen, X. Chen, et al., 2008). Many, if not most, of the PE investments form a concentrated ownership structure, PE funds may find additional channels to monitor and communicate portfolio firm information. One example may be a case where the PE fund with a 100% ownership appoints a new management team to the portfolio firm; the new management can report on a regular basis (perhaps even more frequently than normal reporting periods).<sup>5</sup> Here, information asymmetry would be trivial because the main audience (the single shareholder, PE) received all the information it needs. This is further acknowledged by how PE funds exert tighter monitoring to their portfolio firms. Prior PE literature suggests that PE funds actively monitor their portfolio companies through board memberships (Cotter and Peck, 2001; Guo et al., 2011; Jensen, 1989; Renneboog and Simons, 2005). Because PE funds already monitor their portfolio companies well through alternative channels, PE owners may not increase disclosure and audit quality. Still, I conjecture that PE funds will prioritize their objective to exit the portfolio over the counteracting forces against enhancing disclosure and audit quality.

## 2.3 Relationship between H1 and H2

In effect, it is important to acknowledge that my two hypotheses are interdependent upon each other. Hypothesis 1 examines the difference between firms chosen for PE investment against those that were not; on the contrary, hypothesis 2 asks whether PE incrementally changes disclosure and audit quality once it owns the firm. Potentially there may be cases where H1 holds but H2 does not, and where H2 does but H1 does not. If PE funds already select firms with higher disclosure and audit quality and feel the level at the point in which PE funds invested (H1 holds), PE funds may not necessarily increase disclosure and audit quality (H2 does not hold). Alternatively, if PE funds do not select firms with superior disclosure and audit quality, PE funds may still transform their portfolio firms to have better disclosure and audit quality in anticipation with their exit. Of course, there may be cases

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<sup>5</sup>In fact, Gompers et al. (2016) find that for about half of PE transactions PE managers replace existing management to their favored management team.

where I find both results, whereby PE ownership increases disclosure and audit quality even further than already high levels.

Anecdotally, an example in relation to this notion may be where some PE funds would not invest in firms that did not receive an audit, or received an audit but not from big 4 auditors. These cases are more common for project funds or co-investment transactions, in which the PE funds are forced to either invest with the LPs or fundraise from LPs solely for that particular transaction. Managers would reject the deals saying “the LPs will never want to see deals that are not audited by big 4 auditors.”<sup>6</sup> This story suggests a potential case in which a transaction can fall apart just because the target firm did not receive an audit from a big 4 auditor (because of the influence of the LPs), whereas the deal could have happened if the transaction were to be a sole decision from the PE fund, and eventually could have changed the auditors after the PE fund invested in the target company (in which case H2 holds).

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<sup>6</sup>Project funds refer to PE funds that a PE fundraises only for one or two deals. In this case, LPs decide whether to invest in the PE fund by the attractiveness of the transaction, rather than the PE fund’s past track record. Co-investments are cases where LPs and PE funds directly invest together, and again the LPs will focus on the transaction itself.



## Chapter 3

### Research design

### 3.1 Testing H1: Disclosure Quality and the Propensity of Private Equity firms to Invest

I first create a propensity score matched control group, using industry, year, size (natural log of total assets), and profitability (ROA). This is to generate a reasonable comparable control group that holds similar characteristics of the PE-selected firms. I use nearest neighbor matching within caliper that is set 0.5 times the standard deviation of the variable, as used in Kausar et al. (2016) and Rosenbaum and Rubin (1985).

Next, I run the following logistic and linear probability model regressions:

$$\begin{aligned}
 PE_{i,t} = & \beta_1 DQ\_BS_{i,t} + \beta_2 DQ\_IS_{i,t} + \beta_3 Big4_{i,t} + \beta_4 \ln Auditfee_{i,t} \\
 & + \beta_5 \ln Totalassets_{i,t} + \beta_6 ROA_{i,t} + \beta_7 Revgrowth_{i,t} + \beta_8 Leverage_{i,t} \quad (3.1) \\
 & + \gamma_t \times \eta_{ind} + \epsilon_{i,t}
 \end{aligned}$$

where  $PE_{i,t}$  is a dummy variable that equals one if firm  $i$  has been invested by a private equity firm at time  $t$ , and zero if the firm was not;  $DQ\_BS_{i,t}$  and  $DQ\_IS_{i,t}$  denotes the disclosure quality of balance sheet and income statement, respectively, for firm  $i$  at time  $t$ ;  $Big4_{i,t}$  is a dummy variable which equals one if firm  $i$  is audited by one of big 4 auditors (PricewaterhouseCoopers, Deloitte, KPMG, and Ernst & Young) at time  $t$ , and zero otherwise;  $\ln Totalassets_{i,t}$  is the natural log of total assets of firm  $i$  at time  $t$ ;  $ROA_{i,t}$  is ROA of firm  $i$  at time  $t$ , calculated by net income divided by total assets;  $Revgrowth_{i,t}$  denotes yearly percentage revenue growth rate of firm  $i$  at time  $t$ ;  $Leverage_{i,t}$  is the leverage ratio calculated as total liabilities divided by shareholders' equity;  $\gamma_t \times \eta_{ind}$  is the year  $\times$  industry fixed effects, and finally,  $\epsilon_{i,t}$  is the error term.

Selection issues can be raised for the above research design. It may well be that the PE fund's decision to invest in a target company can stem from unobserved factors that I did not control for and therefore influence my results. To reduce these concerns and provide additional information about PE behavior, I study whether firms with abnormal firm characteristics show different responses to disclosure and audit qualities. For each firm char-



acteristics - revenue growth, and leverage, I create dummy variables that indicate top decile firms in a given year. Then, I perform the following OLS for each dummy variable:

$$\begin{aligned}
PE_{i,t} = & \beta_1 TOP_{i,t} + \beta_2 DQ\_BS_{i,t} + \beta_3 DQBS\_TOP_{i,t} \\
& + \beta_4 DQ\_IS_{i,t} + \beta_5 DQIS\_TOP_{i,t} + \beta_6 Big4_{i,t} + \beta_7 BIG4\_TOP_{i,t} \\
& + \beta_8 \ln Auditfee_{i,t} + \beta_9 LNAUDFEE\_TOP_{i,t} + \gamma_t + \eta_{ind} + \epsilon_{i,t}
\end{aligned} \tag{3.2}$$

where  $TOP_{i,t}$  denotes top decile dummies for each characteristics: it equals one if a firm is within the top decile of revenue growth, leverage, total assets, and ROA in a given year.  $DQBS\_TOP_{i,t}$ ,  $DQIS\_TOP_{i,t}$ ,  $BIG4\_TOP_{i,t}$ ,  $LNAUDFEE\_TOP_{i,t}$  denote interaction terms between  $DQ\_BS$  and top decile dummies,  $DQ\_IS$  and top decile dummies,  $BIG4$  and top decile dummies, and  $\ln Auditfee$  and top decile dummies, respectively. Each interaction terms would signify the marginal importance of disclosure or audit quality for top decile firms. For example, if  $DQIS\_TOPPREVGROWTH$  shows positive coefficients with statistical significance, it could be that for high revenue growth firms, income statement disclosure quality becomes more associated with higher propensity to receive private equity investments. I select revenue growth and leverage for abnormal characteristics because they are known to be two of the most important sources of return drivers Gompers et al. (2016).<sup>1</sup> If the interaction terms ( $DQBS\_TOP_{i,t}$ ,  $DQIS\_TOP_{i,t}$ ,  $BIG4\_TOP_{i,t}$ ,  $LNAUDFEE\_TOP_{i,t}$ ) show statistically significant results, this signifies that for firms that show abnormally high revenue growth or leverage, PE investors view financial disaggregation or audit quality more important than other firms, and pay more attention to disclosure and audit. Intuitively, PE managers would know from experience when they observe abnormal growth or leverage, and viewing that, I conjecture that the managers would look more closely into the financial statements to find the sources why a firm has been showing these abnormal results.

Additionally, in terms of disclosure, I refer to the German disclosure requirement setting and research design presented in Bernard (2016) and Breuer (2017).<sup>2</sup> Previous research design from the UK setting does not fully explain how disclosure quality affects PE invest-

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<sup>1</sup>According to Gompers et al. (2016)'s survey, 100% of PE manager respondents answered growth in the value of the business is important for the importance, and 76.1% answered leverage to be important.

<sup>2</sup>In this version, because of time constraints I am not formally testing this design.

ment decisions, as the shock is only valid about audit qualities. Furthermore, as the *DQ* measure is a self-calculated metric that simply calculates the number of missing items, it is difficult to generate an exogenous variable (instrument) or a shock that can enable me to build a treatment and a control group. The German setting is an effort to overcome this issue.

Although Germany had a size-based disclosure requirements for limited liability firms pre-2007, it was end of 2006 when Germany actually started to reinforce this requirement due to political pressure from the EU commission. Hence, as the German state initiated easier publication registering system and enforced the legislation more tightly, through the Bill on the Electronic Registers for Commerce, Companies and Associations (EHUG) in 2007, effective from financial statements ending December 2016 or later. Hence, Breuer (2017) finds the disclosure rate substantially increases post 2007.

Based on this institutional setting, I conduct a difference-in-difference regression using the following equation:

$$PE_{i,t} = \beta_1 LL_{i,t} + \beta_2 POST2006_i + \beta_3 \ln TotalAssets_{i,t} + \beta_4 Revenue_{i,t} + \gamma_t \times \eta_{ind} + \epsilon_{i,t} \quad (3.3)$$

Where  $LL_{i,t}$  is a dummy variable that equals one for treatment (limited liability firms, GmbH, GmbH & Co.KG, AG, KGaA), and zero for controlled unlimited liability firms (sole proprietorship, OHG, KG, cooperative) as control group.<sup>3</sup> I include year and industry fixed effects.

## 3.2 Testing H2: Private Equity Investment and Disclosure Policies

I again create a set of control firms using propensity score matching method used in H1. This time, however, on top of size and profitability, I add *DQ\_BS* and *DQ\_IS* to control

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<sup>3</sup>This follows Breuer (2017)'s classifications.

for disclosure quality. This way, I can create a control group that has similar disclosure quality and measure the incremental effect PE brings in terms of disclosure quality.<sup>4</sup>

I run the following difference-in-difference regression for a number of DQ-AQ related dependent variables:

$$\begin{aligned}
 Y_{i,t} = & \beta_1 PEOWN_{i,t} + \beta_2 PE_{i,t} + \beta_3 OWN_{i,t} + \beta_4 ROA_{i,t} \\
 & + \beta_5 \ln TotalAssets_{i,t} + \beta_6 Revenue_{i,t} + \beta_7 Leverage_{i,t} \\
 & + \gamma_t \times \eta_{ind} + \epsilon_{i,t}
 \end{aligned} \tag{3.4}$$

where  $Y_{i,t}$  are the dependent variables of disclosure and audit quality ( $DQ\_BS$ ,  $DQ\_IS$ ,  $\ln AUDITFEE$ ,  $BIG4$  dummy),  $PE_{i,t}$  is a dummy that equals one if  $PEOWN_{i,t}$  is a interaction dummy variable, where it equals 1 if a PE fund owns the portfolio company  $i$  at year  $t$ , 0 if the company  $i$  is not owned by PE at time  $t$  (either before the deal or after exit). I include ROA to control for a firm's profitability, revenue and total assets to control for size, and revenue growth to control for future growth opportunities. I also include year and industry fixed effects ( $\gamma$  and  $\eta$ ) to account for time trends and industry effects. I explain further calculating disclosure quality proxies ( $DQ\_BS$  and  $DQ\_IS$ ) in section 3.4. I also use the propensity score matching method to generate control firms (non-PE invested firms with same industry, same year, with similar profitability and revenue), and I explain more about the matching process in the data section. The matching method is used in Kausar et al. (2016) and Rosenbaum and Rubin (1985), whereas the regression is used in Bernstein and Sheen (2016).<sup>5</sup>

To reduce endogeneity and selection concerns in terms of audit quality, I examine whether PE firms to change their auditors, and if so, to their favorite auditors, by running

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<sup>4</sup>In this version, I leave out big4 and audit fees out from controlling because of (1) data constraints in big 4 and (2) audit fees are generally subsumed by size.

<sup>5</sup>Bernstein and Sheen (2016) also uses control groups, but they are not matched with a particular set of characteristics. Rather, they utilize ZIP-code-by-year fixed effects to account for local trends.

the following regressions:

$$\begin{aligned} AUDCHANGE_{i,t} = & \beta_1 OWN_{i,t} + \beta_2 \ln Totalassets_{i,t} + \beta_3 ROA_{i,t} \\ & + \beta_4 Revgrowth_{i,t} + \beta_5 Leverage_{i,t} + \gamma_t \times \eta_{ind} \end{aligned} \quad (3.5)$$

$$\begin{aligned} AUDFAVOR_{i,t} = & \beta_1 OWN_{i,t} + \beta_2 \ln Totalassets_{i,t} + \beta_3 ROA_{i,t} \\ & + \beta_4 Revgrowth_{i,t} + \beta_5 Leverage_{i,t} + \gamma_t \times \eta_{ind} \end{aligned} \quad (3.6)$$

$$\begin{aligned} AUDFAVOR\_SECONDARY_{i,t} = & \beta_1 OWN_{i,t} + \beta_2 \ln Totalassets_{i,t} + \beta_3 ROA_{i,t} \\ & + \beta_4 Revgrowth_{i,t} + \beta_5 Leverage_{i,t} + \gamma_t \times \eta_{ind} \end{aligned} \quad (3.7)$$

where  $AUDCHANGE_{i,t}$  equals one if a firm's auditor is different from the previous year  $t-1$  and zero otherwise,  $OWN_{i,t}$  equals one if a firm is owned by a PE fund at time  $t$  and zero otherwise.  $AUDFAVOR_{i,t}$  and  $AUDFAVOR\_SECONDARY_{i,t}$  equals one if the current auditor is the PE firm's favorite (or second favorite for  $AUDFAVOR\_SECONDARY$ ) auditor, and zero otherwise. Remaining terms follow aforementioned definitions. If  $OWN$  shows statistically significant positive coefficients, it would signal that PE ownership is associated with auditor changes, changes to favorite auditors, and changes to second-favorite auditors. More importantly, switching to their favorite auditors would support the idea that PE is indeed making an impact on its portfolio firms.

Next, switching auditors does not necessarily signify audit quality augments. Thus, I regress the following:

$$\begin{aligned} Y_{i,t} = & \beta_1 OWN_{i,t} + \beta_2 OWN\_SWITCH_{i,t} + \beta_3 OWN\_FAVOR_{i,t} \\ & + \beta_4 OWN\_SECONDARY_{i,t} + \beta_5 \ln Totalassets_{i,t} + \beta_6 ROA_{i,t} \\ & + \beta_7 Revgrowth_{i,t} + \beta_8 Leverage_{i,t} + \gamma_t \times \eta_{ind} + \epsilon_{i,t} \end{aligned} \quad (3.8)$$

where  $Y_{i,t}$  are proxies of audit quality (Big4 and  $\ln Auditfee$ ). Remaining terms follow aforementioned definitions. If the interaction terms show statistically positive coefficients, this implies that the act of PE funds switching an auditor, switching to their favorite or their second favorite auditors would be associated with switching to a big 4 auditor, which

I assume to be an increase in audit quality.

By conducting the research design above, I hope to find that PE investors indeed change auditors, more often to their favored auditors. Further, if their favored auditors are big 4 auditors, this sequence of regressions supports the logic that PE intervention is related to enhancing audit quality.

### 3.3 Proxies of Disclosure and Audit Quality

Different proxies of disclosure quality have been developed in the past, in two routes: voluntary disclosure proxies and proxies that capture general disclosure qualities. In particular, the second type of disclosure quality proxies include measures from analysts (AIMR scores) or researcher-developed metrics (Botosan, 1997; Francis et al., 2008; Li, 2008). Both AIMR and researcher-developed scores are implausible to compute in our setting, because either the scores are applicable only to public firms or they require textual analysis of annual reports, which all are not available in my setting, and are costly to construct.

Hence, I use the slightly modified version of the S. Chen, Miao, et al. (2015) measure to proxy for disclosure quality. This measure captures the extent to which how much a financial statement is disaggregated, i.e. broken down into detail. This measure is advantageous for a number of reasons: (1) well represents what practitioners would define disclosure quality<sup>6</sup> (2) relatively simple to calculate, and (3) applicable to a wide array of firms. I compute the DQ measure in the following steps:

1. For each group account<sup>7</sup>, count the number of missing items in the financial statement provided by FAME.
2. Classify each firm by industry (using UK two-digit SIC code) and rule out items that are reported less than 5% of the items.

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<sup>6</sup>For academic evidence that supports higher disaggregation leads to higher disclosure quality, see Hirst et al. (2007) and D'Souza and Shen (2010))

<sup>7</sup>I refer to current assets, noncurrent assets, current liabilities, noncurrent liabilities, and shareholders' equity as group accounts.

3. Compute the following equation for the balance sheet:

$$DQ\_BS = \sum_{i=1}^5 \frac{\text{No. of nonmissing items}_i}{\text{No. of total items}_i} \times \frac{Group_i}{TA} \div 2 \quad (3.9)$$

where  $i$  is the group account from  $1 \dots 5$ ,  $GROU P_i$  is the sum of each group account (e.g. total current assets), and  $TA$  is total assets. Group accounts are mid-level accounts within assets or liabilities, categorized as current assets, fixed assets, current liabilities, long-term liabilities, and shareholders' equity. I divide by 2 to provide a metric between 0 and 1 (following Chen et al.'s method). By value-weighting DQ with respect to total assets, we can gauge how important that particular group account is within the firm.

My method differs from that of S. Chen, Miao, et al. (2015) in that I adjust for industry SIC codes (step 2) and do not fully account for the nested feature which Chen et al. uses, due to certain limitations within the FAME dataset. Nonetheless, I believe this metric still captures the core of disclosure quality, by adjusting missing items in terms of industry. If a certain industry does not use a certain item within the financial statement, the users of those financial statements would take this fact into account. <sup>8</sup>

4. Compute the following for the income statement:

$$DQ\_IS = \frac{\text{No. of nonmissing items}}{\text{No. of total items}} \quad (3.10)$$

For income statement DQ, I use the equal-weighting method, in a similar light with S. Chen, Miao, et al. (2015).  $DQ\_IS$  also ranges between 0 and 1. I do not use group accounts here because I mechanically count the number of missing items and divide by the number of total income statement items (after industry-adjusted).

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<sup>8</sup>Although many of FAME's financial statement accounts are nested, there are certain items that do not have a nested feature (Compustat, used in Chen et al., has this feature for all accounts); this makes me difficult to judge whether a certain account is blank because it is unrecorded or the company really does have zero balance

I use two audit quality proxies in this research, both commonly used in audit-related research: Big 4 auditor dummy and audit fees. Prior research has shown that both of these proxies are reasonable gauges of audit quality (see DeFond and Zhang (2014) for additional information). Big 4 auditor proxy is also usable in the UK settings as established in extant literature (Kausar et al., 2016; Lennox and Pittman, 2011).





# Chapter 4

## Data and setting

## 4.1 Preqin

Preqin dataset is a relatively new dataset which is now one of the most commonly used datasets with regards to private equity research (Acharya et al., 2013; Barber and Yasuda, 2017; Chung et al., 2012; Gompers et al., 2016; R. S. Harris et al., 2014; Korteweg and Sorensen, 2017; Welch, 2017). The data contains not only detailed information on PE funds, but also on PE-backed transactions (both investments and exits), on a global scale.

Since PE-related data remain largely private, it is important to explain how Preqin collects data in the first place. The methods are largely threefold: Freedom of Information Act (FOIA)<sup>1</sup> and voluntary disclosures from PE firms, and public filings. Preqin also asks directly for data to PE firms, and over 3,300 firms have contributed to the dataset (Preqin2018). Finally, Preqin also finds financial reports, public filings, and annual reports to supplement their data. Preqin is one of the most comprehensive sources of private equity dataset. Preqin contains roughly 79% of PE funds launched since 1999 (R. Harris et al., 2010), and the distribution of PE performance is similar to that of other alternatives such as datasets from Cambridge Associates and Thomson Venture Economics.

These data collection methodology is not immune to selection issues, as pointed out in Welch (2017). As Preqin’s primary sources of data collection are FOIA requests and voluntary disclosure from PE firms, PE funds that do not work with FOIA-affiliated LPs<sup>3</sup> and do not voluntarily disclose to Preqin. Still, Lerner et al. (2007) finds that public pension funds have a representative performance of the entire PE universe. Further, Chung et al. (2012) notes that about 85% of Preqin’s data is obtained from FOIA requests, and thus the risk of self-selection bias would be minimized.

From this Preqin dataset, we retrieve 6,580 deals.

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<sup>1</sup>For US deals, FOIA has been Preqin’s major source of data collection, and requests data from public institutional Limited Partners<sup>2</sup>. For non-US deals the database mostly relies on the latter two methods.

<sup>3</sup>Limited Partners. Typically defined as investors of PE funds.

## 4.2 FAME

To obtain financial statement data of public and private UK companies, around the PE investment period, I turn to “Financial Analysis Made Easy” (FAME) managed by Bureau van Dijk (BvD), used in a number of UK private-firm related research (Ball and Shivakumar, 2005; Kausar et al., 2016; Lennox and Pittman, 2011), FAME includes detailed financial information, directors, and auditor information for 11 million private and public companies registered in the UK and Ireland. UK and Irish firms are required by law to report their financial statements to the Companies House, which are then collected by BvD.<sup>4</sup> Auditor information becomes especially crucial for our research in that audit-related proxies (e.g. audit fees, auditor name) will be central in terms of measuring audit quality.

I collect firms with assets more than GBP 1 million with 10 years worth of most recent financial statements (mostly clustered around 2006 and 2016, but for some companies that do not have recent financial data earlier years are available). We retrieve 338,555 firms that are ready for matching with Preqin data.

## 4.3 Matching Preqin with FAME and additional adjustments

As Preqin and FAME do not share firm ID numbers, I attempt to match Preqin deals to FAME financials using a matching algorithm from SAS. Using the algorithm yields us 2,212 Preqin-FAME matched deals, spanning from 1980 to 2018. I have 19,321 firm year observations.

After this procedure, I delete all the deals which FAME does not have overlapping financial time series. For example, if a certain company has financials between years -12 to -3 or +3 to +12 (when PE investment is 0), then I delete this deal. Remaining are 1,232 deals with 11,068 firm years.

I initially mentioned there 6,580 UK deals from available in Preqin; We lose the deals

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<sup>4</sup>Technically, Jordans collects data from the Companies House directly, and BvD collects data from Jordans.

because of the following reasons. First, entities may have changed their names. Preqin records the target company's name at the time of the deal announcement. FAME updates its name to the most current name. Between the time of the deal and 2017 (when the FAME data was downloaded), I would not be able to match the two names and hence the deal would be dropped. Another potential reason may be that the target's assets were under GBP 1 million. I have not downloaded companies with less than total assets of GBP 1 million. Any target that has less than this threshold is not on FAME record, hence the deal will not match.<sup>5</sup>

Table A.1 reports the summary statistics of Preqin-FAME matched sample. In Panel A I show PE transactions and their mean/median deal size for each year. "No. of transactions" denote the total number of transactions observed in a given year, whereas "No. of transactions with deal size" refers to only deals that recorded deal size. All in all, we observe more deals around 2012-2016; I speculate the lower observations during 2008-2009 due to the global financial crisis.

Median deal value at PE's time of investment is \$ 44.74 million for all period, and this is significantly lower than the statistics presented in Guo et al. (2011) and Acharya et al. (2013). Part of the reason may be because Guo et al. (2011) only looks at public to private deals, which would generally have a higher deal size, and because for Acharya et al. (2013), their data comes from McKinsey that generally serves only mid-cap and large-cap private equity houses.<sup>6</sup> The sample I use all types of deals categorized by Preqin, which will provide a wider perspective of the effect of PE ownership (also mentioned in (Acharya et al., 2013)).

Panel B reports mean and median exit values for each year. I observe much lower

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<sup>5</sup>To enhance Preqin-FAME matching procedure, and to increase sample size, I plan to take following steps in future drafts: (1) Manual matching by retrieving current and past entity names from UK companies House website and manually adding to my sample. (2) Reach Amadeus database that archives European (including UK) private firms financials, but with less finer data. Calculating DQ may be an issue here, but I can at least add auditor metrics, big 4 and audit fees. (3) Retrieve older period FAME data used in Kausar et al. (2016). Kausar et al. (2016) uses period from 2000 to 2010. By attaching this dataset to my version of FAME dataset, I would be able to extend the timeframe and increase sample size.

<sup>6</sup>In their paper, Acharya et al. points out that their sample only has deals with companies higher than the enterprise value of EUR 50 million. Thus the sample should have a higher deal size than my sample.

observations for exits (even those without exit value) because a significant portion of the deals have not been realized (exited) yet. This signifies the PE fund would still be, at the time of the data collection (April 2018), holding the portfolio company. The proportion of the companies that recorded exit values among those that actually did exit the company is roughly similar (about 50%). Interestingly, I observe much higher median exit values in this sample, qualitatively consistent with Nikoskelainen and Wright (2007) and Acharya et al. (2013)'s results.<sup>7</sup>

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<sup>7</sup>Nikoskelainen and Wright (2007) examined buyouts in the UK from 1995 to 2004. They find that these deals recorded 22% return to enterprise value and 71% return to equity, after adjusting for market returns. Acharya et al. (2013) report the mean IRR of their McKinsey sample to be 56.1%.



## Chapter 5

### Empirical results

## 5.1 H1 Results

Table A.3 demonstrates the basic characteristics of treatment and control groups. Here, I used size (ln Total assets) and profitability (ROA) as the key variables to generate control firms.<sup>1</sup> Although there can be additional firm characteristics I use to control for (leverage, revenue growth, age, among others), for this draft I refrain from controlling for too many constraints because of sample constraints.<sup>2</sup> Still, other controls of interest in this paper (revenue growth, leverage), do not significantly differ from zero. Rather, it is intriguing to observe ROA shows significant difference even after controlling for ROA. This may signify the importance of profitability for PE funds when making investment decisions.

Table A.4 provides baseline results of disclosure and audit quality affecting the chances of receiving PE investment. I demonstrate the results in two sets of regressions, (i) full-sampled logistic regression and linear probability model (OLS) using PE dummy variable as the dependent variable, and including disclosure and audit quality proxies as covariates; (ii) annual cross-sectional logistic regression with the same dependent and independent variables. Panel A supports the notion that disclosure and audit qualities are associated with the PE's decisions to invest in a particular firm. Within disclosure quality, income statement financial disaggregation (disclosure quality) shows stronger signs and significance, where DQ\_IS is statistically significant at 1% for both regressions, whereas DQ\_BS is significant at 10%. This result is consistent with the anecdotal views that PE funds focus on the sources and quality of earnings, and evaluate whether a particular firm can persist its earnings and profitability in the long run.

Speaking of audit quality, employing a big 4 audit firm shows a statistically significant positive relation in terms of improving the chances of receiving investments from a PE fund, with coefficients 0.072 and 0.345 for LPM and logistic regression, respectively. However, increases in audit fee do not lead to higher chances of receiving private equity investment. It may be the case that rather than increasing the scope of an auditing procedure itself, the

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<sup>1</sup>For the probit results for each hypothesis, refer to table E.1.

<sup>2</sup>Controlling for ln total assets, ROA, leverage, revenue growth results in 600 control and treatment groups, which I reasoned it to be too small. I plan to apply additional controls as I increase the sample size. When running H1 regressions, the results from these sample are similar (actually stronger).



brand name and credibility of audit firms may be a more relevant factor when it comes to PE funds' viewing audit results. Other than disclosure and audit quality measures, ROA is statistically significant and suggests the importance of profitability when it comes to what private equity managers believe as a impactful factor for their investments.<sup>3</sup>

## 5.2 Additional tests

Table A.5 divides the deal samples into size and deal characteristics. Panel A divides samples into size terciles and  $\ln Distance$  terciles, by calculating the kilometer distance between a private equity investor and the target firm<sup>4</sup>. Panel B divides samples into size terciles and buyout indicators, which equals one if the deal is categorized as a buyout and zero otherwise. Panel C divides samples into size terciles and growth equity deals, which equals one if the deal is categorized as a growth equity deal and zero otherwise. Panel D divides samples into size terciles and add-on deals, which equals one if the deal is categorized as an add-on deal and zero otherwise.<sup>5</sup> I provide these table under the hope of understanding deal-type variation of audit and disclosure quality. Panel A demonstrates an interesting notion in terms of distance. For small firms (under tercile 1 of  $\ln ta$ ), the proportion of big 4 auditor (0.221) is 45% higher for long distance deals (tercile 3 of  $\ln dist$ ) than short distance deals (tercile 1 of  $\ln dist$ ). This trend eventually becomes subsumed as the size terciles grow, but in later drafts I plan to test the added importance of disclosure and audit quality and deal distance (as a proxy for investors less specialized about a certain firm) in a more formal way.

Panel C also demonstrates some routes of additional research. Growth equity deals are deals that involves minority stake investments from a PE firm. Across all terciles of size, audit quality (BIG4) shows starkly lower coefficients than non-growth equity deals. Although

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<sup>3</sup>Gompers et al. (2016), in his survey of private equity professionals, find that many of these professionals believe a significant part of PE value creation comes from reducing costs (47.4% of respondents), improving revenue (69.5%), and facilitating high value exit (58.8%). All of these responses are directly related to analyzing a firm's income statement at a highly detailed level.

<sup>4</sup>I obtain zipcodes for both PE investors and target firms, and then calculate latitude and longitude data for each zipcode. Then, I calculate the kilometer distance from the latitudes and longitudes

<sup>5</sup>For definitions of buyouts, growth equity, and add-on deals, refer to Table C.1 in Appendix A.

more formal tests are necessary, this may signify the relationship of intended ownership stake and how important disclosure/audit quality becomes to an investor.

Lastly, Panel D's add-on deals vs. non add-on deals reveal similar patterns with respect to disclosure and audit quality. Add-on deals are important in terms of specialization, in that these transactions involve PE's portfolio firm consolidating another firm in the same or similar industry, which makes a compelling case for industry specialization and conjecturing that financial information would be less important to these type of deals.<sup>6</sup> Contrary to the prior literature's notion of the importance of non-financial information, disclosure and audit quality seem to have similar importance to add-on deal investors as do other deal investors.

Table A.6 tests whether a certain firm characteristic can marginally affect the importance of disclosure and audit qualities to a private equity fund. To test this, I create dummy variables that indicate top decile of a given firm characteristic. Panel A uses dummy variables that indicate high revenue growth; variable TOPREVGROWTH equals one if a firm is located within a top decile of revenue growth rates in a given year. Terms DQBS\_TOPREVGROWTH, DQIS\_TOPREVGROWTH, BIG4\_TOPREVGROWTH, and LNAUDFEE\_TOPREVGROWTH denote interaction terms that would indicate for firms having top decile revenue growth rate (unusually high growth rates), disclosure and audit quality becomes more important than an ordinary firm. Both disclosure quality and audit quality metrics become more important for high revenue growth firms, showing positive statistical significance at 1% level, with coefficients of 0.677, 0.428, 0.291, 0.158 for DQBS\_TOPREVGROWTH, DQIS\_TOPREVGROWTH, BIG4\_TOPREVGROWTH, and LNAUDFEE\_TOPREVGROWTH, respectively. The result may be counterintuitive but also makes sense, in that PE investors would want to explore more into why the firm was displaying abnormally high growth rate. If the target firm can prove the quality of revenue by revealing more information to PE managers, PE would be more inclined to invest in the high growth firm. This conjecture also resonates with anecdotal evidence in which PE firms

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<sup>6</sup>Similar examples can be found in the banking literature, e.g. P. G. Berger et al. (2017), that non-financial information can affect information demand from lenders.

attempt to pinpoint sources of earnings and revenue.

Panel B also shows an interesting implication with regards to firms with high leverage. Although not as strong as high revenue growth firms, target firms that have high leverage will also focus their attention on the financial statements. Interestingly, `DQBS_TOPLEVERAGE` coefficient shows 0.856 with 1% statistical significance, which is the strongest among all interaction variables. This may imply that balance sheet disclosure quality (and the fineness) becomes incrementally more important for firms that have unusually high leverage. PE managers would focus more on the balance sheet and investigate the components of the capital structure, and examine why the target firm had took on so much debt. Other interaction variables also are statistically significant. Finer information in the income statement can also help in terms of providing additional information of sources of earnings and support PE funds build confidence into whether the target firm can pay off high levels of debt.

## 5.3 H2 Results

Table A.8 reports descriptive statistics of propensity score matched firms with regards to hypothesis 2. I control for `DQ_BS`, `DQ_IS`, `ln Total assets`, and `ROA`.<sup>7</sup> Similarly with table A.3, we do not observe significant differences for many of the variables. Here, because I also controlled for `DQ_BS` and `DQ_IS`, I observe less difference in terms of the two disclosure quality variables. There are significant differences between `ROA` and leverage.<sup>8</sup> Although natural log of audit fees also demonstrate significant difference (3.23 for PE-owned and 3.16 for control groups with 1% significance), raw values of audit fees do not reveal any difference.

### 5.3.1 Univariate analysis

I then examine whether disclosure and audit quality is affected once PE invests in a company. Table A.9 presents initial univariate results with regards to the trends of the

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<sup>7</sup>See table E.1 for the probit results for each hypothesis.

<sup>8</sup>These two variables still show statistically significant differences even after controlling for them at the probit stage.

portfolio firms' disclosure and audit quality proxies before and after PE investment. For both disclosure quality measures, I do not observe any evidence that PE ownership enhance DQ\_BS and DQ\_IS. Instead, I observe slightly decreasing trends for treatment firms once PE takes ownership (from year 0).

On the other hand, the story is different for Big4. The variable Big4 in particular exhibits a significant increase, from 0.426 at year -5 to 0.553 at year +5. Although Big4 variable also tends to increase for control firms, The level of increase seems to be greater for treatment firms than control firms.

Figure B-1 depicts a more vivid picture of the quality changes throughout a PE fund's ownership of a portfolio firm. Panels A and B shows the trends in disclosure quality before and during PE's ownership of its portfolio company. For both DQ\_BS and DQ\_IS I observe almost identical patterns, indicating no association with PE ownership and improvements in disclosure quality. Moreover, both of these measures show lower median values at year +5. Panel C and D present audit quality changes before and during PE ownership, proxied by natural log of audit fees and mean Big 4 auditor proportions, respectively. Qualitatively, for both ln auditfee and big4 proxies, PE-owned firms show a consistently increasing pattern, contrary to control groups' inconsistent patterns.

### 5.3.2 Multivariate analysis

Table A.10 solidifies the observations shown in table A.9. This table presents the regression results both using the full sample with control variables and the sample without control group.<sup>9</sup> For the sample with control groups, I present cross-sectional OLS regressions using firm-level clustered standard errors, and panel regressions using firm-level clustered standard errors for sample with no control firms.

The independent variable of interest, PEOWN (for regressions with control firms), shows no statistically significant coefficients for both DQ\_BS and DQ\_IS (5% for DQ\_BS and 5 and 10% for DQ\_IS), with coefficients giving -0.009 and 0.008, respectively. In fact, for

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<sup>9</sup>I use cross-sectional regression here due to the construction of propensity score matching. Control firms are matched for each observation, meaning there does not exist a panel structure for control firms.

regressions without the control group, both for regressions (1) and (2) OWN, my coefficient of interest, show statistically significant negative coefficients (-0.023 and -0.013 for DQ\_BS and DQ\_IS, respectively) for regressions with and without the control group, consistent with the trends displayed in table A.9. Based on these two sets of regressions, I do not find evidence that PE ownership is associated with higher disclosure quality, contrary to my hypothesis.

Regressions (3) and (4) presents regression results related to audit quality. Regression (3) regresses natural log of audit fee on PEOWN and other covariates. Both regressions, with and without control, show positive coefficients but not statistically significant values. On the contrary, column (4) demonstrates logistic regressions that sets big4 as a dependent variable. Both regressions with and without control group show statistically significant (at 1% level) positive coefficients, 0.529 and 0.421, respectively. In sum, PE ownership may be positively associated with switching to Big 4 auditors, but does not necessarily increase audit fees after PE owners take control of the portfolio firm.<sup>10</sup>

### 5.3.3 Additional tests

Table A.11 demonstrates PE firms' tendency to switch auditors (Panel A), and tests whether that change leads to increase in audit quality (Panel B). Panel C restricts the sample only to cases where the portfolio firms had different auditors than PE's favorite auditors before investment and runs the same regressions in Panel B. Panel A regresses AUDCHANGE (1), AUDFAVOR (2), and AUDFAVOR\_SECONDARY (3) on PE ownership and other control variables. Regression (1) captures the tendency of private equity firms changing auditors once they take ownership of the firm. Regardless of including other control variables, variable OWN shows positive coefficients and statistical significance at 1% level, signifying that PE ownership is positively associated with auditor changes. Next, regressing AUDFAVOR and AUDFAVOR\_SECONDARY (regressions (2) and (3)) on PE ownership (OWN) also yields positive coefficients (0.097 and 0.041) and statistically significant results at the 1% and 5% level, respectively. This reveals the tendency of PE investors to change

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<sup>10</sup>In an untabulated analysis, regressing scaled audit fee (scaled by revenue) yields qualitatively similar results.

the portfolio companies' auditors to their favored auditors once PE funds take charge of a given company.

Meanwhile, as we observe PE owners change to their favorite auditors, I verify whether these favored auditor changes lead to audit quality changes. Table A.11's Panel B studies this, by regressing Big4 and natural log of audit fees on OWN and interaction variables. Interaction variable OWN\_SWITCH interacts OWN  $\times$  AUDCHANGE, OWN\_FAVOR interacts OWN and AUDFAVOR, and OWN\_SECONDARY interacts OWN and AUDFAVOR\_SECONDARY. If each of these interaction variable coefficients show statistical significance, this evidence would suggest a relationship with the PE's auditor switch being correlated to enhancing audit quality. The results are consistent with my previous statement. OWN\_SWITCH (0.056) and OWN\_FAVOR (0.078) show positive coefficients and statistical significance at 1% and 5%, respectively.

The result still holds even when I restrict samples only to cases where the portfolio firm did not have PE's favored auditors even before PE investment. I restrict the samples in this fashion to counter a potential counter-argument that the results from Panel B may have been driven by cases where PE firms selected portfolio firms with their favored auditors. Column (1)'s OWN\_SWITCH coefficient is 0.101 with 1% level of statistical significance, and column (2)'s OWN\_FAVOR coefficient is 0.062 with 10% statistical significance. These two results, in sum, reveal that if a firm did not have PE's favorite auditor, PE is associated with switching to Big 4 auditors, and if PE switches to its favorite auditors, that switch is also associated with switching with big 4 auditors.

The evidence witnessed in the additional tests to my second hypothesis seem to support the notion of PE firms being associated with enhancing audit quality, or at least *changing* audit firms. Again, however, additional tests may be required to support for a causal statement, in that PE intervention results in better audit quality.

Chapter 6

Conclusion

This study the relationship between audit/disclosure quality and PE funds before and after their investment on their portfolio firms. Using a novel private equity database and a comprehensive financial statement data for UK firms, I find that disclosure and audit quality is associated with private equity investments. On the other hand, I find that only audit quality is associated with PE ownership, and not disclosure quality. My findings suggest firms with better disclosure and audit quality are associated with higher propensity of firms to receive private equity investment. Once a PE has taken over, these portfolio firms are more likely to undergo audit changes and more frequently than not, to a big 4 auditor firm which the PE firm already has favor in. However, I do not find any evidence suggesting that PE-owned firms undergo more financial disaggregation.

It is important to discuss potential reason why disclosure quality does not increase (for some regressions, decrease) under PE ownership. Many reasons can be possible behind this result; because of concentrated ownership and diverse channels of information, PE funds may not find financial statement disclosures as important as they did before investing. Alternatively, perhaps PE managers are more concerned about market competition and would want to disclose less than non-PE owners, given their experience in handling disclosures; however, I refrain from making any causal statements as to the motivation behind PE managers not increasing disclosure quality.

My paper contributes to the existing literature by documenting private equity behavior with respect to disclosure and audit quality. The results especially are in contrast with the prior private equity literature in that PE ownership does not result in increase in financial disaggregation, and thus governance, although disclosure itself seems to be utilized in PE's decision making processes. In addition, the frequent change of PE-owned firms to big 4 auditors highlight the importance of audit quality especially for future equity investments, a theme that is consistent with recent emerging accounting literature.

This paper is still subject to numerous flaws and caveats. This research is still not free from endogeneity and selection concerns. Especially for hypothesis 1, the additional analyses do not provide a clear picture of the marginal differences of firms with abnormal operating



characteristics, and where the sources of disclosure/audit quality's importance come from. I hope to address these issues by devising cleverer research design in future drafts. In addition, audit quality proxies may not be the best in terms of measuring quality of audits. Having big 4 auditors may help in terms of presenting the brand names and confidence to outside stakeholders, but as DeFond and Zhang (2014) mentions, there are possibilities that selecting big 4 is more associated with client's self selection. Audit fees are also potentially problematic in that increase in audit fees are subject to alternative explanations and may capture other characteristics, such as risk premia and audit efficiency (DeFond and Zhang, 2014). Verifying the auditor changes actually leading to better financial reporting accuracy can be an interesting area for future drafts.



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# Appendix A

## Tables

Table A.1: Final sample used to analyze H1 and H2

This table presents the sample selection procedure used to generate the final samples used for analyzing H1 and H2. Final matched firms and firm years denote the sample that I use to run regressions for hypothesis 1 and 2.

	H1 (Deals)	H2 (Firm years)
Preqin deals	6,580	
Matched with FAME	2,212	19,321
- Delete non-overlapping years	980	8,253
Preqin-FAME matched	1,232	11,068
- Delete poor matches	282	3,677
Propensity score matching	950	7,391
+ Add propensity score matched firms	950	7,391
<b>Final matched firms and firm years</b>	<b>1,900</b>	<b>14,782</b>

Table A.2: Summary statistics of Preqin-FAME matched sample

This table provides the summary statistics of Preqin-FAME matched deals. Panel A reports number of transactions and their mean/medians according to each year. No. of transactions with deal size denotes the number of deals that records the deal value at the time of PE's entry. Panel B reports mean, median, and standard deviation for 11,068 firm years of Preqin-FAME matched data. All variables are defined in table C.1 in Appendix A. Total assets, revenue, audit fee, and net income are in £thousands.

Panel A: Private equity transactions and deal size

Year	No. of Transactions	No of Transactions with deal size	Deal Size (\$ mil.)	
			Mean	Median
All deals	1,232	609	185.97	44.74
2006	33	23	135.82	55.47
2007	107	66	324.01	80.25
2008	85	50	213.54	65.00
2009	47	22	145.70	56.15
2010	90	55	117.27	39.80
2011	92	40	147.52	47
2012	127	66	130.72	35.1
2013	130	72	181.20	44.70
2014	181	92	166.56	36.56
2015	184	66	292.24	54.66
2016	147	55	79.294	24

Panel B: Portfolio firm summary statistics

	Mean	Median	Std
DQ_BS	0.567	0.588	0.152
DQ_IS	0.462	0.549	0.263
Total assets	94,677	12,292	829,593
Revenue	73,433	21,241	238,766
Audit fee	54.312	24	272
Net income	3,895	882	28,581
Big 4 dummy	0.443	0	0.497
Leverage	176.14	1.31	14686
ROA	7.671	0.060	671
Revgrowth	0.821	0.080	27.72
Firm years	11,068		



Table A.3: H1 control and treatment group descriptive statistics

These tables present descriptive statistics of treatment and control groups generated from the propensity score matching procedure. It runs a t-test to examine any differences in firm characteristics between the treatment and control group. All variables are defined in table C.1 in Appendix A. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% level, respectively, using a two-tailed t-test. Leverage, ln Auditfee, ROA, and Revgrowth are winsorized at 1% and 99%.

Ttest	PE=1 treat	PE=0 control	Diff	T	PE=1 N	PE=0 N
DQ_BS	0.627	0.563	0.063***	8.800	950	950
DQ_IS	0.598	0.511	0.087***	11.734	950	950
ln Auditfee	3.27	3.009	0.26***	5.002	844	747
Big4	0.513	0.506	0.006	0.275	950	950
ln Total assets	9.953	9.952	0.00	0.022	950	950
ROA	0.078	0.047	0.031***	3.540	950	950
Leverage	5.70	3.533	-2.17	1.206	725	673
Revgrowth	0.455	0.236	-0.219*	1.910	771	683

Table A.4: Chances of receiving PE investment: Logistic and linear probability model (LPM) regressions

This table represents the results from a logistic regression and OLS where the dependent variable **PE** equals one for firms that received private equity investment, and zero for firms that did not receive any private equity investment during the sample period. Robust firm-level clustered standard errors were used for all regressions. All variables are defined in table C.1 in Appendix A. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% level, respectively, using a z-test. Leverage, ln Auditfee, ROA, and Revgrowth are winsorized at 1% and 99%.

Dependent variable: PE	(1)	(2)
Methods	LPM	Logit
DQ_BS	0.218*	1.098*
	(0.127)	(0.643)
DQ_IS	0.790***	3.618***
	(0.188)	(0.874)
Big4	0.072*	0.345**
	(0.039)	(0.174)
ln Auditfee	0.025	0.090
	(0.025)	(0.110)
ln Total assets	-0.037**	-0.161**
	(0.017)	(0.077)
ROA	0.204***	0.970***
	(0.078)	(0.373)
Leverage	0.000	0.001
	(0.000)	(0.001)
Revenue growth	0.000***	0.031*
	(0.000)	(0.017)
Intercept	-0.174	-1.953
	(0.340)	(1.622)
Industry FE	Yes	Yes
Year FE	Yes	Yes
Observations	1,021	989
R-squared	0.117	0.078

Table A.5: Disclosure and audit quality variables sorted by size and deal characteristics

This table divides deal samples into size terciles and different types of private equity deals, and observe disclosure and audit quality means. Panel A divides samples into size terciles (ln total assets) and deal distance terciles. Panel B divides samples into size and buyout indicators. Panel C divides samples into size and growth equity deal indicators. Panel D divides samples into size and add-on deal indicators. All variables are defined in table C.1 in Appendix A.

Panel A: Size terciles and deal distance

Indist Terciles	Variables	Inta Terciles		
		1	2	3
1	DQ_BS	0.51	0.606	0.609
	DQ_IS	0.298	0.578	0.571
	BIG4	0.157	0.377	0.786
	ln Audfee	2.538	3.095	4.099
2	DQ_BS	0.523	0.638	0.589
	DQ_IS	0.288	0.611	0.565
	BIG4	0.137	0.414	0.73
	ln Audfee	2.245	2.971	3.577
3	DQ_BS	0.534	0.603	0.636
	DQ_IS	0.361	0.528	0.611
	BIG4	0.221	0.402	0.774
	ln Audfee	2.392	2.897	4.117

Panel B: Size terciles and buyout deals

buyout	Variables	Inta Terciles		
		1	2	3
0	DQ_BS	0.532	0.634	0.640
	DQ_IS	0.346	0.612	0.633
	BIG4	0.202	0.4	0.752
	ln Audfee	2.398	2.890	4.127
1	DQ_BS	0.532	0.620	0.611
	DQ_IS	0.429	0.612	0.592
	BIG4	0.176	0.421	0.767
	ln Audfee	2.546	2.996	3.989

Panel C: Size terciles and growth equity deals

Growth	Variables	Inta Terciles		
		1	2	3
0	DQ_BS	0.538	0.624	0.615
	DQ_IS	0.421	0.596	0.592
	BIG4	0.215	0.438	0.769
	ln Audfee	2.485	2.996	4.007
1	DQ_BS	0.510	0.644	0.664
	DQ_IS	0.041	0.618	0.629
	BIG4	0.098	0.216	0.712
	ln Audfee	2.485	2.890	3.902

Panel D: Size terciles and Add-on deals

addon	Variables	Inta Terciles		
		1	2	3
0	DQ_BS	0.520	0.611	0.608
	DQ_IS	0.318	0.571	0.585
	BIG4	0.156	0.379	0.769
	ln Audfee	2.477	3.002	3.989
1	DQ_BS	0.529	0.630	0.635
	DQ_IS	0.319	0.538	0.575
	BIG4	0.252	0.500	0.686
	ln Audfee	2.340	2.934	3.787

Table A.6: Top decile firms by firm characteristics and relative importance of disclosure and audit qualities

This table segregates firms into top deciles and non-top-decile firms according to revenue growth (Panel A) and leverage (Panel B) and examines relative importance of disclosure and audit qualities for top decile firms, by regressing PE on disclosure/audit quality, top decile dummies, and their interaction terms. Robust firm-level clustered standard errors were used for all regressions. All variables are defined in table C.1 in Appendix A. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% level, respectively. Leverage is winsorized at 1% and 99%.

Panel A: Top decile revenue growth

Dependent variable	PE			
	(1)	(2)	(3)	(4)
DQ_BS	0.519*** (0.116)			
DQ_IS		1.035*** (0.133)		
Big4			0.004 (0.038)	
ln Auditfee				0.058** (0.025)
TOPREVGROWTH	-0.268 (0.206)	0.157*** (0.051)	0.004 (0.078)	-0.388** (0.160)
DQBS_TOPREVGROWTH	0.677** (0.317)			
DQIS_TOPREVGROWTH		0.428*** (0.101)		
BIG4_TOPREVGROWTH			0.291*** (0.103)	
LNAUDFEE_TOPREVGROWTH				0.158*** (0.040)
ROA	0.199*** (0.075)	0.084 (0.092)	0.221** (0.091)	0.196** (0.092)
ln Total assets	-0.005 (0.013)	-0.015 (0.012)	-0.003 (0.014)	-0.032* (0.018)
Leverage	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Revenue growth	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Intercept	-0.374 (0.274)	-0.429* (0.247)	-0.152 (0.265)	-0.028 (0.281)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	1,125	1,125	1,125	1,021
R-squared	0.095	0.134	0.074	0.099

Panel B: Top decile leverage

Dependent variable	PE			
	(1)	(2)	(3)	(4)
DQ_BS	0.543*** (0.115)			
DQ_IS		0.963*** (0.147)		
Big4			0.010 (0.039)	
ln Auditfee				0.074*** (0.0259)
TOPLEVERAGE	-0.381** (0.177)	-0.289 (0.178)	-0.034 (0.083)	-0.097 (0.142)
DQBS_TOPLEVERAGE	0.856*** (0.297)			
DQIS_TOPLEVERAGE		0.707** (0.304)		
BIG4_TOPLEVERAGE			0.186* (0.111)	
LNAUDFEE_TOPLEVERAGE				0.072* (0.039)
ROA	0.222*** (0.075)	0.230** (0.090)	0.216** (0.090)	0.200** (0.093)
ln Total assets	-0.003 (0.013)	-0.018 (0.012)	0.000 (0.014)	-0.039** (0.018)
Revenue growth	0.001 (0.000)	0.001 (0.000)	0.000 (0.000)	0.001 (0.000)
Leverage	0.000*** (0.000)	0.000*** (0.000)	0.000** (0.000)	0.000*** (0.000)
Intercept	-0.403 (0.286)	-0.306 (0.283)	-0.150 (0.288)	0.037 (0.321)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	1,125	1,125	1,125	1,021
R-squared	0.093	0.122	0.065	0.090

Table A.8: H2 control and treatment group descriptive statistics

This table presents descriptive statistics of treatment and control groups generated from the propensity score matching procedure. It runs a t-test to examine any differences in firm characteristics between the treatment and control group. All variables are defined in table C.1 in Appendix A. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% level, respectively, using a two-tailed t-test. Leverage, ln Auditfee, ROA, and Revgrowth are winsorized at 1% and 99%.

	PE=1 (treated)	PE=0 (control)	Diff	T	PE=1 N	PE=0 N
DQ_BS	0.627	0.586	0.042*	1.727	7,391	7,391
DQ_IS	0.593	0.591	0.002	0.814	7,391	7,391
ln Auditfee	3.23	3.160	0.07***	4.011	6,567	6,601
Audit fee	50.21	50.36	0.152	0.102	6,567	6,601
Big4	0.453	0.447	0.006	0.744	7,391	7,391
ln Total assets	9.921	9.953	-0.03	1.103	7,391	7,391
ROA	0.064	0.035	0.029***	8.980	7,391	7,391
Leverage	3.59	4.378	-0.79***	2.265	5,772	5,750
Revgrowth	0.170	0.156	0.014	1.369	5,732	5,892

Table A.9: Changes in disclosure quality and audit quality before/after PE ownership

This table presents yearly means and medians of proxies of disclosure and audit quality. **Year** denotes the year relative to the year of private equity investment, where year 0 is the year in which the private equity invested in the particular company. **PE=1** denote treatment firms that received PE investment at some point in their panel, and **PE=0** denote control firms matched by ROA, lnta, DQ\_BS and DQ\_IS. Control firms without PE firms are matched by year to have the same year as the matching treatment firm's year. All variables are defined in table C.1 in Appendix A.

Year	N		PE=0				N	PE=1			
			DQ_BS	DQ_IS	Big4	ln Auditfee		DQ_BS	DQ_IS	Big4	ln Auditfee
-5	381	Mean	0.589	0.559	0.423	3.034	437	0.613	0.570	0.426	3.179
		Median	0.60	0.553	0.000	2.944		0.617	0.571	0.000	3.045
-4	447	Mean	0.600	0.58	0.459	3.188	503	0.619	0.590	0.437	3.191
		Median	0.613	0.596	0.000	3.045		0.635	0.592	0.000	3.091
-3	523	Mean	0.621	0.602	0.453	3.090	574	0.633	0.610	0.430	3.156
		Median	0.65	0.612	0.000	2.956		0.640	0.620	0.000	3.045
-2	597	Mean	0.619	0.606	0.486	3.187	641	0.640	0.622	0.424	3.208
		Median	0.635	0.633	0.000	3.045		0.650	0.638	0.000	3.091
-1	674	Mean	0.634	0.615	0.432	3.162	713	0.655	0.621	0.426	3.250
		Median	0.646	0.637	0.000	2.996		0.654	0.638	0.000	3.091
0	892	Mean	0.624	0.601	0.434	3.206	886	0.642	0.607	0.439	3.25
		Median	0.636	0.617	0.000	3.135		0.646	0.625	0.000	3.091
1	718	Mean	0.652	0.589	0.418	3.211	715	0.629	0.592	0.495	3.230
		Median	0.631	0.617	0.000	3.091		0.64	0.617	0.000	3.135
2	601	Mean	0.62	0.598	0.441	3.175	570	0.626	0.597	0.447	3.367
		Median	0.654	0.638	0.000	2.996		0.642	0.625	0.000	3.178
3	465	Mean	0.625	0.603	0.471	3.182	435	0.629	0.600	0.476	3.317
		Median	0.650	0.638	0.000	3.045		0.647	0.646	0.000	3.091
4	362	Mean	0.608	0.616	0.412	3.113	325	0.634	0.599	0.505	3.230
		Median	0.661	0.660	0.000	2.996		0.653	0.638	1.000	3.091
5	277	Mean	0.634	0.608	0.487	3.274	246	0.624	0.596	0.553	3.308
		Median	0.665	0.653	0.000	3.091		0.641	0.638	1.000	3.178

Table A.10: The effect of PE ownership on disclosure and audit quality

This table demonstrates the results from multiple regressions to examine the effect of PE ownership to disclosure and audit quality. Regressions (1), (2), (3), and (4) select DQ\_BS, DQ\_IS, ln Audit fee, and Big4, as dependent variables, respectively. **Control** denotes cross-sectional regressions using robust firm-level clustered standard errors that include control firms in the regressions. **No control** denotes panel regressions using robust firm-level clustered standard errors that do not include control firms. All other variables are defined in table C.1 in Appendix A. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% level, respectively, using a two-tailed t-test. Leverage, ln Auditfee, ROA, and Revgrowth are winsorized at 1% and 99%.

VARIABLES	(1)		(2)		(3)		(4)	
	Control	No control	Control	DQ_IS	Control	No control	Control	No control
PE	0.009** (0.007)		0.002 (0.005)		0.002 (0.021)		0.057*** (0.035)	
OWN	-0.008 (0.006)	-0.023*** (0.005)	0.005 (0.004)	-0.013** (0.005)	-0.008 (0.017)	0.052** (0.021)	0.021 (0.031)	-0.071 (0.0470)
PEOWN	-0.009 (0.010)		0.008 (0.009)		0.101*** (0.039)		0.069 (0.057)	
ln Total assets	0.011*** (0.002)	0.016*** (0.002)	0.020*** (0.002)	0.029*** (0.002)	0.139*** (0.006)	0.137*** (0.006)	0.511*** (0.013)	0.529*** (0.016)
ROA	0.045** (0.042)	-0.008 (0.019)	-0.004 (0.005)	-0.006 (0.009)	-0.083*** (0.026)	-0.085*** (0.032)	-0.212*** (0.050)	-0.430*** (0.129)
Leverage	-0.000 (0.000)	-0.000** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000*** (0.000)	-0.000** (0.000)
Revgrowth	0.000 (0.000)	-0.000*** (0.000)	0.000 (0.000)	-0.000** (0.000)	-0.000** (0.000)	0.000 (0.000)	0.000 (0.000)	-0.001*** (0.000)
Intercept	0.213 (0.174)	0.371*** (0.022)	0.617*** (0.021)	0.240*** (0.021)	-1.185*** (0.068)	-1.070*** (0.373)	-0.467*** (0.134)	-2.711*** (0.249)
Ind x Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,425	3,536	9,425	3,536	9,425	3,536	8,811	3,536
R-squared	0.240	0.663	0.343	0.758	0.312	0.724	0.627	0.602



Table A.11: PE auditor changes and favorite auditors

This table examines the propensity of PE firms to change auditors to their favorite auditors, and the propensity to improve audit quality once PE takes ownership of a firm. Panel A performs LPM regressions using robus firm-level clustered standard errors by regressing audit change (1), audit favor (2), and AUDFAVOR\_SECONDARY on PE ownership and other control variables. Panel B tests whether PE firms' switches in audit firms relate to higher audit quality, by running regressions using robus firm-level clustered standard errors by regressing Big4 (1) and natural log of audit fees (2) on OWN, interaction terms, and other controlling covariates. Panel C runs the same regressions as Panel B, using subsamples that had auditors different from a PE's favored auditors. All variables are defined in table C.1 in Appendix A. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% level, respectively, using a two-tailed t-test. Leverage, ln Auditfee, ROA, and Revgrowth are winsorized at 1% and 99%.

Panel A: PE ownership and changes to their favorite auditors

Dependent variable	(1) AUDCHANGE		(2) AUDFAVOR		(3) AUDFAVOR_SECONDARY	
OWN	0.142*** (0.019)	0.097*** (0.027)	0.105*** (0.018)	0.097*** (0.027)	0.033** (0.015)	0.041** (0.018)
ln Total assets		-0.023 (0.025)		0.007 (0.022)		-0.009 (0.017)
ROA		-0.117** (0.048)		0.012 (0.028)		-0.023 (0.025)
Revgrowth		0.000*** (0.000)		0.000 (0.000)		-0.000 (0.000)
Leverage		-0.000*** (0.000)		-0.000 (0.000)		-0.000 (0.000)
Intercept	0.429*** (0.036)	0.841*** (0.264)	0.126*** (0.024)	-0.006 (0.233)	0.006 (0.023)	0.047 (0.175)
Observations	7,103	3,674	8,034	3,674	8,034	3,674
Industry x Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm indicators	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.268	0.402	0.166	0.255	0.108	0.224

Panel B: PE audit changes to favorite auditors and their relationship to audit quality

Dependent variable	(1) Big4			(2) ln Auditfee		
OWN	0.073*** (0.024)	0.055** (0.027)	0.080*** (0.025)	0.006 (0.034)	-0.002 (0.037)	0.009 (0.033)
OWN_SWITCH	0.056*** (0.022)			0.015 (0.032)		
OWN_FAVOR		0.078** (0.032)			0.026 (0.033)	
OWN_SECONDARY			0.025 (0.047)			-0.005 (0.061)
ln Total assets	0.107*** (0.026)	0.109*** (0.026)	0.126*** (0.013)	0.482*** (0.021)	0.481*** (0.022)	0.481*** (0.022)
ROA	-0.042 (0.029)	-0.047 (0.029)	-0.054** (0.027)	-0.157*** (0.0574)	-0.158*** (0.0578)	-0.158*** (0.0577)
Revgrowth	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)
Leverage	-0.000** (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Intercept	-0.634** (0.273)	-0.604** (0.272)	-0.863*** (0.200)	-1.697*** (0.322)	-1.653*** (0.323)	-1.671*** (0.319)
Observations	3,674	3,674	3,674	3,425	3,425	3,425
Industry x Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm indicators	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.381	0.383	0.377	0.411	0.411	0.411

Panel C: PE audit changes to favorite auditors and their relationship to audit quality, only for subsamples that did not have PE's favored auditors

Dependent variable	(1)	big4 (2)	(3)
OWN	0.076*** (0.028)	0.085*** (0.030)	0.092*** (0.030)
OWN_SWITCH	0.101*** (0.026)		
OWN_FAVOR		0.062* (0.037)	
OWN_SECONDARY			0.062 (0.0523)
ln Total assets	0.125*** (0.031)	0.123*** (0.031)	0.124*** (0.031)
ROA	-0.048 (0.035)	-0.056 (0.037)	-0.055 (0.037)
Revgrowth	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Leverage	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Intercept	-0.861*** (0.318)	-0.791** (0.319)	-0.803** (0.317)
Ind x Year FE	Yes	Yes	Yes
Firm indicators	Yes	Yes	Yes
Observations	2,807	2,807	2,807
R-squared	0.441	0.435	0.434

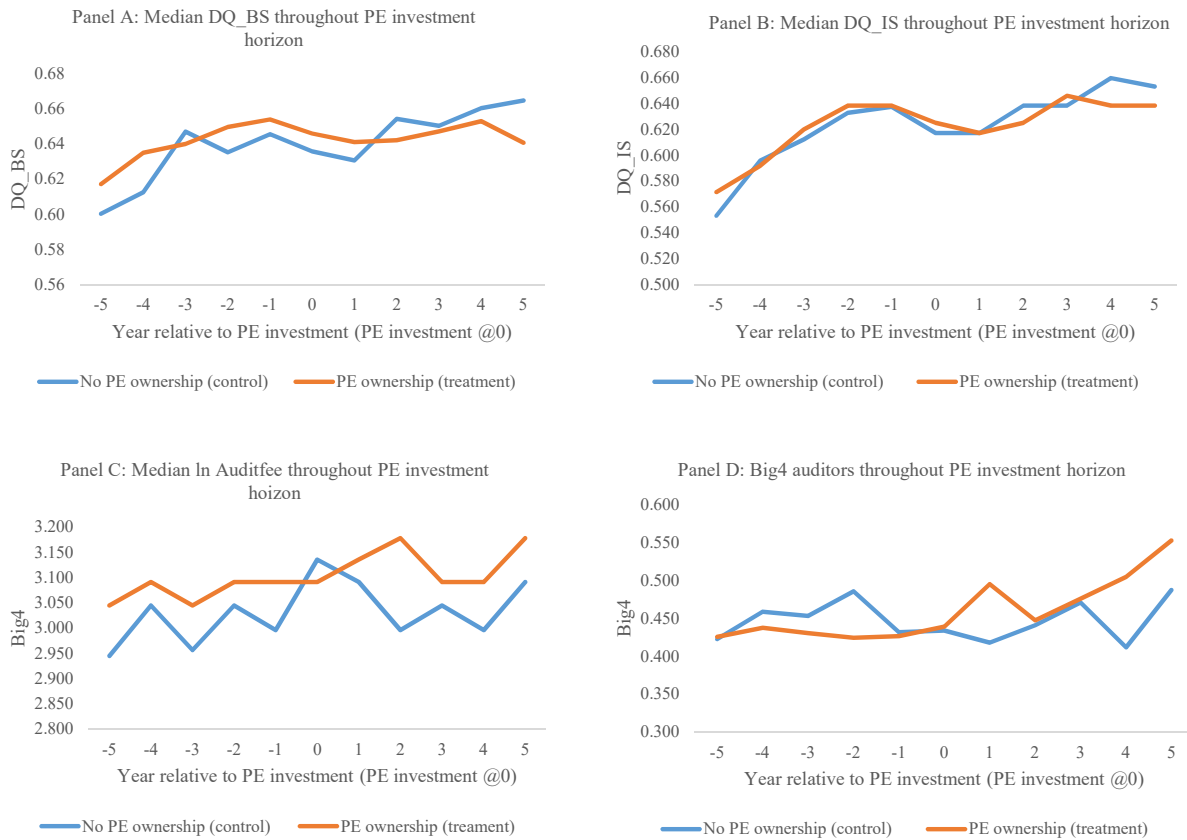


# Appendix B

## Figures

Figure B-1: Changes in disclosure quality and audit quality over time, against control groups

This figure depicts the median (and mean for Big4) values of disclosure and audit quality proxies for each relative year, compared to propensity-score matched control firms. Panel A shows median DQ\_BS values throughout each relative year throughout PE’s investment horizon. Panel B shows median DQ\_IS values throughout PE’s investment horizon. Panel C visualizes median natural log audit fees throughout PE investment horizon. Panel B shows mean Big4 values throughout PE investment horizon. For all panels, orange line represents PE-owned treatment groups, and the blue line represents non PE-owned control firms.



# Appendix C

## Variable definitions

Table C.1: Variable definitions

Variable name	Test variables Definition
DQ_BS	Balance sheet disclosure quality inspired by Chen et al. 2015.
DQ_IS	Income statement disclosure quality inspired by Chen et al 2015.
BIG4	Equals one if a firm is audited by one of the big 4 auditors (KPMG, PricewaterhouseCoopers, Ernst & Young, and Deloitte), and zero otherwise.
ln Auditfee	Natural log of a firm's audit fees in a given fiscal year.
ln Totalassets	Natural log of a firm's total assets in a given fiscal year.
ROA	Measures profitability of a firm, calculated as net income / total assets.
Revgrowth	Annual revenue growth rate
Leverage	Measures the firm's financial structure, calculated as total liabilities / total shareholders' equity.
TOPREVGROWTH	Equals one if a firm is in the top decile in terms of revenue growth in a given year, and zero otherwise.
TOPLEVERAGE	Equals one if a firm is in the top decile in terms of leverage in a given year, and zero otherwise.
TOPLNTA	Equals one if a firm is in the top decile in terms of ln total assets in a given year, and zero otherwise.
TOPROA	Equals one if a firm is in the top decile in terms of ROA in a given year, and zero otherwise.
DQBS_TOP	Interaction term between 'TOP' variables and DQ_BS. DQ_BS * TOP variable
DQIS_TOP	Interaction term between 'TOP' variables and DQ_IS. DQ_IS * TOP variable
BIG4_TOP	Interaction term between 'TOP' variables and BIG4. BIG4 * TOP variable
LNAUDFEE_TOP	Interaction term between 'TOP' variables and ln auditfee. Ln Auditfee * TOP variable
LL	Limited liabilities. Equals one if a company is a limited liabilities firm, and zero otherwise.
POST2006	Equals one if the year is post 2006, and zero otherwise.
PE	Equals one if a company received PE investment some point in time within the sample period, zero otherwise.
OWN	Equals one if the relative year of PE investment is greater than or equal to zero. Also applies to matching control firms
PEOWN	Interaction term between PE and OWN. PE * OWN.
AUDCHANGE	Equals one if a firm's auditor are different from previous year's auditors, and zero otherwise.
AUDFAVOR	Equals one if a firm's auditor is the investing PE's favorite auditor, and zero otherwise.
AUDFAVOR_SECONDARY	Equals one if a firm's auditor is the investing PE's second favorite auditor, and zero otherwise.
PEOWN_SWITCH	Interaction term between PEOWN and AUDFAVOR. Indicates one if a PE-owned firm switched its auditors from the previous year's, and zero otherwise.
PEOWN_FAVOR	Interaction term between PEOWN and AUDCHANGE. Indicates one if a PE-owned firm switched to its favorite auditor from the previous year's, and zero otherwise.



PEOWN_SECONDARY	Interaction term between PEOWN and AUDFAVOR_SECONDARY. Indicates one if a PE-owned firm switched to its second-favorite auditor from the previous year's, and zero otherwise.
ExitVal	Exit value of a given deal.

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*Continued from previous page*

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Variable	Private equity-related terms Definition
Target firm	Firms that are targeted by PE funds for investment, but have not yet been invested.
Portfolio firm	Firms that are already taken over or invested by a PE fund. Target firms become portfolio firms if PE transaction is successful.
Add-on	A type of private equity deal that involves a PE-backed portfolio company acquiring another company, often to consolidate market positions.
Buyout	Private equity deals that involve a controlling share of the company. If the deal is financed with large amount of debt, the deal is referred to as a leveraged buyout (LBO).
Distressed Debt	Deals that involve purchasing debts at distressed prices. Often purchased to accumulate control of the company of interest, at the time of bankruptcy.
Growth capital	Deals that involve minority shares of a company. Often happens when a company is looking for expansion capital.
Merger	A PE-backed company merges with another company to form a new entity.
PIPE	Private investment in public equity. Involves purchasing publicly traded shares to private investors.
Public to private	Also known as reverse leveraged buyouts. Takes a publicly traded company private to increase company value.
Recapitalization	Replacing equity with debt. Often the company would receive equity as dividends and increase debt in same amount.
Restructuring	Deals that involve significant changes to a firm's capital and operational structures.
Turnaround	Deals that involve purchasing poor-performing companies under the hope to restore the company value.
IPO	Initial public offering. Taking a private company public.
Private placement	Selling shares or bonds directly to a private investor.
Sale to GP	Selling shares to another private equity fund.
Sale to management	Selling shares to the portfolio company's management team.
Trade sale	Selling shares of the portfolio company to a third party strategic investor.
Write-off	A state where the portfolio company discontinues its operations and goes into liquidation. Equivalent to Chapter 7 bankruptcy.
Limited Partners (LP)	Investors of PE funds. Typically involves pension funds, insurance companies, endowment funds, and family offices that engage in passive investing.
General Partners (GP)	Typically indicates the PE fund, which manages the fund and engages in private equity transactions directly.
Dry powder	Indicates the amount of free cash available for investing in a PE fund.
IRR	Internal rate of return. One of the most common metric to project potential returns in evaluating PE deals.
MOIC	Multiple of invested capital. Simply calculates how much money a PE fund has made upon the realization of its investment.

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## Appendix D

### Calculating Disclosure Quality: An example

Below I exhibit an example of calculating balance sheet disclosure quality.<sup>1</sup> Suppose I am calculating  $DQ\_BS$  of **company A**, which is in **industry I**. The capital structure is as follows:

Group account name	£	%
Current assets	30	60
Noncurrent assets	20	40
Total assets	50	100
Current liabilities	10	20
Noncurrent liabilities	10	20
Shareholders' equity	30	60
Total liabilities and shareholders' equity	50	100

For each group account, suppose this industry has 2 individual items that are not used. Below table explains calculating disclosure quality for each group account:

Group acct name	Non-missing items <sup>2</sup>	Total # of available items	Ind. adj.	DQ per group acct
Current assets	6	14	-2	6/12
Noncurrent assets	8	12	-2	8/10
Current liabilities	14	16	-2	14/14
Noncurrent liabilities	5	17	-2	5/15
Shareholders' equity	4	10	-2	4/8

Next, I weight each group account DQ to calculate  $DQ\_BS$ :

$$DQ\_BS = \left( \underbrace{0.6 \times \frac{6}{12}}_{DQ\_CA} + \underbrace{0.4 \times \frac{8}{10}}_{DQ\_NCA} + \underbrace{0.2 \times \frac{14}{14}}_{DQ\_CL} + \underbrace{0.2 \times \frac{5}{15}}_{DQ\_NCL} + \underbrace{0.6 \times \frac{4}{8}}_{DQ\_SE} \right) \div 2 = 0.593$$

<sup>1</sup>Did not include income statement disclosure quality as the process is quite simple.

## Appendix E

Probit results used for creating propensity score matching samples

Table E.1: Probit results for creating H1 H2 propensity score matching samples

This table shows probit results from regressing PE on control factors to generate control groups for each hypothesis. All variables are defined in table C.1 in Appendix A. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5%, and 1% level, respectively, using z-score.

Dependent variable	PE	
	H1	H2
In Total assets	0.089*** (0.005)	0.079*** (0.003)
ROA	0.000 (0.000)	0.000 (0.000)
DQ_BS		0.000 (0.000)
DQ_IS		1.424*** (0.025)
Intercept	-3.936*** (0.048)	-3.942*** (0.026)
Observations	1,030,704	1,021,129
Pseudo R-squared	0.022	0.068