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Fair value measurement by listed private equity funds

DO THEY CAPTURE THE FUNDAMENTALS OF INVESTEE COMPANIES?

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Contents

Summary 2

1. Fair value measurement 4

2. Listed private equity funds: the setting 5

3. Research questions 6

4. Empirical tests 7

5. The data 10

6. Do investee fundamentals reflect the information in LPE fair value estimates? 12

7. What are the consequences when LPE fund managers use information beyond that reflected in the financial statement fundamentals? 13

8. Conclusion 14

References 15

About the authors 16

Summary

International Financial Reporting Standards and US GAAP require certain categories of assets and liabilities to be measured at fair value. Fair value measurements should reflect the price at which an orderly transaction to sell an asset or transfer a liability would occur. Fair value measurements may use Level 1, Level 2 or Level 3 inputs:

- Level 1 inputs are quoted prices for identical assets and liabilities for which there is an observable actively traded market.
- Level 2 inputs are observable market data other than Level 1 inputs, including quoted market prices for similar assets, quoted prices in inactive markets, and other observable inputs relevant to pricing or derived from or corroborated by other observable market data.
- Level 3 inputs are unobservable inputs used when observable (Level 1 or Level 2) inputs are not available. Level 3 inputs include estimates and assumptions necessary for the valuation process.

Prior research examining the relevance of fair value measurements reported by banks suggests that the stock market valuation of Level 3 assets is at a discount.[1,2] A possible reason for this is that investors perceive Level 3 fair value asset valuations to be less reliable than either Level 1 or 2 fair value asset valuations. This view is in line with one of the main criticisms levelled against fair value accounting: that it allows potentially unreliable fair value measurement when the asset (or liability) in question is not traded in a liquid market. In contrast, recent research based on the fair value measurements reported by closed-end funds[3] suggests that Level 3 assets are priced similarly to Level 1 and Level 2 assets.[4]

We examine whether reported fair values of individual investment assets held by listed private equity (LPE) funds reflect the economic fundamentals of the investees. We exploit the requirement for private companies in the UK to file financial statements. Under the assumption that company financial statements capture relevant information about economic fundamentals, we examine the extent to which the fair value measurements of individual investments recognised and disclosed by LPE funds reflect the fundamentals of investees.

Initially, we use LPE fund annual reports to identify 26,602 investee-year observations for 96 unique LPE funds over the period 2006-2015, with on average approximately 41 investments per fund year. We then eliminate observations relating to:

- investments in debt instruments or preferred stock, because the fixed cash flows for these instruments imply that different valuation models focused on credit risk are applicable;
- funds that do not disclose the carrying values or the size of ownership stakes of individual investments; and
- investees whose net income or equity book value is not provided in Bureau van Dijk's Financial Analysis Made Easy (FAME) database, or whose equity book value is negative.

[1] See Song et al. (2010).

[2] Throughout the paper, we use the term 'Level 1 assets', for example, for investees whose fair value measurements are determined by investors using Level 1 inputs.

[3] Known as investment trusts in the UK.

[4] See Lawrence et al. (2016). They also find that Level 3 fair values are priced similarly to Level 1 and Level 2 fair values for a sample of banks resembling that studied by Song et al. (2010), after controlling for unrecognised losses in bank lending.

Our final sample comprises 7,802 individual investee-years for which fair value measurements and ownership stakes are available along with matching investee fundamentals data. When viewed at the LPE fund level, our sample comprises 405 investor-year observations. When we classify the available fair value measurements relating to individual LPE investments, we find that 5,131 (65.8%) use Level 1 inputs and 2,671 (34.2%) use Level 3 inputs.

We estimate linear regression models expressing fair value measurements as a weighted combination of equity book value and net income of investees. This enables us to evaluate the extent to which book value and net income capture the information used by LPE managers in making their fair value estimates. We examine for differences in the weights on book value and net income across Level 1 and Level 3 fair value assets. Our findings indicate that Level 3 assets' equity book value reflects information used by LPE fund managers when valuing the Level 3 assets, but net income does not. However, both equity book value and net income of Level 1 assets capture information used by LPE fund managers when valuing Level 1 assets. Additional analysis suggests that one reason for this difference might be that earnings of Level 3 assets are less persistent than those of Level 1 assets.

Next, we estimate the discretion used by LPE fund managers in determining the fair values. Discretion is defined as the extent to which information used by LPE fund managers is not captured by investee book value and net income. If LPE fund managers use discretion opportunistically when valuing investees, we would expect investors in LPE funds to discount investee fair values recognised by LPE funds. However, we find no evidence that investors in LPE funds discount the fair values recognised by LPE funds when the level of discretion exercised is relatively high.

Taken together, our results suggest that Level 1 and Level 3 assets reported by LPE funds reflect the financial statement information reported by investees, but to different degrees. Further, our evidence suggests that investors in LPE funds do not discount the discretion used by the LPE funds when valuing investees. Our results suggest that in fair value measurement LPE fund managers use information extending beyond the book value and net income of investee companies, and that the resulting fair value measurements are seen as credible by investors in LPE funds.

This briefing provides an overview of the ICAEW-funded research published in Ferreira, Kräussl, Landsman, Nykyforovych Borysoff and Pope (2019).

1. Fair value measurement

Fair value accounting is controversial among both practitioners and academics. Proponents posit that fair value measurement can result in more relevant balance sheet numbers that take into account private, forward-looking information. Critics suggest that fair value accounting results in unreliable accounting numbers because it involves valuation under uncertainty and often requires the exercise of judgement and discretion by the managers of the reporting entity. These arguments are especially relevant for Level 3 inputs. Ultimately, the trade-off between the relevance of fair value measurements and their reliability depends on the degree of uncertainty, the quality of information about future cash flows and economic benefits, and the incentives of managers in reporting entities.[5]

IFRS 13: *Fair value measurements* (IASB, 2011) defines the three levels of inputs used in determining fair values:

- Level 1 inputs are quoted prices in active markets for identical assets or liabilities that the entity can access at the measurement date. [IFRS 13:76]
- Level 2 inputs are observable market data other than Level 1 inputs, including quoted market prices for similar assets, quoted prices in inactive markets, and other observable inputs relevant to pricing or derived from or corroborated by other observable market data. [IFRS 13:81]
- Level 3 inputs are unobservable inputs used in fair value measurement when observable inputs (Level 1 or Level 2) are unavailable. Level 3 inputs include estimates and assumptions necessary for the valuation process. [IFRS 13:86]

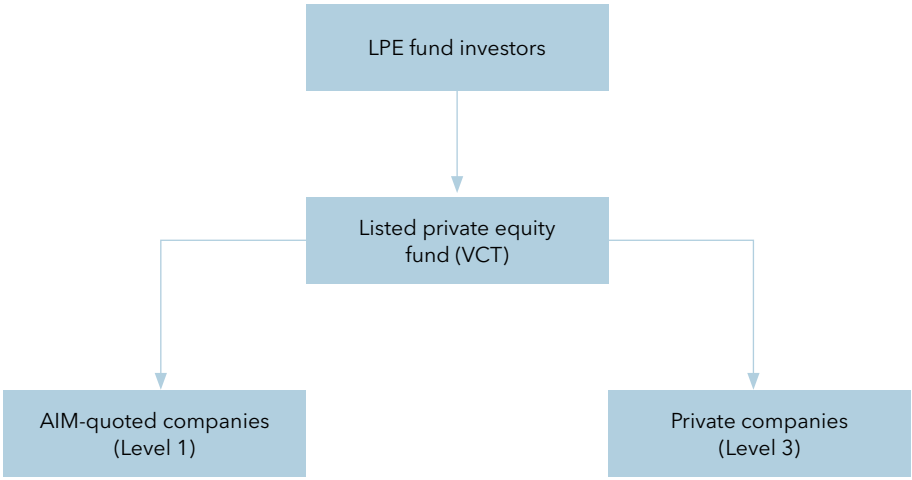
The key feature giving rise to concerns about the reliability of Level 3 inputs is that they are unobservable, relying on models, estimates and judgements used by the management of the reporting entity.

[5] Note that the term 'reliability' was replaced with 'faithful representation' in the revised Conceptual Framework (IASB, 2015).

2. Listed private equity funds: the setting

Listed private equity (LPE) funds are collective investment funds that invest in private companies and firms listed on the Alternative Investment Market (AIM). However, these funds are themselves listed on the London Stock Exchange, providing retail investors with opportunities to invest directly in portfolios of private companies. In this study, we focus on venture capital trusts (VCTs), which comprise approximately 80% of all LPE funds. VCTs have special tax status because they are required to invest in unlisted small and medium-sized UK companies. Importantly, when it comes to determining their eligibility for VCT investment, companies quoted on the AIM segment of the London Stock Exchange are considered to be unlisted. As a consequence, VCT funds may hold AIM-quoted investments for which Level 1 inputs are available; they also invest in private companies that require Level 3 inputs for valuation. Figure 1 illustrates the VCT structure.

Figure 1: Graphical representation of LPE investments



3. Research questions

All limited liability companies in the EU are required to file financial statements. Hence LPE investors are able to access the financial statements of private companies in which an LPE invests. We are also able to observe the fair values of investee companies reported by an LPE in its own financial statements. This unique setting allows us to ask two related research questions, also summarised in Figure 2:

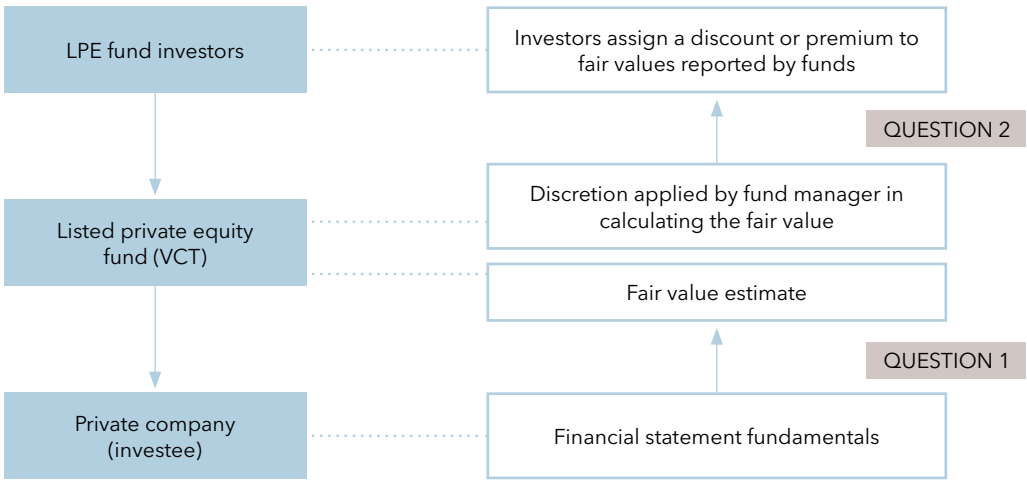
1) Are the financial statement fundamentals of investees reflected in the fair value measurements of LPE fund managers?

In seeking to provide answers to this question, we are particularly interested in Level 3 inputs and in whether there is evidence that they are less reliable than Level 1 inputs. To shed light on this issue, we examine whether Level 3 fair value measurements reflect financial statement fundamentals in a similar way to stock prices for publicly listed companies.

2) Do investors place different weight on fair value estimates when they deviate more from the values implied by investee fundamentals?

Fair values might deviate from fundamentals because LPE fund managers exercise more discretion, add private information or place less weight on investees' fundamentals. Hence LPE managers might be adding information, noise or bias in the valuation process. Our empirical tests cannot discriminate perfectly between these possible effects, but they do establish whether valuations that deviate more from fundamentals are valued differently by investors in LPEs. If fair value measurements are priced at a discount by investors in LPEs this would suggest that the fair value measurements are perceived as less reliable because of noise or upward bias. If, on the other hand, fair value measurements are valued at a premium, this would suggest that investors perceive fair values to be conservatively estimated.

Figure 2: Graphical depiction of research questions



4. Empirical tests

We study fair value measurements classified by LPE funds as using either Level 1 or Level 3 inputs.[6] LPE funds hold investments traded in active stock markets, including the Main Market and the Alternative Investment Market of the London Stock Exchange, and these are valued using Level 1 inputs; they also hold private company investments, measured at fair value using Level 3 inputs.

We assume that LPE funds use both private and public information (including financial statement information) when they measure the fair values of their individual investments. This public and private information is used to estimate future (unobservable) cash flows which are valued using unobservable risk-adjusted discount rates. Even if LPE funds use observed market valuation multiples from public markets (eg, market-based price-earnings or price-to-book ratios), valuation still requires observable *non-market* data from investees' financial statements, in which case fair value measurements are still classified as using Level 3 inputs.

There is a long tradition in academic financial accounting research of using large sample value relevance studies to judge whether accounting amounts are relevant and reliable.[7] In this research literature the statistical association between stock prices or stock returns and accounting amounts is used to infer whether the accounting numbers are relevant and reliable from the perspective of stock market investors. In our empirical tests, we build on these notions of value relevance in two main ways:

1. We examine the relation between investee-level fair value measurements and the corresponding economic fundamentals of investees, as reflected in their private company financial statements. We seek to establish the extent to which investee financial statements capture the information implicitly used by LPE funds in fair value measurement.

We cannot directly observe the information used by LPE fund managers in determining the fair value of investments. However, the value relevance research methodology used in previous academic research provides a platform to address the first research question. As Barth, Beaver and Landsman (2001) state, 'Value relevance studies use various valuation models to structure their tests, and typically use equity market value as the valuation benchmark to assess how well particular accounting amounts reflect information used by investors.' Extending this reasoning, even though we are unable to observe the information used by LPE managers in determining fair value measurements, we can use value relevance tests to investigate whether and to what extent financial statement fundamentals capture the information used by LPE fund managers. In other words, we examine whether financial statement fundamentals explain (in a statistical sense) fair value measurements. For the purposes of this study, we follow prior value-relevance literature and focus on the bottom-line summary financial statement numbers from the balance sheet and income statement, ie, equity book value and net income.

[6] We focus on Level 1 and Level 3 fair value measurements in this study because very few fair value estimates in our sample are designated as Level 2. See sections 5 and 6 for further details.

[7] See, for example, Barth, Beaver and Landsman (2001).

We estimate the following regression model to address this question:

$$FV_{ijt}=\alpha_0+\alpha_1 BVE_{jt}+\alpha_2 NI_{jt}+\alpha_3 Loss_{jt}+\alpha_4 NI\times Loss_{jt}+\varepsilon_{ijt} \quad (1)$$

where *FV* is the fair value (or market value of equity) of the investment *j* in year *t* by LPE fund *i*, *BVE* is the equity book value and *NI* is the net income of the firm being valued (the investee). *Loss* and *NI* × *Loss* are included as a control for firms that have losses. If α_1 is statistically significant then this suggests that equity book value reflects important information used by the LPE fund manager when estimating the fair value of the fund's investment in the firm. Similarly α_2 reflects information in net income used by LPE managers, while the terms involving *Loss* allow for the information in net income to differ for loss-making investees. We first estimate the above regression for all investments, and then for Level 1 and Level 3 assets separately, to determine whether financial statement fundamentals play a different information role for Level 1 assets than they play for Level 3 assets. The focus on Level 3 assets is new to the accounting research literature.

When we implement our empirical tests we also include controls for changes in valuation models over time and for possible differences across LPE investors.

2. We examine the relation between the market prices of LPE funds and the total fair values recognised in the balance sheets of LPE funds using Level 1 and Level 3 inputs, respectively. We seek to establish whether the total fair value measurements are regarded by LPE investors as relevant and reliable.

In this second set of tests, we examine the relation between LPE fund share price and the total fair value determined using each input category (Level 1 and Level 3) recognised in the LPE fund balance sheet. We test whether the estimated relation suggests that LPE investors regard the total of investee fair value measurements as relevant and reliable. In testing the implied reliability of fair value estimates, we assume that if two categories of inputs (ie, Level 1 and Level 3) appear to receive different valuation weights in stock market pricing, then there is a difference in the reliability of the two measures perceived by the market. Specifically, if Level 3 assets attract a lower valuation weight than Level 1 assets, this implies that market participants perceive Level 3 assets to be less reliably valued than Level 1 assets. We therefore test whether LPE fund investors appear to value Level 1 and Level 3 assets as if they are equally reliable using the following equation:

$$MVE_{it}=\alpha_0+\alpha_1 BVE_other_{it}+\alpha_2 BVE_FV1_{it}+\alpha_3 BVE_FV3_{it}+\alpha_4 NI_{it}+\alpha_5 Loss_{it}+\alpha_6 NI\times Loss_{it}+\varepsilon_{it} \quad (2)$$

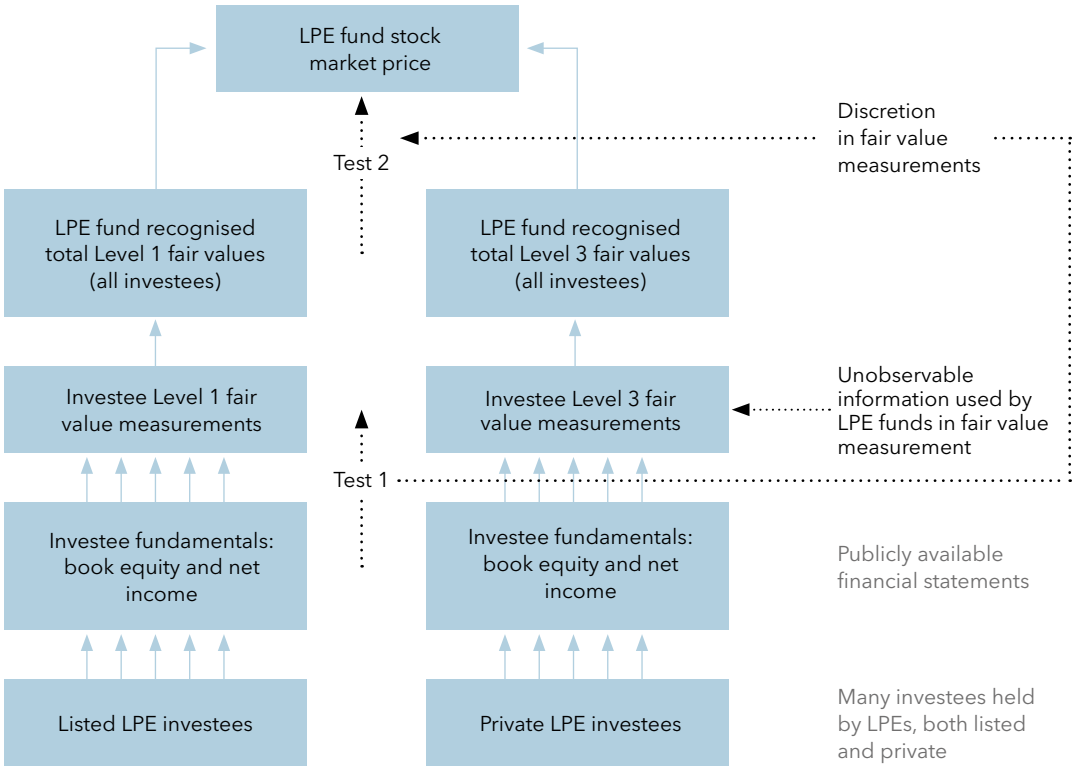
where *MVE* represents the equity market value of the fund, *BVE_FV1* and *BVE_FV3* represent the recognised amount of Level 1 and Level 3 assets of an LPE fund, respectively. *BVE_other* represents the difference between equity book value and the sum of *BVE_FV1* and *BVE_FV3*. Subscript *i* refers to the LPE fund and *t* to the year. *NI* is net income and *Loss* equals 1 if the LPE fund made a loss during the current year, 0 otherwise. In this test, if α_2 and α_3 are significant and positive, the results suggest that the information used by LPE fund investors is reflected in the

disclosed Level 1 and Level 3 asset fair values. Moreover, if the coefficients α_2 and α_3 are not statistically different from each other, market participants view the Level 1 and Level 3 assets' fair values as equally reliable.

Based on the first set of tests, we also develop an estimate of the extent to which private information or discretion was used by each LPE fund in generating fair value measurements. We then test whether discretion appears to be accepted as reliable by LPE investors in pricing LPE funds in the stock market. Specifically, we investigate whether the stock market assigns a discount to the fair value measurements of LPE funds if fair values appear to reflect discretion or private information because they deviate more from values implied by investee fundamentals.

In Figure 3 we summarise the two main sets of empirical analyses and how they relate to one another.

Figure 3: Empirical tests of investee fair values, fundamentals and LPE fund values

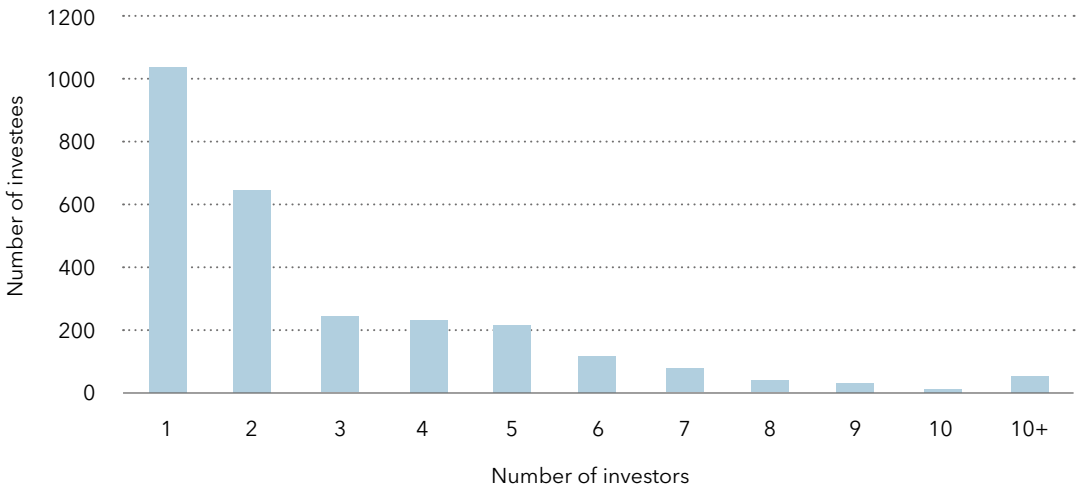


5. The data

We identify all the VCT funds listed on the London Stock Exchange in the period 2006 to 2015, and hand collect data for 656 fund-years (96 unique funds).[8] We then hand collect information on the numerous investments held by each LPE fund using the LPE annual financial statements as the primary source, supplemented by information from the annual returns filed by each investee at the UK Companies House Registry. We identify the fair values and size of each ownership stake for 26,602 investee-year observations (an average of 41 investments per fund-year). We then match financial statement fundamentals of investees to the fair value estimates, using financial statement information from the FAME database. The final sample with complete data including fair values, ownership stake and matching investee financial statement comprises 7,802 investee-year observations.

We classify each investee-year fair value measurement as a Level 1 or Level 3 asset, based on the inputs used. The inputs are determined using LPE fund descriptions or, when explicit categorisation by funds is absent, our own judgements based on other information provided in LPE funds' financial statements and disclosures.[9] Figure 4 shows the frequency with which investee companies in our sample are held as investments by the LPE investors in our sample. While it is most common for an investee company to have just one LPE investor, we see that there are many cases where two or more LPE investors are invested in the same company in the same year (often, but not always, they are funds from the same management group).

Figure 4: Number of investors per investee-year



[8] Financial statements are obtained from the Companies House website, investor websites, and by contacting the fund managers directly.
[9] We delete all observations for which the input is not clearly at Level 1 or Level 3.

In modelling the relation between fair value estimates and investee fundamentals, we gross up fair value estimates by dividing by the fractional ownership stake. For example, assume that *VCT Limited* owns 10% of the equity of *Private Company* at a cost of £1,000,000. Also assume that the fair value estimate disclosed by *VCT Limited* is £1,200,000. This fair value implies a total equity value for *Private Company* equal to £12m (£1,200,000 ÷ 10%). In examining the first research question – ie, the relation between fair value measurements and investee fundamentals – we use the implied equity fair value of £12m and relate this to the financial statement fundamentals – book value of equity and net income – of *Private Company* (the investee).

Our final sample of investee data comprises 5,131 investee-year observations where fair values are based on Level 1 inputs, and 2,671 observations where fair values use Level 3 inputs. The average values of investee equity fair value measurements (equivalent to an investment stake of 100%), net income and book value are larger for fair values based on Level 1 inputs. This is to be expected because investments with fair value measurements using Level 1 inputs relate to companies that have reached a stage of maturity and size where they can apply for a quotation and be traded on the AIM market.

Our final sample of LPE fund level data comprises 405 fund-year observations.[10] The average of equity book value across all fund-years is £25.29m, of which the average Level 1 fair value assets is £4.01m and the average Level 3 fair value assets is £4.52m. The remaining equity book value unaccounted for by fair values averages £16.76m.[11] The average market value of the equity of LPE funds is £22.90m.

[10] Note that the initial fund-year observations decreased from 656 to 405 because of restrictions applied to research questions 1 and 2.

[11] The other category includes Level 1 and Level 3 assets for which we were not able to determine whether the classification is Level 1 or Level 3, or where we were not able to calculate the 100% equity valuation, as described previously.

6. Do investee fundamentals reflect the information in LPE fair value estimates?

Our results show that the coefficients on equity book value and net income are both positive and statistically significant, explaining variation in fair value measurements quite well (regression R^2 is 60%). The coefficients on *BVE* (0.90) and *NI* (7.66) are quite similar to those observed in prior research examining the mapping of fundamentals into stock market prices. Our results suggest that on average across all LPE investments, financial statement fundamentals reliably reflect a significant amount of the information used by LPE fund managers in deriving fair value estimates.

When we estimate regression (1) for Level 1 and Level 3 assets separately, we find that for fair value measurements based on Level 1 inputs the coefficients on *BVE* and *NI* are 0.92 and 8.26 respectively and these are statistically significant. Our results indicate that investee equity book value and net income explain a high proportion of the overall variation in fair value measurements using Level 1 inputs. In contrast, our results for fair value measurements using Level 3 inputs indicate that only equity book value plays a statistically significant role – the coefficients on *BVE* and *NI* are 0.81 and 2.60, respectively. However, while the coefficient on *BVE* is statistically significant, that on *NI* is not. These results indicate that the book values of investees partially capture the information used by LPE fund managers in fair value measurement using Level 3 inputs, but net income does not.

We perform various additional analyses aimed at obtaining a richer understanding of the properties of fair value estimates. First, we confirm that fair value measurements using Level 1 inputs are similar to investee stock market values. Second, we find that net income for unquoted investees, where fair value measurement uses Level 3 inputs, is less persistent than for the AIM-quoted investees, where fair value measurements use Level 1 inputs. This lower persistence suggests that current net income has lower predictive power for future net income or cash flows, and helps explain why net income is not significantly related to fair value measurements using Level 3 inputs.[12]

[12] We perform additional analyses to address the concern that our results are influenced by the size of ownership stakes. Our conclusions remain unchanged after taking the size of ownership stakes into account.

7. What are the consequences when LPE fund managers use information beyond that reflected in the financial statement fundamentals?

We now turn to the value relevance of total fair value measurements recognised by LPE funds in their own financial statements. When we estimate regression (2), the coefficients on *BVE_other*, *BVE_FV1* and *BVE_FV3* are 0.99, 1.01 and 0.90, respectively, and all are highly statistically significant. Importantly, none of these valuation coefficient estimates is significantly different from the others. These results suggest that LPE fund investors do not perceive a difference in the reliability of fair value measurements using Level 1 and Level 3 inputs and apply similar valuation weights (close to one-for-one) to all equity book value components when valuing LPE funds.

Further analysis reveals that while fair value measurements are relevant to LPE fund investors, the market does not seem to discount the fair value measurements of LPE fund managers who appear to exercise high discretion in calculating fair values. In other words, LPE market valuations appear to treat LPE fund managers' fair value estimates as reliable, irrespective of how close they are to the values predicted by the underlying investee fundamentals.[13]

[13] We conduct a series of sensitivity checks examining whether low LPE market liquidity might influence our results. We find that our main conclusions are insensitive to differences in liquidity across LPE funds.

8. Conclusion

Critics of fair value measurement suggest that its lack of reliability reduces the usefulness of reported asset values. Concerns are greatest for fair value measurements based on unobservable inputs. We exploit a unique setting in which public financial statement disclosure provides access to the accounting fundamentals of investees for which fair value measurements use Level 3 inputs. This makes possible an empirical assessment of the perceived reliability of fair value measurements. Our research develops two main sets of insights.

First, we report evidence suggesting the information used by LPE fund managers in fair value measurement is partially captured by the financial statement fundamentals of investees. However, there are differences between fair value measurements using Level 1 and Level 3 inputs. More specifically, fair value measurements using Level 1 inputs are strongly associated with both investee equity book value and net income, but fair value measurements using Level 3 inputs are associated only with equity book value. Additional analysis suggests that one reason for this difference might be that earnings of Level 3 assets are less persistent than those of Level 1 assets.

Second, we estimate the discretion used by LPE fund managers in fair value measurement. We think of discretion as analogous to information beyond investee financial statement fundamentals which is used in fair value measurements. Our results indicate that LPE fund investors do not discount the fair value measurements of LPE fund managers who appear to use relatively high levels of discretion. Hence our results suggest that LPE fund investors generally consider the fair value measurements recognised by LPE fund managers to be reliable.

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