An Analysis of Private vs. Public Firm Valuations and the Contribution of Financial Experts

Dan Elnathan
The College of Management

Ilanit Gavious*
Ben-Gurion University

Shmuel Hauser
Ono Academic College and Ben-Gurion University

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* Corresponding Author:

Ilanit Gavious, Guilford Glazer School of Business and Management, Department of Business

Administration, Ben-Gurion University, PO Box 653, Beer-Sheva 84105, Israel.

Tel.: +972-8-6477538; fax: +972-8-6477691.

E-mail address: madaril@bgu.ac.il

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Abstract

This study investigates differences in expert valuations of private versus public firms, conducted for transactions outside the exchange. First, we provide evidence for extreme reliance of the experts on private firms' reported earnings, despite a possible manipulation of these earnings. In contrast, experts valuing public firms seem to rely on other, non-financial statement information sources, even if the quality of pre-acquisition earnings is higher in these firms. Second, we present evidence that the contribution of experts to investors in private firms is questionable at best. Our findings indicate that a private firm valuation performed by a potential investor based on available information provides results similar to those of the expert. Third, we show that inconclusive results regarding the existence of a discount in private firm valuations may be explained by experts' compliance with the interests of the commissioner of the valuation. This finding provides at least a partial explanation for the private company discount, one that adds to prior standard explanations (e.g., liquidity) offered in the finance literature.

Keywords: financial experts, firm valuation, private company discount, valuation multiples, value relevance

JEL classification: G32, G34

1. Introduction

Firm valuation by financial experts is a widely researched topic in accounting and finance literature. Thus far, researchers have focused on valuations of firms whose shares are traded on the exchange (i.e., public firms). Many studies relate to routine valuations performed regularly by "sell-side" analysts employed by investment houses and banks (e.g., O'Brien, 1998; Amir et al., 1999; De Bondet & Thaler, 1990; Lim, 2001; Orens & Lybaert, 2007). Another type of valuation is those commissioned by interested parties – buyers or sellers – as part of the negotiations underlying transactions that take place outside the exchange (e.g. mergers and acquisitions). In these transactions, an expert opinion is needed to provide an independent estimation for the fair value of the shares being sold. However, these experts have been criticized for being "rubber stamps" for a price already determined by the commissioner of the valuation (e.g., DeAngelo, 1990; Elnathan et al., 2009). Events such as the bursting of the "technology bubble", massive financial frauds (e.g., Enron Corporation), and more recently the "Sub prime" crisis, have raised further doubts regarding the objectivity – and hence the added value – of financial experts in appraising a firm's value. Notably, these issues have never been investigated in a setting of private targets.

In this study, we seek to examine the added value of financial experts performing valuations for private firms. Such examination is applicable in a setting where transactions take place outside the exchange, since the target company may be either private or public. Markedly, only a small number of studies have empirically examined this type of valuation, focusing only on public firms (DeAngelo, 1990; Elnathan et al., 2009). The scarce literature in this case is primarily due to a lack of large-scale data for researchers to study and the difficulty obtaining the documented

valuations. Furthermore, construction of a reliable database for an empirical study requires manual collection of data and creation of an electronic database.

To facilitate inferences, in concomitance to valuations of private firms, we also perform the analyses on valuations of public firms (henceforth referred to as private and public firm valuations, respectively). We use a unique sample of 81 expert valuations of firms listed on the Tel-Aviv Stock Exchange (TASE) and 66 expert valuations of private firms performed in the course of mergers, acquisitions and private placements between 1991-2006. The sample is restricted to private and public firms purchased by public firms. In such cases, the Israel Securities Authority (ISA - Israeli SEC) requires a full disclosure of the transaction including a justification for the price of transaction to take place. Customarily, majority shareholders that are on the sell or buy side of the transaction commission an expert valuation to justify the transaction price. Elnathan et al. (2009) explain that "The need for such non-routine expert valuations is often argued to be driven by management's perception that full disclosure (argued by some to simply be sophisticated data manipulation) of the procedure underlying the transaction would justify the price agreed upon for the transaction. Also, it appears that management considers the expert valuation as a hedge against possible litigation by outside shareholders."

The study explores the following three related research questions.

1. To what extent do the experts rely on financial statement information in private firm valuations, compared with public firm valuations?

2. Do the experts competently use their access to inside information in private firm valuations, compared with public firm valuations?

3. To what extent do the experts comply with the interests of the commissioner of the valuation, in private firm valuations versus public firm valuations?

We now elaborate. In the first phase of the study, we examine the role of financial statement information in explaining the expert valuations of private versus public firms. The relation between expert valuations of private firms and accounting information has not been examined thus far, either in academic or in practitioner literature. An important affect of the relation between financial statements and price relates to information asymmetry. Information asymmetry between buyers and sellers is expected to be higher for private firms. In our setting, higher information asymmetry for private firms is also found between the sellers and the analysts valuing the shares being sold. De Franco et al. (2008) explain that whereas public firms must fulfill regulatory and exchange requirements (such as filing prospectuses) and issue audited financial statements, private firms do not prepare comprehensive documents for regulators. Furthermore, in contrast with public firms, private firms undergo minimal monitoring and information collection and processing by outside stakeholders (e.g., sell-side analysts do not analyze these firms, and journalists are less likely to write media articles about them). According to De Franco et al. (2008), these differences lead to more primitive accounting systems for private firms as well as weaker internal controls. They document a higher possibility of earnings management in private firms, in particular given that the business is for sale.[1] The empirical literature documents the lower quality of earnings for private firms in general, relative to public firms (e.g., Ball & Shivakumar, 2005; Burgstahler et al., 2006).

While financial statements of private firms may be of lower quality, they remain

the main source of information about these firms. We thus do not form a prediction as to the weight experts place on financial statements when they value a private firm as opposed to a public firm. Our findings indicate that, while the book value of equity seems to be value relevant for both private and public firms, reported earnings are (ir)relevant in private (public) firm valuations. It seems that the experts strongly rely on private firms' earnings, despite a possible manipulation in these earnings. In contrast, when they value a public firm, the experts tend to rely on other, non-financial statement information sources, even if the quality of pre-acquisition earnings is higher in these firms.

In the second phase of the study, we present evidence indicating that potential investors could perform a valuation of the private firm themselves based on available information using the P/E valuation method and end up with results that do not differ significantly from those obtained by the experts. This is consistent with our finding of extreme reliance by experts on private firms' reported earnings. Elnathan et al. (2009), who investigate public firm valuations, suggest that the experts do not have an advantage over other investors in obtaining or utilizing more efficiently the information disclosed to the public. Our findings show that this lack of advantage is by far more pronounced when the valuated company is private.

The third stage of the study employs a valuation multiples analysis to explore experts' compliance with the interests of commissioner of the valuation, in private versus public firm valuations. We first employ a univariate analysis to establish the existence of a private company discount applied by experts when they value a private firm. Then, using a multivariate analysis that controls for differences in industry, time, risk, profitability, growth and earnings quality, we focus on the direct affect of the commissioner's identity – buy/sell-side – on the valuation results. The results of the

univariate analysis indicate that while the earnings multiple derived from the expert valuations is lower for private firms than for public firms, the book value multiple is higher. This is consistent with prior studies that investigated *acquisition* multiples in private versus public firms (e.g., Officer, 2007). The lower earnings multiple derived from private firm valuations implies a 22% private company discount, which falls within the range of discounts derived from acquisition prices of private companies as documented in prior studies (15%-37%). Markedly, the results from the multivariate analysis of the valuation multiples suggest that the inconclusive results from the univariate analysis regarding the existence of a discount in private firm valuations may be related to experts complying with the interests of the commissioner of the valuation, and provide higher (lower) valuation if the commissioner is the seller (buyer). Specifically, when the buyer has commissioned the valuation, we find evidence for a private company discount in both the earnings multiple and the book value multiple; when the commissioner is the seller, we find that compliance with the interests of the seller is further pronounced (through higher valuations) when the valuated firm is private resulting in an elimination of the private company discount, and even creation of a seemingly private company premium. We offer this as at least a partial explanation for inconclusive results regarding the private company discount. This result adds to standard liquidity explanations offered for the private company discount in the finance literature (e.g., Officer, 2007).

The various findings imply that the contribution of financial experts to investors in private firms is questionable at best. While prior studies have questioned the objectivity of financial experts when valuing public firms, the evidence presented in this study indicates that issues of objectivity, impartiality, and the added value of the experts are far more problematic and challenging when the valuated firm is private.

Our results should be of interest to academics as well as practitioners, accounting standard setters, and regulators, as there is a dearth of knowledge about private firms in general, and valuation aspects of these firms in particular.

The remainder of the paper proceeds as follows. Section 2 contains our literature review and presents our hypotheses. Section 3 describes our sample. Section 4 discusses our research methods and results for each of the three research questions. Section 5 summarizes the paper and presents the conclusions.

2. Literature Review

Private firms are different from public firms along a number of dimensions which potentially affect firms' valuation. While only a few studies have empirically investigated public firm valuations performed in the course of transactions outside the exchange (e.g., DeAngelo, 1990; Elnathan et al., 2009), no study thus far has dealt with expert valuation of private firms, mainly because of the lack of data for researchers to study (i.e., private firms are private).

Prior studies have examined different aspects related to private firms. One strand of the literature examines the relevance of accounting information to the pricing of private firms. Hand (2005) finds that financial statement information is value relevant in the pre-IPO venture capital market for biotechnology firms, and it becomes more value relevant as the firm matures, consistent with financial statements capturing the intensity of assets-in-place relative to future investment options. Armstrong et al. (2006) find that financial statement information explains a sizable component of the levels of, and changes in, values in both the pre-IPO and post-IPO periods for a sample of 502 venture-capital-backed companies from six different industries. De Franco et al. (2008) find that the coefficient on net income is significantly lower for private firms than for public firms, while there is insignificant

difference in the coefficients on the book value of equity. Similar regressions, in which they decompose earnings into operating cash flows and accruals, show that private-firm coefficients on both operating cash flows and accruals are significantly lower than the respective public-firm coefficients. According to De Franco et al., (2008), these results are consistent with earnings in general, and not just the accrual portion, being of lower quality for private firms.

Studies that deal with the aspect of earnings quality in private firms document a lower quality of earnings for private firms in general. For a sample of U.K. firms, Ball and Shivakumar (2005) show that financial reporting for private firms is less conservative than for public firms due to different market demands, regulation notwithstanding. For U.S. firms, Katz (2006) documents less (more) conservatism in private (public) firms with public market debt. Burgstahler et al. (2006) find earnings management is more pervasive in private firms across European countries. De Franco et al. (2008) explain that lower earnings quality in private firms is related to reduced regulatory oversight and monitoring by external stakeholders; innate characteristics, such as smaller size and greater operating variability;[2] and, a short history of audited financial statements. These factors lead to less sophisticated accounting systems and weaker internal controls in private firms than in public firms and to a higher opportunity for accrual manipulation.

While financial statements of private firms may be of lower quality, they remain the main source of information for these firms. We thus do not form a prediction as to the weight that experts place on financial statements when they value a private firm in comparison to a public firm. Notably, extreme analyst reliance on a firm's reported earnings prior to a sale transaction casts doubt on the reliability of the valuation results, given managers' incentive to manage earnings upward prior to being

sold (as price is expected to be a positive function of earnings). Furthermore, researchers emphasize the essentiality of experts' ability to obtain inside information when they value a firm (DeAngelo, 1990; Elnathan et al., 2009). The superiority of financial experts over investors is usually attributed to the former's professional knowledge and experience, access to inside information and even good gut instincts. Both DeAngelo (1990) and Elnathan et al. (2009) indicate that experts may rely too heavily on the information gathered from insiders. We conjecture that experts' contribution to investors depends on the former having access to inside information and using it competently in their valuations. In contrast, if the experts rely mainly on low quality earnings, which are also available to the investors involved in the transaction, then their contribution is questionable at best.

Another strand of research investigates whether private firms are evaluated at a discount relative to public firms. While it is widely asserted in the practitioner literature that private firms are evaluated at a discount relative to public firms, the empirical evidence presented by practitioners and researchers to support the existence of such a discount is limited and does not produce consistent inferences. For example, while Pratt (2001) finds evidence for higher (lower) price-earnings ratios for public (private) firms in most years, Phillips and Freeman (1995) show that after controlling for size, profitability, and whether the transaction occurred in the banking industry there is no significant discount. Koeplin et al. (2000) estimate a 20% private company discount using the enterprise value-to-EBITDA multiple, but none for enterprise value-to-sales. Officer (2007) estimates the private company discount to lie in the 15%-30% range based on price-earnings, enterprise value-to-EBITDA, and enterprise value-to-sales multiples; however, he finds that the price-to-book value multiple is not lower, but significantly higher, for private firms. De Franco et al. (2008) estimate the

private company discount to range from 21% to 37% using enterprise value-to-EBITDA and enterprise value-to-sales acquisition multiples.

The private company discount is usually attributed by practitioners and researchers to the lower – or lack of – marketability of private firms' shares. A clear difference between private and public firms is that, in contrast to the latter, private firms' shares are not traded on the exchange. Whereas stockholders in public companies typically have a ready market in which to sell their shares, stockholders in private companies lack that outlet (Koeplin et al., 2000). Officer (2007) attributes much of the private company discount to sellers who accept higher discounts because they need to liquidate their investment.[3] According to De Franco et al. (2008), the liquidity explanation presented by Officer (2007) overlaps with the general notion of lack of marketability, since unlisted firms do not face ready access to capital markets when short of cash. De Franco et al. (2008, 2009) suggest another explanation for the private company discount that is related to the information quality facing the buyer. They show that private targets have characteristics associated with lower innate earnings quality and that the quality of external monitoring is lower for private targets, relative to public targets. As they find that valuation multiples are increasing in factors that proxy for earnings quality (e.g., Big 4 auditor) as well as a proxy for liquidity (working capital), and given that private firms have lower values of these factors that proxy for earnings quality (e.g., less likelihood of a Big 4 auditor), their results represent an earnings quality explanation for the private company discount.

Lower earnings quality leads to greater information asymmetry between the target and the acquirer. Officer (2007, p. 572) explains that "…it seems obvious that lower sale multiples in acquisitions of nonpublic targets are at least partly caused by bidders lowering their offer price to protect themselves against the possibility that they are

less than fully informed about the business they are acquiring". Nonetheless, he is able to obtain only weak results in support of this conjecture, since "…information asymmetry is a notoriously difficult construct to measure, and empirical proxies for asymmetric information are naturally imprecise".

In this study, we hypothesize that the private company discount may be explained by additional factors other than liquidity, information quality or information asymmetry. Specifically, we suggest that expert's compliance with the interests of the valuation's commissioner has an important affect on private firm valuations and could offer another explanation for inconclusive results regarding the private company discount. No study thus far has entertained this notion.

3. Data

The sample consists of 147 firm valuations conducted by financial experts in the years 1991-2006. Of the 147 valuations, 81 are public and 66 are private firm valuations.[4] The valuations were performed in the course of mergers, acquisitions and private placements; namely, transactions in which firms' shares were being sold outside the exchange.[5] The sample is restricted to private and public firms purchased by public firms. Notably, each public (private) firm in our sample remained public (private) subsequent to the transaction (i.e., firms do not "switch" between the two sub-samples). The documented valuations were obtained from the filings of the Tel-Aviv Stock Exchange (TASE) and the Israel Securities Authority (ISA). Valuations of public firms are submitted to the TASE and ISA as part of the full disclosure requirements set by the ISA in the case of extraordinary transactions.[6] Valuations of private firms are submitted when related parties to the transaction and/or to the private target firm (e.g., the public acquiring firm) are required to do so as part of the full

disclosure requirements.[7] The documents of the valuations generally include descriptive and numerical information needed for the valuation: the firm's identity (firm name, industrial sector); description of the transaction for which the valuation was commissioned; the parties involved in the transaction and the nature of their relationship prior to and after the transaction; who commissioned the valuation (buyer, seller or both); some historical accounting data; the experts' assumptions, analyses and forecasts; the valuation methodology; values obtained from the method(s) employed; and sensitivity tests of the results. We manually collected the data and created an electronic database to facilitate empirical research.[8]

From the documents of the valuations, we also extract the identity of the expert performing the valuation. We identify three experts that together performed over 50% of the private firm valuations, as well as over 50% of the public firm valuations in the sample, and at least nine valuations each. Specifically, these three experts performed 59.09% of the private and 58.44% of the public valuations. Also, the identity of the other, 'less reputable' experts is generally similar for the two types of valuations. The latter provided no more than three private and/or public firm valuations each. Hence, the experts performing valuations for private targets do not differ from those performing valuations for public targets in attributes related to capabilities (resources, professionalism, etc.). In this study, we investigate whether these experts still perform differently when the target firm is private rather than public. Partitioning our sample into two sub-groups of private firm valuations and public firm valuations and performing the analyses for each sub-group separately, allows us to control for other attributes potentially affecting the experts when making valuation judgments for private versus public firms, and to focus on our primary research questions concerning the added value of these experts.

We also draw information from the last annual financial statements published by the public companies in our sample prior to the release of the expert valuations. For the private firms, we drew accounting information from the documented valuations, as their financial statements are unpublished. Private firm valuations generally include major accounting fundamentals of the valuated private firms – total assets, book value of equity and net income before and after extraordinary items.[9] Following prior literature (e.g., Collins et al., 1997; Brown et al., 1999; Core et al., 2003; De Franco et al., 2008), we restrict our sample to firms with positive book value of equity. To mitigate the effect of outliers in our analyses, we winsorize the top and bottom 1% of continuous variables. We winsorize outliers instead of deleting them to conserve data. The results do not change qualitatively when outliers are deleted.

Table 1 contains descriptive statistics for our sample of private and public firm valuations. As expected, private firms are smaller. Median total assets of private (public) firms is 40.0 (132.9) and median book value of equity is NIS 9.7 (106.0) million.[10] Median expert valuation for private (public) firms' equity is NIS 22.7 (195.9) million. These differences between private and public firms are significant at the 1% level. It is documented that smaller firms are riskier than larger firms (e.g., Fama & French, 1993). The private firms in our sample are leveraged to a higher degree.[11] Private firms' systematic risk is also expressed by higher accounting returns and higher dispersion of these returns. Median *ROE* in private (public) firms is 0.09 (0.05) with standard deviation of 4.17 (0.31).

Unscaled earnings (net income before extraordinary items) are insignificantly different between private and public firms. To explore these insignificant differences in earnings, we divide the sample firms by the sign of their earnings. 25 out of 81 public firms (31%) and 14 out of 66 private firms (21%) had negative earnings.

Private firms' negative earnings are, on average (median), -2.3 (-1.5) million compared to NIS -86.7 (-25.8) million in public firms [p-value: 0.033 (0.001)]. On the other hand, private firms' positive earnings are, on average (median), NIS 14.3 (1.5) million compared to NIS 72.9 (14.6) million in public firms [p-value: 0.008 (0.003)]. Thus, the larger public firms generate higher profits and suffer greater losses than the smaller private firms. The greater losses offset public firms' advantage over private firms in profits, resulting in seemingly insignificant differences in unscaled earnings between the two groups of firms. Earnings growth (percentage change in annual earnings) is higher for private firms, consistent with private firms being small growing firms (see, e.g., De Franco et al., 2008; Officer, 2007); however the difference is not significant for our sample firms. For comparison, for a sample of foreign (outside the U.S.) firms, Koeplin et al. (2000) find that earnings growth was lower for private firms than for public firms prior to the acquisition, whereas for a sample of U.S. firms, the earnings of private firms grew at a higher rate than the earnings of public firms.

TABLE 1 ABOUT HERE

4. Research Methods and Results

The three subsections that follow correspond to our three research questions, respectively. In each subsection, we first present our tests and then discuss the results.

4.1. Value-Relevance of Financial Statement Information

At the first phase of the analysis we examine the relevance of financial statement information for private versus public firm valuations. As stated, the relation between expert valuations of private firms and accounting information has not been examined thus far. A small number of studies examined the relation between

transaction values of private firms and financial statement information (Hand, 2005; Armstrong et al, 2006; De Franco et al., 2008).

Consistent with the literature (e.g., Collins et al., 1997; Hand, 2005), we run regressions of firm values on accounting fundamentals, where we define value-relevance as the adjusted R-square from these regressions:

$$EV_{it} = \beta_0 + \beta_1 BV_{it} + \beta_2 E_{it} + \varepsilon_{it} \quad (1)$$

EV is the expert valuation of the firm's equity, *BV* is book value of equity, and *E* is earnings before extraordinary items. In each regression analysis, we mitigate the effects of outliers by winsorizing observations in the top and bottom one percent of the dependent and independent variables. We control in the regressions for industry[12] and time effects. Namely, we include intercept dummies for each industry and time period to capture constant industry-specific and time-specific factors. To control for time effects, we divide our sample period into five time periods, based on the main changes in market conditions and regulation in Israel during this period. Specifically, we divide the sample period into five sub-periods: (1) 1991 through 1993: bull market; (2) 1994[13] through 1997: bear market; (3) 1998 through 3/2000: the technology bubble; (4) 4/2000 through 2002: the bursting of the bubble and the downturn in the capital market that followed the bursting; (5) and 2003 through 2006: the rebound in the capital market. The qualitative results are similar when we control for year fixed effects in the regressions. The regressions include White's (1980) correction

We first employ log-linear regressions of expert valuations on the financial variables. A log-linear valuation model has been applied in prior studies investigating the value-relevance of financial statement information (e.g., Hand, 2005; see also Ye and Finn, 2000 and Beatty et al., 2001 who derive and motivate a log-linear valuation

model).[14] In the log-linear specification, each variable ("X") in the regression is log-transformed as follows:

$$L(X) = \begin{cases} \ln(X+1), & X \geq 0, \\ -\ln(-X+1), & X < 0. \end{cases}$$

The transformation shown above is monotone and information-preserving; it ensures that $L(X)$ is defined when X is zero [by the addition of 1 (million NIS) to X] and that negative values (of earnings) are not discarded. The results are presented in panel "a" of Table 2. For private firms, we find that the coefficients on earnings as well as on the book value of equity are significantly positive in the log-linear regression. To examine the robustness of these results to the regression specification, we also employ a deflated model specification. Specifically, we deflate Eq. (1) by the book value of equity. Scaling by book value of equity is consistent with several value relevance studies, such as Trueman et al. (2000) and Core et al. (2003). All observations are conserved as our sample is restricted to firms with positive book value (see also, e.g., Collins et al., 1997; Brown et al., 1999; Core et al., 2003). Lo (2004) advocates deflating financial data in accounting research by a proxy for scale, rather than including a scale proxy as an independent variable. The advantages of deflation by a scale proxy include, *inter alia*, mitigation of hetroscedasticity, R^2 bias and coefficient bias.

Our deflated regression model is:

$$EV_{it} / BV_{it} = \beta_0 1 / BV_{it} + \beta_1 + \beta_2 E_{it} / BV_{it} + \varepsilon_{it} \quad (2)$$

The intercept in the deflated model can be interpreted as the coefficient on book value of equity in the undeflated model. Consistent with prior studies, we retain the inverse of book value of equity as an explanatory variable in the deflated regression model. According to Core et al. (2003), the inverse of book value of equity should be retained in the deflated regression, "because we include the intercept in the unscaled model to

explain economic variation in market values that is not captured by our other explanatory variables."

The results of the deflated regressions are presented in panel "b" of Table 2. The results indicate that the experts rely heavily on earnings when they value a private firm (an adjusted R-square of 90%). The intercept in the private firms' regression, interpreted as the coefficient on book value of equity in the undeflated regression, is also positive consistent with prior research, however marginally significant. For both the log-linear and the deflated models,, the adjusted R-square without the fixed effects remains at the 90% level with a p-value of 0.000, indicating that this significance is not due to time and industry effects.

For public firm valuations, the book value of equity (earnings) is (in)significant in the log-linear regression. The results from the deflated model support this notion. The irrelevance of reported earnings for public firm valuation may be attributed to experts expecting or suspecting low earnings quality prior to the transaction. Notably, the motivation for earnings management prior to transactions such as mergers, acquisitions and private placements is considerably high. For example, prior to being sold, firm managers have incentives to take actions that increase their sale price. If management expects price to be a positive function of earnings, firms could manage accruals upwards. Hence, total accruals and/or abnormal accruals are generally used as *ex post* measures of earnings quality. For our private firm sample, the data needed to calculate accruals are unavailable.

TABLE 2 ABOUT HERE

As this stage, we apply two *ex ante* measures of earnings quality used in prior studies; the existence of a Big 4 auditor and firm leverage. Based on the conjecture that improved external monitoring will reduce both the bias and noise in reported

earnings, the existence of a Big 4 auditor and higher degree of leverage should increase earnings quality. A comparison of our *ex ante* measures of earnings quality between the private and public firm samples yields mixed results. Specifically, 31 percent of private firms are audited by a Big 4 auditor, compared with 90 percent of public firms. On the other hand, the private firms in our sample are leveraged to a significantly higher extent than the public firms; 56 percent of total assets compared with 38 percent, on average, respectively. Since we lack sufficient data needed to directly determine differences in earnings quality for our sub-samples (mainly accrual measures), and given that various studies present evidence for higher quality of earnings in public firms than in private firms (e.g., Ball and Shivakumar, 2005; Katz, 2006; Burgstahler et al., 2006; De Franco et al., 2008), we conclude that, despite the possibility for lower quality of private firm earnings, the experts seem to place a considerably high weight on these earnings in their valuations, possibly since these are the main source of information for these firms. Our results do not change when we allow in the regressions for positive and negative earnings to have different slope coefficients as well as different intercepts. For private as well as for public firms we find no differences in the valuation of profits and losses; i.e., the coefficients on positive and negative earnings do not differ significantly.

In contrast to last year's earnings variable, the book value of equity consists of accumulated earnings. Hence, the book value of equity may be perceived by the experts as more reliable and value relevant as it consists of past earnings not affected by short term considerations related to the upcoming transaction.

Using Vuong's test, we find that the differences between the R-square in the regressions of public firms and those of private firms are significant at the 1% level. The lower R-square in the regressions of public firms, relative to private firms,

suggests that there is greater unexplained variation; i.e., the expert valuations of public firms contain unexplained variation that is not correlated with these firms' financial statement information. In other words, the variation in expert valuations of public firms remains to be explained by other explanatory variables which are omitted from regression (1), and are probably not correlated with the explanatory financial statement variables. This implies that even if the quality of pre-acquisition earnings is higher for public firms, as suggested in prior studies, the experts do not rely on these earnings in their valuations. Rather, they seem to rely on other, non-financial statement information sources when they perform a valuation for a transaction outside the exchange. In contrast, private firm valuations strongly rely on the firms' reported earnings, despite a possible manipulation in these earnings.

4.2. Experts' Contribution to Investors in Private vs. Public Firms

This subsection further examines the contribution of experts to investors involved in the transaction, and whether this contribution is affected by the valuated firm being public or private. Given the emphasis in practitioner as well as in academic literature that is attributed to experts' ability to obtain inside information, we directly examine the contribution of experts by comparing between the expert valuations and tentative values computed based solely on information available to investors. If experts have access to inside information and use it competently in their valuations, their valuations should be significantly different from a basic computation of a value that exclusively relies on information available to investors.

We compute values for our public and private sample firms using the multiples valuation method in order to ensure that investors can easily obtain a valuation based on available information. We employ two multiples in our analyses,

Price-Earnings (P/E) and Price-Book (P/B). The P/E and P/B benchmark valuation methods have received growing academic attention during the past years (see, e.g., Penman, 1996; Alford, 1992; Cheng & McNamara, 2000; Liu et al., 2002).[15] Notably, the P/E valuation method is considered to be "one of the most popular valuation methods in the investment community" (Cheng & McNamara, 2000). Cheng & McNamara (2000) show that the P/E valuation method performs better than the P/B valuation method; however, a combined method which takes the simple average of the valuations from the P/E and the P/E methods outperforms either the P/E or the P/B method. The P/E (P/B) valuation method estimates the value of the firm as a product of its earnings (book value of equity) and a benchmark P/E (P/B) multiple of a set of comparable firms. To further simplify the calculation of firm value that hypothetically could have been conducted by the buyer and/or the seller themselves, we do not identify specific firms within the industrial sector which could be considered as most comparable to the target firm (based on various criteria such as size, profitability, financial risk, product lines, etc.) but use average industry P/E and P/B ratios. Average multiple for each industry at the time of valuation is publicly available.[16] Earnings and book values are taken from the target firm's most recent annual financial statements prior to the date of valuation. Four alternative earnings measures are used in the analysis: (1) last annual earnings; (2) last annual earnings before extraordinary items; (3) average earnings of last 3 years; (4) average earnings before extraordinary items of last 3 years. For public companies, the accounting numbers are public information. For private companies, those numbers are available to the investors involved in the transaction. In the calculations, 25 (14) observations were lost for public (private) firms due to negative earnings; hence, statistics are presented for a sample of 56 public and 52 private firm valuations.

Panel "a" of Table 3 presents the discrepancies between the expert values and our calculated values using the P/E method. We find that whereas expert valuations of public firms are significantly different (higher) than our basic value calculations, for private firms they are insignificantly different. The results do not change qualitatively whether we use one-year earnings or average historical earnings, or whether extraordinary items are deducted or not. These findings cast doubt on the superiority of the experts over a potential investor who tentatively values the target private company by multiplying its "bottom-line" earnings by an industry earnings multiple. In other words, it seems that potential investors could do as well as the expert in valuating the private company themselves, using P/E method and basic information that is either publicly available or received from the target company. Moreover, the investor need not "bother" looking back at historical earnings, or deducting special items from those earnings; last year's reported earnings, easily extracted from the company's income statement, would suffice. This is consistent with our finding, presented in the previous section, of an extreme reliance by experts on private firms' reported earnings. Notably, if private firms' pre-acquisition earnings are indeed extensively manipulated as shown in prior studies, our results imply that the experts either do not detect or do not deal with this manipulation in their valuations. On the other hand, for public firms our results indicate that experts use information beyond basic accounting fundamentals, and thus our basic value calculations provide values significantly different from those of the experts.

TABLE 3 ABOUT HERE

In panel "b" of Table 3 we present the discrepancies between the expert values and our calculated values using a combined P/E – P/B method as per Cheng & McNamara (2000), i.e., a simple average of the values calculated from the P/E and the

P/B methods. The tabulated results are for when last annual earnings are used to calculate the value from the P/E method. The results support those obtained from the P/E method alone; expert valuations of public (private) firms are (in)significantly different than the values calculated using the P/E – P/B method. Results do not change qualitatively when each of the other earnings measures are used.

4.3. Analysis of Valuation Multiples

We now move to explore the contribution of the experts in private firm valuations, compared with public firm valuations, from a different perspective. Employing a valuation multiples approach, we explore the degree to which the experts – and hence their valuations – are affected by the interests of the commissioner of the valuation. Central to our approach is an attempt to control for those valuation differences unrelated to whether the firm is private or public. We point out that experts who accommodate the interests of the commissioner take the risk of being taken to courts and suffering costly litigation damages, including damage to their brand name reputation. In practice, such never happened in Israel.

Two commonly used valuation multiples, the earnings multiple (*EV/E*) and the book value multiple (*EV/BV*), appear in Table 1. Specifically, *EV/E* (*EV/BV*) is the ratio of expert valuation to earnings (book value of equity). Comparing the valuation multiples between the two sub-samples, we find that *EV/E* ratio is significantly lower for private firms than for public firms. Lower *EV/E* ratio for private firms is consistent with the expectation for a private company discount. As discussed in Section 2, the private company discount is usually attributed by practitioners and researchers to the lower marketability, or liquidity, of private firms' shares (e.g., Koeplin et al., 2000; Officer, 2007). Further research suggests additional explanations for the private

company discount, an earnings quality explanation and an information asymmetry explanation (Officer, 2007; De Franco et al., 2008; De Franco et al., 2009).

Markedly, whereas *EV/E* ratio is lower for private firms than for public firms in our sample, the *EV/BV* ratio is higher. Prior studies that investigated differences in *acquisition* multiples of private and public firms have also yielded mixed results. De Franco et al. (2008) estimate a private company discount of 21%-37% using enterprise value-to-EBITDA and enterprise value-to-sales acquisition multiples. In contrast, they find that the price-to-book multiple is significantly higher for private firms, implying a private company premium rather than a discount. Officer (2007) finds corresponding results. He documents acquisition discounts for private firms of 15%-30% based on price-earnings, enterprise value-to-EBITDA, and enterprise value-to-sales multiples; however, similar to the results in our study and to De Franco et al. (2008), he finds that the price-to-book value multiple is not lower, but significantly higher, for private firms. For comparison, when we apply De Franco et al.'s (2008) and Koeplin et al.'s (2000)[17] approach to estimate the private company discount, as presented in Eq. (3), we obtain a 22% discount [(20.41-15.99)/20.41] for our sample of private firms based on the earnings valuation multiple.

$$Private\ Company\ Discount = \frac{(EV/E_{Public} - EV/E_{Private})}{EV/E_{Public}} \qquad (3)$$

Our multiples analysis differs from previous studies in that it investigates *valuation* multiples rather than *acquisition* multiples; i.e., our analysis focuses on multiples derived from the expert valuations and thus on the discount/premium applied by the experts valuing the firm, whereas other studies refer to multiples derived from transaction prices and the discount actually applied by acquiring firms. Valuation multiples differ from acquisition multiples in that they are affected by the

experts' considerations. Experts may be driven to comply with the wishes of the party to the transaction (buyer or seller) that commissioned the valuation. Financial experts performing firm valuations for transactions that take place outside the exchange have been criticized for being "rubber stamps" to a price already determined by the commissioner of the valuation (see, e.g., DeAngelo, 1990). For a sample of 44 public firm valuations for the period of 1991-1999, Elnathan et al. (2009), find that the experts are biased towards the majority shareholders who hired them to value the firm. Particularly, Elnathan et al.'s findings are based on a sample period that ended before the technology bubble burst in 2000 and the revelations of massive financial frauds (e.g. Enron Corporation). These major events further catalyzed public controversy over fraudulent or subjective valuations by experts suffering from conflicts of interest.[18] Such conflicts of interest that financial experts may face – namely whether to perform objective research or comply with the clients' wishes – can affect the results of their research (e.g., De Bondt & Thaler, 1990; Francis & Philbrick, 1993; Lin & McNichols, 1998; Lim, 2001) and thus the valuation multiples and the discount/premium applied in private firm valuations.

To further explore the extent to which the experts are affected by the interests of the commissioner of the valuation, we move from a univariate analysis to a multivariate analysis of the differences in valuation multiples of private versus public firms. Most notably, differences in multiples can derive from factors other than whether the firm is private or public. For example, a salient difference between private and public firms is in their size. Firms size is, as stated, related to risk, and thus affects valuation multiples. Higher risk implies that analysts, given a proxy for expected future cash flows, would use a higher discount rate, resulting in lower firm valuations.

The multivariate model that we employ is (see also, e.g., De Franco et al., 2008; Bhojraj & Lee, 2002; Francis et al., 2005):

$$ValuationRatio = \beta_0 + \lambda_1 BuyerCommis + \lambda_2 Size + \lambda_3 Leverage + \lambda_4 ROE + \lambda_5 EarnGrowth\% + \varepsilon \tag{4}$$

This equation is estimated separately for *BV/EV* ratio and for *E/EV* ratio. Consistent with prior studies, we use *BV/EV* and *E/EV* (the inverse of the *EV/BV* and *EV/E* multiples, respectively) as the dependent variables based on Beatty et al. (1999) who show the advantage of applying the inverse of multiples when using the method of comparables. Beatty et al. explain that as the accounting variable is considered to be a noisy measure for expected cash flows, placing it in the denominator leads to estimated coefficients that are positively biased. However, placing it in the numerator yields unbiased estimated coefficients.

Independent variables are defined as follows: *BuyerCommis* is an indicator variable that equals 1 (0) if the buyer (seller) has commissioned the expert valuation; *Size* is the log of the firm's total assets; *Leverage* is the ratio of total liabilities less current liabilities to total assets; *ROE* is net income before extraordinary items divided by book value of equity; and *EarnGrowth%* is the percentage change in the firm's annual earnings. *ROE* and earnings growth serve as proxies for profitability and growth, respectively.[19] *Size* and *Leverage* proxy for risk. Prior literature suggests that creditors, such as banks, could be monitoring firms' accrual process, leading to higher earnings quality, or choosing firms with higher earnings quality (e.g., Fama, 1985; Berlin and Loeys, 1988). Hence, *Leverage* could also serve as a proxy for creditor's demand for quality financial information (see also De Franco et al., 2009).

The identity of the party to the transaction that commissioned the expert valuation (buy-side or sell-side) controls for a possible favoritism in the expert valuation towards the interests of the commissioner. We point out that the expert

performing a valuation for a merger or an acquisition considers the potential synergies created from the transaction, regardless of who commissioned the valuation (buyer/seller) and regardless of the valuated firm being public/private. We also control in the regressions for industry and time effects. Another factor potentially affecting valuation multiples in general, and the discount in private firm valuations in particular (Officer, 2007), is liquidity. Since liquidity measures are unavailable for our private firm valuation sample, we were not able to include such in our regressions.[20]

The results of the multivariate analysis are presented in Table 4. We find that the coefficient on earnings growth is, as expected, significantly negative for both the private and the public firm sub-samples, consistent with earnings growth serving as proxy for future growth in cash flows, and hence positively affecting valuation multiples (*EV/BV* as well as *EV/E*). The coefficient on *ROE* is (in)significantly negative in the private (public) firm regressions. This is consistent with our finding that the experts (do not) rely on reported earnings when valuing private (public) firms. For size, no significant effect is found. If size serves as a proxy for risk – i.e., smaller firms are riskier – it is expected that size would be positively related to multiples (negatively related to the inverse of these multiples as specified in our model). De Franco et al. (2008) explain that the positive effect of risk on multiples may be offset by other factors for which size controls. "For example, as firms enter later stages of their life-cycle, they convert future growth opportunities into assets-in-place. Hence, firms with more assets in place (i.e., our size measure) have less growth opportunities. This effect leads to a negative relation between target size and multiples" (De Franco et al., 2008). Our results imply that the risk factor is, indeed, offset by other factors that size controls for. The coefficient on *Leverage* is significantly negative in all regressions implying that the risk factor is offset by leverage serving as an observable

firm characteristic that is *ex ante* determinant of higher earnings quality.

TABLE 4 ABOUT HERE

The multivariate regressions presented in Table 4 indicate that expert valuations of private as well as public firms are affected by the identity of the commissioner. Specifically, as expected, they seem to coincide with the interests of the side to the transaction that commissioned the valuation. That can be deduced from the observation that the coefficient on *BuyerCommis* is significantly positive in all regressions, indicating that valuation multiples for private firms, as well as those for public firms, are lower when the valuation is commissioned by the buyer than when it is commissioned by the seller.

When comparing between the private firm and the public firm regressions, we find that the coefficient on the intercept in the *BV/EV* regression for private firms is significantly lower than in the *BV/EV* regression for public firms. We also find that the coefficient on the *BuyerCommis* variable is significantly higher (at the 1% significance level). This implies that the book value multiple is higher for private firms than for public firms when the commissioner of the valuation is the seller, after controlling for differences in time, industry composition, risk, profitability and growth. Conversely, the book value multiple is lower for private firms when the commissioner of the valuation is the buyer (as the sum of the intercept and the coefficient on *BuyerCommis* in the private firm regression is significantly higher than in the public firm regression).

Taken together, these observations point to experts' compliance with the interests of the commissioner of the valuation, in the expected direction, and to the fact that such compliance is more evident in private firms' valuations than in public firms' valuations.

Similar results are obtained from the regressions of *E/EV*, except for the insignificant difference between the intercepts of the private and the public firm regressions, which implies that the earnings multiple for private firms is not significantly different than for public firms when the commissioner of the valuation is the seller. We interpret this result as follows: Private firm valuations commissioned by the seller were high due to the identity of the commissioner, and in fact they were high enough as to eliminate the typical private company discount, resulting in seemingly no difference in the earnings multiple derived from private and public firm valuations. In the *BV/EV* regression it seems that the experts are even more biased when the commissioner of a private firm valuation is the seller, as reflected in higher book value multiples for private firms than for public firms, after controlling for the affects of time, industry, risk, profitability and growth. We also point out that when the commissioner of the valuation is the buyer, both book value multiple and earnings multiple are lower for private firms than for public firms. This result is consistent with the liquidity argument, as well as experts' compliance with the interests of the commissioner of the firm valuation.

While the incentives to comply with the interests of the commissioner are similar for both private and public firms, experts could potentially bias the valuation results of private firms to a greater degree in equilibrium given that the information related to private firms is private. In contrast to public firms, private firms are not obligated to fulfill regulatory and exchange requirements, such as filing prospectuses and financial statements. Additionally, private firms undergo minimal monitoring and information collection and processing by outside stakeholders. The lack of regulatory oversight and monitoring of private firms may imply that the expected cost (in terms

of litigation risk and/or damage to brand name reputation) of favoritism towards the commissioner is lower when the valuated firm is private rather than public.

An alternative explanation for our findings is related to information asymmetry. Specifically, a valuation commissioned by the buyer may suffer more severe information asymmetry than when commissioned by the seller, which could lead to a rational downward adjustment to the valuation results. To assess the viability of this alternative explanation we examine whether valuations commissioned by the buyer are captured by investors as less reliable or less credible. For the private firm and public firm subsamples, we compare between the expert value and the final transaction value. We find that, except for one (public firm) case,[21] in all cases the actual price of the deal was identical to that of the expert valuation. Hence sellers are willing to accept a price based on a valuation that has originally been commissioned by the buyer. This result indicates that the relevance and reliability of the expert valuation's credibility do not depend on the identity of the valuation's commissioner, regardless of the valuated firm being public or private.[22] Elnathan et al. (2009) explain that by the time the expert valuation is reported to the public, it is in fact the ending point, rather than the starting point, for the negotiations between seller and buyer. "…since the expert valuation is meant to provide justification for the transaction price, his preliminary valuation is, in fact, indirectly part of the negotiations and he or the parties involved may change their final valuation prior to reporting it to the public" (Elnathan et al., 2009). This explanation further weakens the information asymmetry argument and strengthens our confidence that the differences found between valuations commissioned by buyers and sellers are related to experts' compliance with the commissioner's interests. Notably, such compliance has also been observed in DeAngelo (1990) and Elnathan et al. (2009).

We suggest that our findings add to standard liquidity explanations offered for the private company discount in the finance literature (e.g., Officer, 2007). The effects we document are substantial. When the buyer has commissioned the valuation, we find evidence for a private company discount in both the earnings multiple and the book value multiple. In contrast, when the commissioner is the seller, the expert's compliance with the interests of the seller seems to result in higher valuations; notably, this favoritism towards the seller seems to be more pronounced when the valuated firm is private than when it is public, hence resulting in the offsetting of the expected private company discount, and even creating what appears to be a premium. Acknowledging the absence of a liquidity control in our analysis, we offer this as at least a partial explanation for inconclusive results regarding the private company discount.

5. Summary

This study explores differences between expert valuations performed for private versus public firms. In particular, we seek to examine the added value of financial experts when performing valuations for private firms. To facilitate inferences, the private firm valuations are analyzed in comparison to public firm valuations. We focus on valuations conducted by financial experts for transactions that take place outside the exchange, specifically mergers, acquisitions and private placements. In these transactions, firms' shares are being sold and thus, an expert opinion is needed to provide an estimate for the fair value of the shares. Our main findings are summarized as follows. First, we provide evidence for extreme reliance of the experts on private firms' reported earnings, despite a possible manipulation in these earnings. On the other hand, experts valuing public firms seem to rely on other,

non-financial statement information sources, even if the quality of pre-acquisition earnings is higher in these firms. In the second stage of our analysis, we show that the experts do not incrementally contribute to investors in private firms. Our findings indicate that potential investors could perform a valuation on the private firm themselves based on available information using the P/E valuation method, or combined P/E-P/B valuation method, and end up with results that are not significantly different from those obtained by the expert. Finally, we show that the earnings (book value) multiple derived from the expert valuations is lower (higher) for private firms than for public firms, implying a private company discount (premium). This is consistent with prior studies that investigated acquisition multiples in private versus public firms. The multivariate analysis of the valuation multiples reveals that the inconclusive results from the univariate analysis regarding the existence of a discount in private firm valuations may be explained by experts' compliance with the interests of the commissioner of the valuation. We offer this as at least a partial explanation for the private company discount, one that adds to prior standard explanations (such as liquidity) offered in the finance literature. The results presented in this study should be of interest to academics, practitioners and regulators, as there is a dearth of knowledge about private firms in general, and valuation aspects of these firms in particular.

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Table 1: Descriptive Statistics on Sample Firms

This table reports descriptive statistics for our sample of 81 public and 66 private firm valuations. All financial statement data is from the target firm's most recent fiscal period ending prior to the date of expert valuation and are measured in millions of NIS. *TA* is total assets. *BV* is book value of equity. *E* is net income before extraordinary items. *EV* represents the expert valuation of the firm's equity. *EarningsGrowth%* is the percentage change in the annual earnings. *ROE* is income before extraordinary items divided by book value of equity. Observations with negative book value of equity were omitted from the research sample. In the calculation of EV/E ratio 25 (14) observations were lost for public (private) firms due to negative earnings; hence, statistics presented for EV/E ratio are for a sample of 56 public and 52 private firm valuations.

Extreme values (top and bottom 1%) of continuous variables are winsorized. ***, **, and * denotes significance at the 1%, 5% and 10% (two-tailed) levels, respectively.

Variable	Private Firms				Public Firms				Difference	
	Mean	Median	SD	Interquartile Range	Mean	Median	SD	Interquartile Range	Mean	Median
Unscaled Variables										
EV	165.32	22.74	465.65	88.20	1,594.13	195.90	3,190.71	1174.80	-1,428.81***	-173.16***
TA	207.99	40.06	567.18	111.93	1,633.69	132.94	4,116.58	1422.08	-1,425.70***	-92.88***
BV	99.75	9.65	311.09	44.66	1,168.04	106.00	2,662.58	744.03	-1,068.29***	-96.35***
E	10.79	0.90	35.64	4.61	23.64	2.15	255.59	16.73	-12.85	-1.25
Scaled Variables										
EarningsGrowth%	0.37	0.02	1.78	0.72	-0.78	0.00	8.60	1.42	1.15	0.02
ROE	1.08	0.09	4.17	0.33	0.04	0.05	0.31	0.15	1.04**	0.04***
EV/E	22.07	15.99	16.97	23.83	45.81	20.41	81.13	20.31	-23.74**	-4.42*
EV/BV	7.25	2.22	16.77	3.50	2.20	1.50	1.94	1.73	5.05***	0.72***

Table 2: Relevance of Financial Statement Information for Private vs. Public Firm Valuations

The table reports the parameter estimates together with their significance levels for two regression models. In panel a the results are for a log-linear regression of EV on BV and E. EV is expert value of equity; BV is book value of equity; and E is earnings before extraordinary items. Each Variable ("X") in the regression is log-transformed as follows:

$$L(X) = \begin{cases} \ln(X+1), & X \geq 0, \\ -\ln(-X+1), & X < 0. \end{cases}$$

The transformation shown above is monotone and information-preserving; it ensures that L(X) is defined when X is zero [by the addition of 1 (million NIS) to X] and that negative values (of earnings) are not discarded. In panel b the results are for the following regression:

$$EV_{it} / BV_{it} = \beta_0 1 / BV_{it} + \beta_1 + \beta_2 E_{it} / BV_{it} + \varepsilon_{it}$$

The intercept (β_1) can be interpreted as the coefficient on book value of equity in the undeflated model. We include intercept dummies in the regressions for each industry and time period to control for industry and time effects. To deal with outliers, the independent and dependent variables are winsorized (top and bottom 1%). Standard errors of the coefficients are presented in parenthesis. *, **, and *** indicates significance level of 10, 5, and 1 percent, respectively.

Panel a: Log-linear regressions

	Private Firms	Public Firms
Intercept	2.639*** (0.186)	0.550* (0.308)
BV	0.218*** (0.061)	0.801*** (0.082)
E	0.689*** (0.114)	0.195 (0.073)
Adj. R^2	0.932***	0.543***
No. of Obs.	66	81

Panel b: Deflated regressions

	Private Firms	Public Firms
Intercept	2.127 (2.941)	2.195*** (0.396)
1/BV	4.415*** (0.724)	1.494 (1.877)
E/BV	4.481*** (1.268)	0.266 (1.173)
Adj. R^2	0.898***	0.000
No. of Obs.	66	81

Table 3: Discrepancy between Expert Values and Values Calculated Using the

P/E and the Combined P/E—P/B Valuation Methods

In this table we present the discrepancy, in %, between expert valuation of companies and the calculated value of these companies using the P/E (in panel a) and the combined P/E – P/B (in panel b) valuation methods. Using the P/E method, the value is calculated by multiplying industry P/E ratio by the firm's reported earnings. Earnings are taken in four alternative ways: (1) last annual earnings; (2) last annual earnings before extraordinary items; (3) average earnings of last 3 years; (4) average earnings of last 3 years before extraordinary items. Using the P/E – P/B method, the value is calculated as the simple average of the values calculated from the P/E, using last annual earnings, and the P/B methods. In the P/B method, the value is calculated by multiplying industry P/B ratio by the firm's book value of equity. Statistics are presented for a sample of 56 public and 52 private firm valuations; observations loss is due to negative earnings. *, **, and *** indicate significance levels of 10, 5, and 1 percent, respectively to the t-test (Wilcoxon Signed Ranks Test) that the mean (median) value differs significantly from zero.

	Private Firms			Public Firms		
	Mean	Median	SD	Mean	Median	SD
P/E method						
Earnings used to calculate firm value:						
Last annual earnings	-0.140	-0.386	0.913	0.485***	0.142**	1.095
Last annual earnings before extraordinary items	-0.232	-0.403	0.725	0.468***	0.291**	1.034
Average earnings of last 3 years	0.327	0.014	1.362	0.323**	0.213**	0.862
Average earnings of last 3 years before extraordinary items	0.284	-0.086	1.230	0.451***	0.380**	0.929
P/E – P/B method	0.294	0.056	1.030	0.367***	0.192**	0.809

Table 4: Multivariate Analysis of Valuation Multiples

Table 4 presents the results of the following regression model:

$$ValuationR\,atio = \beta_0 + \lambda_1 BuyerCommi\,s + \lambda_2 Size + \lambda_3 Leverage + \lambda_4 ROE + \lambda_5 EarnGrowth\,\% + \varepsilon$$

The regression is estimated separately for *BV/EV* ratio and for *E/EV* ratio. *BV* is book value of equity, *E* is net income before extraordinary items, and *EV* is the expert valuation of the enterprise value. *Buyercommis* is an indicator variable that equals 1 (0) if the buyer (seller) has commissioned the expert valuation; *Size* is the log of the target's total assets; *Leverage* is the ratio of total liabilities less current liabilities to total assets; *ROE* is net income before extraordinary items divided by book value of equity; and *EarnGrowth%* is the percentage change in the target's annual net income before extraordinary items. We control in the regressions for industry and time effects. In the calculation of *E/EV* ratio 25 (14) observations were lost for public (private) firms due to negative earnings; hence, statistics presented for *E/EV* regression are for a sample of 56 public and 52 private firm valuations.

To mitigate the effect of outliers, we winsorize the top and bottom 1% of the regressions continuous variables. Standard errors of the coefficients are presented in parenthesis. *, **, and *** indicate significance levels of 10, 5, and 1 percent, respectively.

	Predicted Sign	BV/EV		E/EV	
		Private Firms	**Public Firms**	**Private Firms**	**Public Firms**
Intercept		0.534***	0.738***	0.087**	0.076**
		(0.101)	(0.205)	(0.032)	(0.047)
Buyercommis	+	0.519***	0.082**	0.046**	0.020**
		(0.071)	(0.168)	(0.027)	(0.033)
Size	+/–	0.055	-0.001	-0.013	0.004
		(0.018)	(0.043)	(0.006)	(0.008)
Leverage	+/–	-0.391***	-0.088*	-0.018*	-0.055*
		(0.133)	(0.187)	(0.031)	(0.054)
ROE	–	-0.010**	-0.048	-0.007**	-0.015
		(0.009)	(0.324)	(0.006)	(0.109)
EarnGrowth%	–	-0.027**	-0.066**	-0.006**	-0.008**
		(0.026)	(0.099)	(0.006)	(0.002)
Adj. R^2		0.703***	0.296***	0.639***	0.272***
No. of Obs.		66	81	52	56

[1] Additional studies document firms' incentives to manage earnings around large transactions. For example, Easterwood (1998), Christie & Zimmerman (1994), Erickson & Wang (1999), Louis (2004), and Powell & Stark (2005) for mergers and acquisitions; DeAngelo (1986) and Perry & Williams (1994) for management buyouts; Aharony et al. (1993), Friedlan (1994), Teoh et al. (1998a), Teoh & Wong (2002), and Ball & Shivakumar (2006) for initial public offerings; Teoh et al. (1998b), Rangan (1998), Shivakumar (2000), Teoh & Wong (2002) and Marquardt & Wiedman (2004) for seasoned equity offerings; Louis & Robinson (2005) for stock splits; and Coles et al. (2006) for employee stock option reissues.

[2] According to De Franco et al. (2008), these innate characteristics of private companies could result in a relatively limited product and market scope which leads to low diversification and hence to a high variability in sales and operating cash flows – innate factors of low earnings quality identified and used by Dechow and Dichev (2002) and Francis et al. (2005).

[3] Several empirical studies provide evidence of less liquidity for private firms as expressed by a positive abnormal return for bidders of private targets, in contrast to the negative abnormal return for bidders of public targets (see, e.g., Ang and Kohers, 2001; Chang, 1998; Fuller et al., 2002; Draper and Paudyal, 2006).

[4] In contrast to the private firms, the public firms in our sample are also closely followed by sell-side analysts. We also point out that neither firm in the private sample has been privatized by private equity firms. Additionally, neither firm in our sample has been delisted from the exchange during the sample period.

[5] Elnathan et al. (2009) outline the mandatory valuation reporting procedure in Israel: "…whenever an extraordinary transaction is considered, the ISA requires a full disclosure on the nature of the transaction and the way the price was determined. As a result, in all such transactions, in practice, at least one of the parties involved hires an expert to provide a valuation that justifies the transaction price. Usually that party will be an interested party (holding at least 5% of the company's shares). Since the ISA examines the expert valuation, and often times makes comments on that valuation which may actually lead to changes in the valuation, the transaction price agreed upon by the parties is reported to the public together with the final valuation. As a result, almost always the transaction price will be in line with the expert's valuation. Since the expert valuation is meant to provide justification for the transaction price, he is, in fact, indirectly part of the negotiations. In fact, often he will be invited to the ISA together with the selling and buying parties to respond directly to the inquiries of the ISA officials. Hence, the valuation made by the expert is an important benchmark for the transaction price that will eventually be agreed upon by the parties involved. Notably, since the ISA may address questions to the expert and may consider asking for another expert's opinion, the expert is supposed to be committed to an objective valuation... In rare cases, these valuations are not reported to the public, if the expert valuation did not justify the transaction price and the deal was called off by the parties involved".

[6] Firms provide voluntary disclosure of expert valuation during *ordinary events* if they base their decision on such valuation. Otherwise, almost always they will refrain from doing it.

[7] IPOs disclosure requirements in the Tel Aviv Stock Exchange (TASE) follow to a large extent the same requirements of the American SEC. The main ones are: a prospectus that fully discloses the firm and its owners, authorization by the ISA (Israeli SEC) and by the TASE, a threshold level of equity, restrictions on sale of shares by original owners for a specified period after the IPO, a minimum number of shareholders after the completion of the IPO, and a minimum percentage of equity offered to the public.

[8] The primary manual collection of data involved three tasks: (1) retrieving, printing and organizing the valuation documents; (2) reading the documents, selecting, processing and coding the critical information; and, (3) entering the information into a spreadsheet and converting this information into a format that statistical software can use.

[9] During the period of the study the level of fair value accounting in Israel was not high. However, Israeli accounting had a unique feature where all financial statements' information was adjusted to inflation, using general price level index as basis for adjustments. Thus the book value of equity would be adjusted to changes in the general price level, making it different from historical book value but not necessarily reflecting complete fair value accounting. The taxes payable were also affected by the adjustment, in effect eliminating taxation on inflationary profits. The adjustments were required for all companies, public and private. That adjustment was abandoned in 2004 due to reduced level of inflation.

[10] During the sample period, FX rate was in the range of 2.2-4.9 NIS per 1 $US.

[11] The leverage degree of private and public firms is compared based on the ratio of total liabilities to total assets. Sufficient data to separate between current liabilities and long-term liabilities was not available for the private firms in our sample.

[12] We obtain industry classification from the periodic reports of the TASE, which classifies firms according to their industry affiliation.

[13] Also, in year 1994, the ISA amended its regulations regarding conflicts of interest between controlling shareholders and 'outsiders' minority shareholders so that any corporate transaction that is not conducted at arm's-length according to market conditions, or any transaction with a controlling shareholder or other party in which the shareholder has a personal interest, requires the approval of the company's audit committee, board of directors and general shareholders' meeting. The new amendment to the Joint Investment in Trust Act – 1994 (Mutual Fund Act), require mutual fund managers to attend and vote in the shareholders meetings of its portfolio companies. Minority shareholders should benefit from institutional investors intervention given their market power to provide at least a partial solution to the failure of the market to align the interests between controlling shareholders and minority shareholders (Hauser and Lauterbach, 2004)..

[14] Hand (2005) explains that, although it may not seem straightforward to develop a model in which equity value is a log-linear function of financial statements from first principles, the advantages in a log-linear valuation model are in "…its flexibility in accommodating nonlinear relationships …and the econometric robustness it provides in dealing with outliers in the underlying nonlogged data".

[15] Additional multiples that are widely used to value firms include enterprise value to EBITDA and enterprise value to sales, where enterprise value is the firm's equity plus long-term liabilities (see, e.g., Kaplan & Ruback, 1995; Bhojraj & Lee, 2002; Lie & Lie, 2002; Liu et al., 2002; Mukherje et al., 2004; De Franco et al., 2008). We were not able to apply these multiples in our study as the data needed to calculate them was not available for the sample of private firms.

[16] Alford (1992) shows that the selection of similar companies on the basis of industry affiliation provides the highest precision when using the P/E method of valuation. Whereas the selection of comparable companies in the US is typically based on the Standard Industrial Classification (SIC) code, Israeli companies are not classified according to a similar system. We obtain industry classification from the periodic reports of the TASE, which classifies firms according to their industry affiliation and also provides an industry multiplier, calculated as "the sum of market value of the shares and options" divided by "annual earnings" for all firms in a specific industry.

[17] Koeplin et al. (2000) estimate a discount of 20%-30% using enterprise value-to-EBIT and EBITDA multiples, however they do not find a significant discount using enterprise value-to-sales.

[18] Analysts (as well as auditors) were criticized for not warning investors from inflated stock prices and imminent bankruptcies. This has resulted in regulatory and legislative change (e.g., the Sarbanes-Oxley Act of 2002).

[19] Additional proxies for growth used in prior studies include sales growth, R&D expenditures, advertising expenditures and capital expenditures (see, e.g., De Franco et al., 2008; Core et al., 2003; Demers & Lev, 2001). However, these variables are unavailable for our private firm sample as they are not presented in their documented valuations.

[20] Because firms may self-select into private firms and public firms depending on their size, financing needs, cost and availability of credit, cost of public reporting, etc., we supplement our regressions with a two-stage Heckman self-selection model. In the first stage, we develop a private/public firm selection model using explanatory variables consistent with prior research that have examined firms' choice to go public (e.g., Pagano et al., 1998). The dependent variable equals 0 if firm i stays private in period t and equals 1 if it goes public. The independent variables are log of total assets, sales growth, leverage, ROE, industry's market-to-book ratio (the ratio at which firms in the same industry trade) and year. Consistent with prior studies, growth is used to capture a firm's financing needs and leverage captures the cost and availability of credit. The untabulated results for the first-stage models indicate that the probability that a firm chooses to go public is increasing in industry's market-to-book ratio, firm size and growth. In the second stage, we control for firm characteristics related to the selection to either go public or remain private by including the Inverse Mills ratio in the empirical model. The results not tabulated in the paper seem to be essentially the same. We also employ a two-stage model to account for a self selection problem with regards to who initiated the valuation (buyer or seller). The choice to initiate a valuation is expected to be correlated with the target firm governance and other internal control variables. In the first stage, we develop a buyer/seller commissioner selection model. The dependent variable is the identity of the commissioner of the valuation, i.e., a variable that equals 1 if the valuation was commissioned by the buyer and equals 0 if the commissioner is the seller. The independent variables are the percentage holdings of insiders, representing corporate governance, and

the interaction between a variable that equals 1 (0) if the firm is private (public) and the percentage holdings of insiders. The untabulated results for the first-stage models indicate that the probability that a buyer would initiate a valuation is increasing in the percentage of insider holdings, i.e., is increasing the more concentrated (closely-held) are the controlling interests in the target firm (the seller). This probability is even higher when the seller is a private firm, implying that the buyer is less confident with regards to governance credibility when buying a private firm, in comparison to a public firm. In the second stage, including the Inverse Mills ratio in the empirical model does not alter the qualitative results. The Inverse Mills ratio is insignificant in our *BV/EV* model as well as in our *E/EV* model, suggesting that selection factors do not have a significant influence in either of our models. We point out that additional explanatory variables suitable for the first stage regressions (e.g., a firm's capital investments to proxy for financing needs, cost and concentration of bank credit to proxy for cost and availability of credit, marginal cost of public reporting, etc.) were not included in the regression because of unavailability of the relevant information. In all, our results are found to be robust to any of the regression models used.

[21] In one case of a public firm valuation, the transaction price was 6.5% lower than the expert valuation.

[22] For the public firm subsample we also explore the market reaction to the valuation results using size adjusted cumulative abnormal returns in the three and seven days centered on the publication of the valuations (the results do not change when taking wider time windows of -10,10 and -30,30 days). Untabulated results indicate that investors did not respond to the publication of the valuation results, as expressed in insignificant cumulative abnormal returns. Similar findings are presented in Elnathan et al. (2009). Elnathan et al. explain that the market recognizes that expert valuations are of limited importance to them since they are aimed at the parties involved in the transactions. They relate this finding to other findings in their study which indicate that expert valuations are not impartial and are biased towards majority shareholders who hired them to value the firm.