

**Trustworthiness of Firm Valuations:
Bias and Market Perception in Compliance with Capital Market
Regulations**

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Trustworthiness of Firm Valuations:

Bias and Market Perception in Compliance with Capital Market Regulations

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This study examines the reliability of expert-prepared firm valuations published by public firms for their subsidiaries, in compliance with capital market regulations. Using Israeli data, we find a significant upward bias (ranging from 93% to 196% for public firms and 82% to 141% for private companies) in forecasted operating profit despite the requirement for fair value assessments. The stock market responds to valuations. Valuations are informative in forecasting future operating income for public firms but not for private firms. While market participants underestimate the bias, and still find valuations valuable. Acknowledging regulatory limitations can benefit market participants despite imperfect regulations.

Keywords:

Firm Valuation, Regulation, Fair Value, Bias, Market Perception

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1. Introduction

Regulations mandate companies to disclose precise and timely details regarding their financial status, operations, and risks. This serves to enable investors to make well-informed decisions and foster market efficiency. A central regulatory development in business reporting in the current century was the adoption of fair value accounting. As part of this development, financial reporting regulations (IFRS and US-GAAP), specifically designed to improve the informativeness of corporate reporting, allow the use of firm valuations by expert opinion. The Discounted Cash Flow (DCF) method, frequently employed in firm valuations, incorporates revenue and earnings forecasts as critical components (e.g., Oded and Michel, 2007). These valuations are included in financial statements and considered for financial reporting purposes as Level-3 Fair Value Measurements. These estimated values are not fully and directly exposed to open and public scrutiny and heavily rely on subjective forecasts by the appraisers.

However, studies by Dechow, Myers, and Shakespeare (2010) and Hanley, Jagolinzer, and Nikolova (2018) have pointed out the sensitivity of relying on managers' earnings forecasts and other subjective estimates affecting value, which poses a risk of intentional or unintentional incorrect securities pricing. They have shown that managers might be tempted to exercise significant discretion in their reporting, potentially leading to misrepresentation in earnings. This gives rise to moral hazard issues between the company's management, investors, auditors, and appraisers, who have different interests. Pressure from management on auditors and appraisers to achieve specific results may result in biased and inaccurate information and value outcomes, leading to poor decision-making by market participants and investors who rely on such information.

To explore the trustworthiness of firm valuations in corporate financial reporting, this study leverages exclusive data from the Israeli capital market. The availability of this data is attributed to a distinctive regulation by the Israeli Securities Authority, which mandates public firms to disclose firm valuation reports, particularly those significantly impacting the value of the firms or their financial statements, such as valuations of subsidiaries.

The remainder of the paper is structured as follows. Section 2 describes the data, followed by Section 3, which outlines the empirical methods and presents the results. Section 4 concludes.

2. Data

The data for this study consists of valuations of public and private companies that were published in compliance with the regulation. We focused on observations with sufficient data from 2008 to 2019 (pre-COVID). To augment our dataset, we collected and processed additional information from the financial statements of public companies. For private companies, we obtained accounting data from the published valuations. Stock prices were retrieved from Thomson Reuters and the Tel-Aviv Stock Exchange website.

Our analysis considered valuations based on the discounted cash flow method, which requires forecasts for future revenues and operating income. To ensure data consistency, all variables were winsorized at the 1% level.

Our dataset comprises 325 valuation reports on 101 companies, including 34 public and 67 private firms. Notably, initial evidence of a potential bias in forecasts is readily observed for public firms. On average, equity valuations are 114.1% higher and 36.2% higher in median compared to the market value of equity at the time of valuation. Through a more detailed investigation, we have established that the bias is present in the forecasts of revenues and operating income, which is evident for both private and public companies.

3. Methodology and Results

3.1. Overview

The methodology and results section of this paper encompasses several vital aspects. Firstly, we investigate the presence and extent of bias in revenue and operating profit forecasts within publicly available valuations of subsidiary companies, considering both public and private entities. Secondly, we assess the value relevance of these valuations in predicting future revenues and operating income. Additionally, we examine the market perception of valuations through two distinct approaches. First, we conduct event studies to analyze whether the market responds to the release of valuations. Secondly, we

administer a survey among market participants to gauge their perception regarding biases in valuations and their perceived usefulness.

3.2. Bias in forecasts

Several studies (Barth, 1994; Goh et al., 2015; Song et al., 2010; Petroni & Wahlen, 1995) suggest that investors often discount fair value estimates derived from Level 3 inputs. The reason behind this discounting is the heavy reliance of these estimates on managerial judgment, which renders them vulnerable to opportunistic behavior (Kothari et al., 2010). Therefore, our first hypothesis posits that the bias in valuation is positive, indicating analysts' inclination to satisfy firm executives with overvalued estimates. We employ two measures to assess this bias. The first measure quantifies the bias in revenue and operating profit (namely earnings before interest and tax; EBIT) forecasts by comparing them to the actual results observed over time. We define the valuation forecast error (VFE) based on the methodology proposed by Capstaff et al. (1995, 2001) as follows:

$$(1) \quad VFE_{k,i,h} = \frac{F_{k,i,t,h} - A_{k,i,t,h}}{|A_{k,i,t,h}|}$$

where $F_{k,i,t,h}$ represent the revenue or EBIT forecast, for company i at time $t = 0$ ($k = 1$ for revenue and $k = 2$ for the EBIT) and $A_{k,i,t}$ denotes the actual realization over a time horizon of $h = 1, 2, 3$ years.

As an alternative, we also examine the difference between the forecasted trends in revenue and operating profit, and the historical trend. We define the trend forecast error TFE as

$$(2) \quad TFE_{k,i,h} = \frac{1}{h} \left[\frac{F_{k,t+h+1} - F_{k,t+1}}{|F_{k,t+1}|} - \frac{A_{k,t-1} - A_{k,t-h-1}}{|A_{k,t-h-1}|} \right]$$

We compute this measure for short-term ($h = 1$) and medium-term ($h = 3$) time horizons.

Table 1 presents the results for VFE. We find that for private firms, all VFEs are positive and statistically significant. The median VFE is 2.4%-4.3% for revenue and 25.1%-56.5% for EBIT. As for public firms, EBIT exhibits a median upward bias of 6.7%-14.3%, statistically significant only for the three-year horizon. The mean bias in EBIT is positive and statistically significant. However, there is no evidence of a positive bias in revenue forecasts.

Turning to TFE (Table 2), we observe a median upward bias of 1.8%-2.6% in revenue forecasts and 18.9%-21.5% in EBIT forecasts among private firms. However, the forecast bias among public companies is statistically insignificant. Our findings demonstrate a positive bias in forecasts, compared to both realizations and past trends, primarily observed in private firms.

Overall, we conclude that there is an upward bias in valuation forecasts, even after accounting for growth trends and "naïve" errors. It is worth noting that despite the audit process and reliance on management forecasts, the degree of bias found in operating profit forecasts within valuations exceeds the findings of Frankel et al. (1998) and Capstaff et al. (2001) regarding sell-side analysts. Our results align with the findings of Chan, Karceski, and Lakonishok (2002) and De Bondt and Thaler (1990), which also reported limited benefits from analysts' forecasts, a tendency for overreactivity, and systematic over-optimism in their predictions.

3.3 Market response to the publication of valuations

In this section, we examine the response of share prices to the publication of valuations for public firms. A significant market response suggests that market participants consider the valuation informative. To conduct this analysis, we utilize daily stock data and the TA-35 stock index obtained from the Tel-Aviv Stock Exchange website. It is important to note that valuations, on average, are approximately 114.1% higher than market prices. Therefore, we control for the information set prior to the publication of the valuation, by scaling the estimated value of a share by its price prior to the publication.

To estimate the parameters of the Capital Asset Pricing Model (CAPM), we use data from 252 days preceding the event window. Subsequently, we employ the standard event study methodology to calculate the cumulative abnormal return for various time windows surrounding the publication date. To assess the relationship between the market response and the valuation-to-price ratio (V/P), we conduct regressions where the dependent variable is the market response, and the independent variable is the V/P ratio.

Table 3 presents our findings, indicating that a higher valuation ratio corresponds to a greater market response, regardless of the time window used to measure the market response. Our results align

with Womack (1996) who reported an average abnormal return of 2.4% when the estimated value of sell-side analysts' reviews exceeded the share price.

3.4 Informativeness of valuations

To assess the informativeness of firm valuations, we examine whether valuations have predictive power for future operating income (EBIT). Following the method proposed by Bai et al. (2016), we estimate the following equation:

$$(3) \quad EBIT_{i,t+h} = \alpha + \beta_V \cdot Value_{i,t} + \gamma \cdot EBIT_{i,t} + \varepsilon_{i,t}$$

In this equation, $EBIT_{i,t+h}$ represents the realization of operating income for firm i at time $t+h$ (where $h=1,2,3$ years) scaled by total assets at time t , $EBIT_{i,t}$ is similarly the natural logarithm of operating income in time t , $Value_{i,t}$ stands for the natural logarithm of the estimated value of the equity of firm i at time t scaled by total assets. α, β_M, β_V and γ are parameters. We also define Z_V as a measure of the information embedded in market prices for predicting of future operating income, given by $Z_V = 100 \cdot abs[\beta_V \cdot \sigma_V]$, where σ_V is defined as the standard deviation of $Value_{it}$.

Table 4 presents the results for private companies, indicating that the prediction power of valuation is both statistically and economically insignificant. This finding suggests that valuations of private firms are not only upward biased but also non-informative for market participants. We repeat the same analysis for public companies, but now include market value in the equation:

$$(4) \quad EBIT_{i,t+h} = \alpha + \beta_M \cdot Market_{i,t} + \gamma \cdot EBIT_{i,t} + \varepsilon_{i,t}$$

Here $Market_{i,t}$ represents the natural logarithm of market value of the equity scaled by total assets of firm i at time t . Similar to Z_V we define Z_M as a measure of informativeness of valuation in predicting future operating income, given by $Z_M = 100 \cdot abs[\beta_M \cdot \sigma_M]$. Table 5 indicates that both market prices and valuations of public companies contain additional information about future operating profit for all periods. It appears that valuations of public firms are not only less biased compared to valuations of private firms but also more informative.

To further investigate the relative information content of valuations compared to market prices, we conduct horserace regressions as follows:

$$(5) \quad EBIT_{i,t+h} = \alpha + \beta_V \cdot Value_{i,t} + \beta_M \cdot Market_{i,t} + \gamma \cdot EBIT_{i,t} + \varepsilon_{i,t}$$

Table 7 presents the results, showing that valuations provide additional information beyond market prices in forecasting future operating income for public firms. The estimated coefficient β_V is positive and statistically significant in all regressions, whereas the estimated β_M is not statistically significant in any regression.

Our findings suggest that although valuation forecasts are biased, and despite the difficulties and complexities involved in estimating valuations, published valuations for public firms still contain valuable information for market participants. These findings align with the conclusions of Penman (2007) and Hodder et al. (2014), who argue that the usefulness of fair value estimates depends on market players' judgments about their reliability, forecasting quality, and ability to evaluate associated risks.

3.5. Survey study

To gather insights on market participants' views regarding valuation forecasts and estimated value, we conducted a survey using a questionnaire. We reached out to potential respondents by sending 2,045 email requests through an approved independent online questionnaire software. The recipients were selected based on information from various sources, including the ten largest accounting firms in Israel, 100 law firms specializing in the Israeli capital market, 100 institutional investors' offices, and the management offices of 100 public companies in Israel as listed in the 2019 edition of Dun and Bradstreet's "Top 100" publication in Israel.

Participation in the survey was voluntary, and we ensured the anonymity of respondents. We sent automatic reminders at one, two, and three-week intervals to those who hadn't replied, and after four weeks, we concluded the survey. Respondents provided their answers independently, without direct interaction with the researchers. To avoid bias, respondents from the same employer were asked not to discuss the questions with each other.

A total of 194 individuals completed the survey, representing approximately 9.5% of the respondents. Among them, 32 identified themselves as appraisers, 24 as auditors, 19 as lawyers, 76 as members of public company management, 16 as market players or institutional investors, and 27 as others. Most respondents (177) had more than nine years of experience in their respective fields, while the remaining respondents had varying levels of experience.

Regarding familiarity with valuations, 150 respondents indicated a good to very good level of familiarity, 22 stated it was reasonable, and 22 considered it low. In terms of occupation and education, 27 respondents had a bachelor's degree, 70 were certified public accountants (CPA), 25 held an LLB degree, 50 had a master's degree or MBA, and 6 had a degree beyond the master's level. Additionally, 16 respondents selected "other" to describe their level of education.

We discovered that the surveyents find valuations informative. 87.1% of them agreed or strongly agreed with the statement: "When I read a valuation, it helps me because it adds information about the market, competitors, and forecasts that I did not necessarily know before. It improves my work."

Given the extensive regulations surrounding the publication of valuations in Israel, we aimed also to assess market participants' opinions on the presence of biases in valuation forecasts. Table 7 presents respondents' assessments of bias perception in revenue forecasts for one year ahead (question 1), operating profit forecasts for one year ahead (question 2), revenue forecasts for three years ahead (question 3), and operating profit forecasts for three years ahead (question 4). We compared their answers with the biases we previously identified (Table 1).

Our findings indicate that market participants believe there is a systematic upward bias in both revenue and operating profit forecasts. These beliefs are statistically significant for both the one-year and three-year timeframes. Furthermore, market participants perceive a greater upward bias in revenue forecasts than what we found. Based on our findings, they assume a 5.2%-9.1% upward bias, compared to the actual bias mean of 5.5%-6.3% (3.7%-7.2% median expectation vs. 1.7%-3.6% actual bias).

Regarding operating profit forecasts, market participants also perceive an upward bias, but their assessments of 4.2%-9.6% are significantly lower than the actual bias of 88.4%-113.1%. Consequently,

they underestimate the actual degree of upward bias by approximately 93% (3.4%-6.8% median expectation vs. 25.8%-44.1% actual bias).

Our results show statistically significant mean and median biases in revenue and operating profit forecasts across all examined periods. We also analyzed respondents' perceptions of the bias in the estimated value itself. On average, respondents believe that valuations are higher than the fair value by 8.2%. We further examined perceived biases based on occupational groups, although the detailed results are omitted for brevity. We found that the perceived upward bias is evident across all occupations, with appraisers' subgroup indicating the lowest bias (5.9%) and lawyers' subgroup perceiving the highest bias (20.5%). Notably, appraisers and company managers often had perceptions that deviated the most from the actual biases, particularly concerning operating income forecast bias and the estimated value versus perceived fair value. Conversely, lawyers consistently had perceptions closest to the actual bias results, albeit still underestimating them. Overall, our findings suggest that market participants are aware of the systematic upward bias in valuation forecasts and take it into consideration.

4. Summary and Concluding Remarks

Our research explores various aspects of valuation, taking advantage of the extensive directives in Israel that require the mandatory publication of some valuation full reports, with the goal of providing more information to market participants.

We find that revenue forecasts in public companies' reports exhibit minimal or no bias, whereas forecasted operating profit demonstrates a significant upward bias compared to the actual realization. Through event study methodology, we observe that the markets respond to the publication of valuations for public companies. By employing the approach developed by Bai et al. (2016), we find that valuations of public companies contain new information about future operating income that is not reflected in market prices. However, for private companies, we observe an upward bias in valuation forecasts and a lack of informative value for predicting future operating income. Our survey results among market participants corroborate their awareness of the upward bias in valuations, and they accounted for it in their decision-making.

The substantial underestimation by market participants of the actual bias, coupled with the significant upward bias in valuations, highlights the limitations inherent in relying solely on a passive, albeit detailed, data approach to valuation reporting, despite its usefulness. Our findings suggest a potential avenue for enhancing the reliability of valuations by complementing the extensive information available in the public domain with active, ongoing, and retrospective analyses of past biases, both at the company and appraiser levels. Our study indicates that market participants prefer having biased information over a complete absence of information.

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Tables

Table 1: Forecasts bias from actual future results (VFE)

This table shows the forecast bias in revenues and EBIT compared to actual realizations of these items. We check statistical significance by using two-sided t-tests for means and rank tests for medians.

Panel (a): Private Companies						
Horizon (h)	1 year		2 years		3 years	
	Mean	Median	Mean	Median	Mean	Median
Revenues	***5.1% (0.14)	2.4%***	8.0%*** (0.21)	4.3%**	11.1%*** (0.28)	4.0%*
EBIT	81.9%*** (1.83)	25.1%***	124.3%*** (2.48)	39.8%***	141.5%*** (2.68)	56.7%***
Observations	170		119		75	

Panel (b): Public Companies						
Horizon (h)	1 year		2 years		3 years	
	Mean	Median	Mean	Median	Mean	Median
Revenues	12.20% (0.78)	0.00%	14.70% (1.11)	1.5%*	-8.90% (0.40)	-0.4%*
EBIT	93.2%** (3.40)	14.30%	196.4%* (4.89)	6.70%	44.3%*** (1.00)	12.3%***
Observations	43		35		29	

(se) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 2: Forecasts trend vs. historical trend (TFE)

This table shows the bias in forecast trends in revenues and EBIT compared to historical trends. We check statistical significance by using two-sided t-tests for means and rank tests for medians.

Panel (a): Private Companies

	Short-term trend		Medium-term trend	
	Mean	Median	Mean	Median
Revenues	4.4%*** (0.22)	2.6%***	2.8%*** (0.17)	1.8%**
EBIT	419.8%*** (22.75)	21.5***	35.9%*** (1.53)	18.9%***
Observations	243		219	

Panel (b): Public Companies

	Short term trend		Medium term trend	
	Mean	Median	Mean	Median
Revenues	1.1% (0.14)	0.8%	-4.3%* (0.18)	-0.9%*
EBIT	4.8% (1.93)	17.8%	23.0% (0.84)	14.9%
Observations	42		37	

(se) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 3: Market response vs. valuation

This table shows the fixed-effect regression results where the dependent variable is cumulative abnormal return for 3 days [0, +2], 5 days [-2, +2], or 7 days [-3, +3], surrounding the publication day of the firm valuation. The independent variable is V/P which is the ratio of the firm's value according to the valuation and the market value of equity one day prior to the publication.

Independent Variable	Dependent Variable		
	CAR3 [0, +2]	CAR5 [-2, +2]	CAR7 [-3, +3]
V/P	0.025** (0.01)	0.028** (0.01)	0.031** (0.02)
Observations	50	50	50
R-squared	0.094	0.078	0.083

(se) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4: Informativeness of private companies' valuations

This table presents the fixed-effect regression results where the dependent variable is $EBIT_{t+h}$, operating income at time $t + h$ scaled by total assets at time t . $Value_t$ is the natural logarithm of the valuation at time t scaled by total assets at time t and $EBIT_t$ is the operating income at time t scaled by total assets at time t . Z_V represents in absolute terms, the degree of information embedded in market prices in prediction of future operating income.

	$EBIT_{t+h}$			
	1-3 years (all)	1 year	2 years	3 years
$Value_t$	0.001 (0.03)	0.032 (0.02)	-0.024 (0.02)	0.05 (0.04)
$EBIT_t$	0.310** (0.12)	0.227** (0.11)	0.374** (0.18)	0.182 (0.19)
Constant	0.040** (0.02)	0.042** (0.02)	0.041* (0.02)	0.056** (0.02)
R-squared	0.103	0.213	0.141	0.224
Z_V	0.066	2.003	1.639	3.395
Observations	255	172	124	82

(se) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5: Informativeness of public companies' evaluations: Evaluations vs. market price in predicting operating income

This table shows fixed-effect regression results for public firms where the dependent is operating income (EBIT) realization in time horizon h ($h=1, 2, 3$ years) scaled by current total assets, and independent variables are Value (natural logarithm of firm equity valuation scaled by total assets), Market (natural logarithm of market valuation of the firm's equity scaled by total assets), and EBIT is the current operating income scaled by current total assets. Z_V and Z_M represent the degree of information embedded in valuations and market prices, respectively, in prediction of future operating income.

EBIT future realizations	1-3 years (all)		1 year		2 years		3 years	
	Valuation	Market	Valuation	Market	Valuation	Market	Valuation	Market
$Value$	0.145*** (0.04)	- -	0.072*** (0.02)	- --	0.281*** (0.04)	- -	0.084*** (0.02)	- -
$Market$	- -	0.077** (0.04)	- -	0.036 (0.22)	- -	0.138** (0.07)	- -	0.070*** (0.01)
$EBIT$	-0.264 (0.18)	-0.352 (0.22)	0.173* (0.10)	0.141* (0.09)	0.999*** (0.15)	1.120*** (0.30)	0.170* (0.11)	0.143* (0.09)
Constant	0.098* (0.05)	0.160** (0.06)	0.074** (0.04)	0.103** (0.04)	0.273*** (0.03)	0.353*** (0.07)	-0.004 (0.02)	0.050*** (0.01)
R-squared	0.093	0.010	0.265	0.238	0.060	0.038	0.142	0.063
Z_V	12.514***	-	6.257***	-	23.351***	-	7.652***	-
Z_M	-	6.045**	-	2.884	-	10.226**	-	5.803***
Observations	68		66		66		64	

(se) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6: Informativeness of public companies' evaluations: A horserace

This table shows fixed-effect regression results for public firms where the dependent is operating income (EBIT) realization scaled by current total assets, and independent variables are Value (natural logarithm of equity valuation scaled by total assets), Market (natural logarithm of market valuation of equity scaled by total assets), and EBIT is the current operating income scaled by current total assets. Z_V and Z_M represent the degree of information embedded in valuations and market prices, respectively, in prediction of future operating income.

Time horizon (h)	1-3 years (all)	1 year	2 years	3 years
<i>Value</i>	0.072*** (0.02)	0.133*** (0.03)	0.160*** (0.04)	0.072** (0.03)
<i>Market</i>	-0.031 (0.02)	-0.019 (0.02)	0.009 (0.04)	-0.014 (0.03)
<i>EBIT</i>	0.413*** (0.15)	0.548*** (0.15)	-0.04 (0.26)	0.048 (0.16)
Constant	0.005 (0.03)	-0.015 (0.03)	0.144* (0.08)	-0.021 (0.04)
R-squared	0.627	0.746	0.701	0.652
Z_V	6.222***	2.842	13.296***	6.523**
Z_M	2.465	1.506	2.934	1.178
Observations	68	66	66	64

(se) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 7: Bias in forecasts: Actual vs. market perceptions

This table shows the survey results for 194 respondents regarding their perceptions regarding biases in appraisers' forecasts for revenues and operating income (EBIT) for time horizons of one year and 3 years. For comparison, we show the actual biases in evaluations of private and public firms, in 215 observations for year 1, and 104 observations for 3 years.

Panel (a): Revenues

Time horizon (h)	Year 1		Year 3	
	Actual	Survey	Actual	Survey
Mean	6.3%** (0.004)	5.2%*** (0.001)	5.5%* (0.003)	9.1%*** (0.002)
Median	1.7%	3.7%***	3.60%	7.2%**

Panel (b): EBIT

Time horizon (h)	Year 1		Year 3	
	Actual	Survey	Actual	Survey
Mean	88.4%*** (0.022)	4.2%*** (0.001)	113.1%*** (0.023)	9.6%*** (0.002)
Median	22.50%	3.4%***	46.50%	6.8%***

(se) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.