Available online at:
https://jurnal.integrasisainsmedia.co.id/index.php/JISSB
Journal Integration of Social Studies and Business Development
Volume 2 Number 2: 105-115
DOI: 10.58229/jissbd.v2i2.237

The Accuracy of Relative Valuation Methods in Predicting the Offer Price of Indonesian IPO Stocks

Rafi Ravenza[1*], Raden Aswin Rahadi[2]
School of Business and Management, Institut Teknologi Bandung[1]

*Email: rafi_ravenza@sbm-itb.ac.id

Abstract

The increasing Initial Public Offerings (IPO) trend in Indonesia has created many investment opportunities for institutional and retail investors. However, multiple valuation methods often result in varying IPO price predictions, leading to uncertainty and confusion among investors. This study aims to assess the effectiveness of relative valuation methods in predicting IPO offer prices, focusing on widely adopted methods due to their simplicity and accessibility. The research evaluates three popular relative valuation metrics: the price-to-book (P/B) ratio, the price-to-earnings (P/E) ratio, and the price-to-sales (P/S) ratio. By analyzing companies that went public in Indonesia in 2023 and utilizing average financial ratios from the preceding year, the study seeks to determine which method provides the most accurate price predictions. The findings indicate that the P/B ratio is the most reliable method, achieving an average absolute error of 51.1%. This suggests that the P/B method minimizes valuation errors more effectively than P/E and P/S ratios. Moreover, regression models' P/B ratio demonstrates the highest adjusted R^2 value of 0.781, further validating its predictive accuracy. The implications of this study are significant for investors and financial analysts who rely on relative valuation methods to make informed decisions about IPO investments. By highlighting the P/B ratio's superior performance in predicting IPO offer prices, this research contributes to the ongoing discourse on valuation methodologies and their practical application in emerging markets like Indonesia.

Keywords: IPO Offer Prices; Relative Valuation Method; Valuation Error; Investment Decision

A. INTRODUCTION

The Initial Public Offering (IPO) represents a crucial milestone for companies transitioning from private to public ownership, offering shares to the public for the first time. Investors are often attracted to IPOs due to the potential for high returns, as these companies seek additional capital for expansion. The Indonesia Stock Exchange (IDX) has witnessed significant activity in recent years, hosting 243 IPOs between 2020 and 2023, which raised substantial capital and bolstered IDX's standing as a major global stock exchange (PwC, 2023).

Accurately determining the initial stock price during an IPO is critical, reflecting the company's intrinsic value and guiding the offering price (Roosenboom, 2012). An offering price that aligns with intrinsic value indicates thorough pricing and fairness for investors. However, discrepancies between these values can suggest mispricing, posing potential risks. While companies provide detailed prospectuses to mitigate investor uncertainty (Puspaningtyas, 2017), challenges persist due to limited historical financial data and varying market perceptions of growth potential (Chang et al., 2015).

Valuation methods, particularly relative valuation approaches, are frequently employed to estimate a company's worth. These methods, including metrics like the price-to-earnings (P/E) and price-to-book (P/B) ratios, compare a firm's value to similar companies (Deloof et al., 2009). However, predicting IPO offer prices is challenging due to information asymmetry and market volatility. Factors such as individual trader behaviour (Choi, 2020) and pre-IPO financial manipulations (Liu, 2020) can further complicate valuation accuracy.

This study aims to assess the accuracy of relative valuation methods in predicting IPO offer prices on the IDX. By analyzing IPOs from 2023 and employing methods such as Price to Book Value (P/B), Price to Earnings (P/E), and Price to Sales (P/S), the research seeks to identify which method most accurately reflects the fair value. The findings offer valuable insights for investors, companies, and policymakers, contributing to more informed decision-making in the Indonesian capital market (Eberhart, 2004; Ong, 2021).

* Corresponding author

Efficient Market Hypothesis (EMH)

The Efficient Market Hypothesis (EMH) posits that financial markets fully reflect all available information in the prices of securities, ensuring that no investor can consistently achieve abnormal returns (Fama, 1991). EMH is categorized into three forms: weak, semi-strong, and strong. The weak form asserts that security prices adjust to new information, making it impossible to outperform the market using historical data (Bodie et al., 2014). The semi-strong form suggests that stock prices incorporate all publicly available information, eliminating any advantage from trading on public announcements or events (Bodie et al., 2014). The strong form claims that security prices reflect all information, including insider knowledge, preventing investors from consistently outperforming the market through private insights (Jensen, 1968).

In the context of Initial Public Offerings (IPOs), the EMH implies that the IPO market should efficiently incorporate all available information into the pricing of new shares. However, studies, such as those by (Mubarok and Fadhli, 2020), have found that the Indonesian stock market is inefficient in its weak form, indicating market anomalies and inefficiencies. Research by (Fadila and Utami, 2020) highlights significant discrepancies between IPO offer prices and initial trading prices in Indonesia, suggesting that informational asymmetries or investor sentiment contribute to market inefficiencies. These findings underscore the challenges of achieving perfect market efficiency in the real-world IPO market despite the theoretical expectations of the EMH.

Relative Valuation

Valuation, especially in the context of IPOs, involves estimating an asset's present value to set an appropriate share price. Relative valuation is a widely used method that estimates a firm's value by comparing it to similar firms based on the principle that comparable assets should have similar prices (Sharma, 2013; Fama, 1991). This approach includes metrics like the Price to Book Value (P/B), Price to Earnings (P/E), and Price to Sales (P/S) ratios, which are particularly useful in markets like Indonesia due to their efficiency in reflecting market prices (Damodaran, 2012). (Kim and Ritter, 1999) emphasize the effectiveness of using forward P/E multiples based on earnings forecasts for IPO valuations, directly linking expected profitability with market valuation.

However, relative valuation has its limitations. Challenges include selecting appropriate comparables and making necessary adjustments, which can impact the accuracy of valuations (Damodaran, 2009). The method also oversimplifies complex factors like growth rates and capital structures, potentially leading to missvaluations (Holthausen, 2012). To address these issues, this study incorporates sector-specific analysis and examines patterns in valuation errors to enhance the reliability of valuation multiples. This approach aims to mitigate the impact of market sentiment and improve the accuracy of IPO valuations (Lie & Lie, 2002).

Relevance of Relative Valuation in the Indonesian IPO Market

Relative valuation is particularly relevant in the Indonesian IPO market due to several key factors. Indonesian investors are well-versed in relative valuation techniques, such as the Price to Earnings (P/E) ratio, which is widely trusted and understood (Sugiharto, 2007; Colline, 2021; Inezwari, 2013). This familiarity is beneficial given the trend of "IPO hunters" actively seeking new investment opportunities. Moreover, relative valuation is well-suited to the challenges of the Indonesian market, which include limited historical financial data and dynamic business environments. Financial information for IPO companies is often derived from prospectuses, making immediate comparability through relative valuation essential (Kusuma, 2001). Despite these constraints, relative valuation remains effective as it uses readily available financial data to provide reliable assessments and correct pricing errors (Sharma, 2013). (Herawati et al., 2016) demonstrated the method's effectiveness by setting IPO prices using the P/E ratio, showing a strong correlation between their valuation model and actual offering prices.

Valuation Errors

Valuation error refers to the discrepancy between a company's estimated value using a specific valuation technique and its actual market price (Fernandez & Carabias, 2006). This gap highlights the accuracy of the valuation method and can be influenced by several factors, including the method's shortcomings, industry risks, and market expectations. (Murugesu, 2010) identified that errors in valuation methods, particularly those related to industry risk, contribute to underpricing in IPO markets. (Fernández, 2004) pointed out common valuation errors, such as issues with discount rate calculations, cash flow forecasting, and residual value estimations, which can affect model accuracy. (Dreman, 2000) noted that earnings forecasts used in valuation models might not

always align with actual earnings, leading to inaccuracies. Additionally, Walkshäusl (2017) found that market expectation errors are prevalent in firms with previous external financing, suggesting a link between financing activities and misvaluation.

A valuation method consistently results in errors that keep values within 10% to 25% of their true worth, indicating its effectiveness for certain sectors. Such accuracy suggests that the method aligns well with market prices and expectations, demonstrating its suitability for those industries (Forte et al., 2020).

B. RESEARCH METHOD

Data Collection

The author gathered secondary data from company prospectuses available on the IDX website for the year 2023. Out of 79 companies that conducted IPOs, those with negative earnings were excluded from the analysis as outliers. The extracted data included offering prices, equity, earnings, revenue, and the number of shares issued. Additionally, one-year average Price-to-Book (P/B), Price-to-Earnings (P/E), and Price-to-Sales (P/S) ratios—referred to as "fair ratios"—were obtained from OJK reports and the Simply Wall Street website to facilitate comparison with the company valuations. Using data from these prospectuses, the author evaluated the IPO companies' valuations using the P/B, P/E, and P/S methods, with the offer price as the benchmark. The fair P/B, P/E, and P/S ratios were calculated based on industry averages over one year in 2023. The formulas for these calculations are as follows:

$$\text{Fair Price using P/B} = \text{1 Year Average Industry P/B} \times \text{Book Value per Share}$$

$$\text{Fair Price using P/E} = \text{1 Year Average Industry P/E} \times \text{Earnings per Share}$$

$$\text{Fair Price using P/S} = \text{1 Year Average Industry P/S} \times \text{Sales per Share}$$

Valuation Errors and Forecast Accuracy

To calculate valuation errors, the absolute difference between the fair industry valuation ratios and the IPO company ratios was determined and compared with the fair industry ratios to derive the percentage error in valuation. The accuracy of the valuation methods in estimating IPO prices was assessed by contrasting the results from the multiples valuation methods with the actual IPO prices. The effectiveness of these predictions was quantified using forecast error metrics, as noted in previous studies (Firth & Smith, 1992; Jaggi, 1997; Jelic et al., 1998; Cheng & Firth, 2000; Dittmann & Weiner, 2005). The valuation error (VE) was calculated using the formula:

$$\textbf{\textit{V}}aluation\ Error\ (VE) = \frac{Fair\ Price - Offer\ Price}{Offer\ Price} \times 100$$

The mean forecast error served as an indicator of bias, revealing whether IPO companies systematically underestimated or overestimated their public offering prices using the multiples method. A positive VE indicates conservative valuation, while a negative VE suggests optimism in the forecasts. To gauge the accuracy of these methods, the absolute valuation error (AVE) was used:

$$Absolute\ Valuation\ Error\ (AVE) = \left|\frac{Fair\ Price - Offer\ Price}{Offer\ Price}\right| \times 100$$

Significance Testing and Regression Analysis

Significance testing was conducted to determine if there are significant differences in the valuation errors produced by the P/B, P/E, and P/S methods. Statistical tests such as ANOVA and Kruskal-Wallis were used to compare the mean valuation errors across the three methods. A significant result would indicate a consistent difference in the accuracy of these methods, providing insights into which approach may be more reliable for investors. Additionally, simple linear regression analysis was employed to examine the relationship between the predicted offer prices generated by each valuation method and the actual IPO offer prices. The predictive accuracy of each relative valuation method was assessed by analyzing regression coefficients, R-squared values, and other goodness-of-fit measures. This analysis helped determine the extent to which these valuation multiples explain the variation in IPO offer prices, aiding in more informed decision-making for investors.

C. RESULTS AND ANALYSIS

Descriptive Statistics

The analysis of the table reveals valuation errors (VE) and absolute valuation errors (AVE) for the Price-to-Book (P/B), Price-to-Earnings (P/E), and Price-to-Sales (P/S) ratios across 72 companies that conducted IPOs. The P/B ratio shows a mean VE of -47.1% with a median of -49.4%, indicating a tendency to overestimate valuations. The standard deviation of 27.6% and a range from -90.4% to 59.4% reflect significant variability. While the AVE, with a mean of 51.1%, suggests more consistency, it still indicates substantial errors, suggesting that although the P/B ratio is relatively more reliable, there remains a considerable risk of overvaluation.

Table 1. Descriptive Statistics

Method	Number of Issues	Mean	Median	Standard Deviation	Minimum	Maximum
P/B	**VE**	72	-47.1%	-49.4%	27.6%	-90.4%	59.4%
	AVE	72	51.1%	51.0%	19.0%	3.4%	90.4%
P/E	**VE**	72	-35.5%	-56.6%	64.6%	-98.8%	242.7%
	AVE	72	62.8%	65.0%	38.1%	0.7%	242.7%
P/S	**VE**	72	-18.5%	-63.5%	182.1%	-95.2%	1343.3%
	AVE	72	88.6%	73.9%	159.8%	0.1%	1343.3%

Source: Research data, 2024

The P/E ratio also tends to overestimate valuations, with a mean VE of -35.5%. However, the median VE of -56.6% and a high standard deviation of 64.6% indicate substantial negative deviation. The range from -98.8% to 242.7% shows extreme variability. The AVE, with a mean of 62.8% and a high standard deviation, further confirms this method's instability and potential inaccuracy in predicting IPO valuations. The P/S ratio shows the highest errors and volatility. With a mean VE of -18.5% and a median VE of -63.5%, the P/S ratio is marked by extreme variability, as seen in the range from -95.2% to 1343.3% and a very high standard deviation of 182.1%. The AVE results further confirm the substantial unreliability of this method, with a mean AVE of 88.6% and a significant standard deviation (159.8%). These findings align with prior research, indicating that the P/B ratio generally has the smallest average absolute error, making it relatively more reliable than the P/E and P/S ratios. The tendency of the P/B ratio to produce smaller errors is consistent with Dittmann's (2008) findings, suggesting that book value-based valuation methods generally reduce bias. Lie (2002) also suggested that asset multiples, such as P/B, offer more accurate estimates than sales and earnings multiples. In contrast, the P/S ratio shows the highest error rates and volatility, confirming its lower accuracy, as observed in Minjina's (2009) study.

These results indicate that while the P/B and P/E ratios tend to overestimate IPO valuations, the errors are relatively moderate compared to the extreme and unreliable outcomes seen with the P/S ratio. This overestimation may be due to overly optimistic market assumptions or economic conditions during the IPO. Given the high error rates and variability associated with the P/S ratio, investors and analysts should exercise caution when relying on this method. Considering the specific context and underlying assumptions, a more nuanced approach is essential to mitigate risks and make more balanced investment decisions.

Distribution of Valuation Errors

The table presents the error distributions for three valuation methods: Price-to-Book (P/B), Price-to-Earnings (P/E), and Price-to-Sales (P/S), analyzing both Valuation Error (VE) and Absolute Valuation Error (AVE). For the P/B valuation method, the VE predominantly shows negative values, indicating a general tendency towards overvaluation. Notably, the highest concentration of VE falls within the interval $-0.8 < VE \leq -0.6$, encompassing 40.3% of the companies, which suggests a significant overestimation of intrinsic values relative to offer prices. The AVE distribution reveals that most companies have absolute errors within the $0.4 < VE \leq 0.6$ and $0.5 < VE \leq 0.6$, each accounting for 20.8% of the companies. This indicates that while the direction of the error tends to be negative, the magnitude is relatively moderate and consistent.

Table 2. Distribution of Valuation Errors

Panel A: VE and AVE Distributions Based on the P/B Method

Distribution of VE	Number of Company	Cumulative Percentage	Distribution of AVE	Number of Company	Cumulative Percentage
$VE \leq -1,0$	0	0.0%	$VE \leq 0,1$	2	2.8%
$-1,0 < VE \leq -0,8$	4	5.6%	$0,1 < VE \leq 0,2$	2	2.8%
$-0,8 < VE \leq -0,6$	17	23.6%	$0,2 < VE \leq 0,3$	7	9.7%
$-0,6 < VE \leq -0,4$	29	40.3%	$0,3 < VE \leq 0,4$	10	13.9%
$-0,4 < VE \leq -0,2$	15	20.8%	$0,4 < VE \leq 0,5$	15	20.8%

-0,2 < VE ≤ 0	3	4.2%	0,5 < VE ≤ 0,6	15	20.8%
0 < VE ≤ 0,2	1	1.4%	0,6 < VE ≤ 0,7	7	9.7%
0,2 < VE ≤ 0,4	2	2.8%	0,7 < VE ≤ 0,8	10	13.9%
0,4 < VE ≤ 0,6	1	1.4%	0,8 < VE ≤ 0,9	3	4.2%
0,6 < VE ≤ 0,8	0	0.0%	0,9 < VE ≤ 1	1	1.4%
0,8 < VE ≤ 1,0	0	0.0%	VE > 1	0	0.0%
VE > 1	0	0.0%	TOTAL	72	100.0%
TOTAL	72	100%			

Panel B: VE and AVE Distributions Based on the P/E Method

Distribution of VE	Number of Company	Cumulative Percentage	Distribution of AVE	Number of Company	Cumulative Percentage
VE ≤ -1,0	0	0.0%	VE ≤ 0,1	5	6.9%
-1,0 < VE ≤ -0,8	19	26.4%	0,1 < VE ≤ 0,2	4	5.6%
-0,8 < VE ≤ -0,6	16	22.2%	0,2 < VE ≤ 0,3	8	11.1%
-0,6 < VE ≤ -0,4	7	9.7%	0,3 < VE ≤ 0,4	4	5.6%
-0,4 < VE ≤ -0,2	10	13.9%	0,4 < VE ≤ 0,5	4	5.6%
-0,2 < VE ≤ 0	6	8.3%	0,5 < VE ≤ 0,6	5	6.9%
0 < VE ≤ 0,2	3	4.2%	0,6 < VE ≤ 0,7	11	15.3%
0,2 < VE ≤ 0,4	2	2.8%	0,7 < VE ≤ 0,8	9	12.5%
0,4 < VE ≤ 0,6	2	2.8%	0,8 < VE ≤ 0,9	8	11.1%
0,6 < VE ≤ 0,8	4	5.6%	0,9 < VE ≤ 1	11	15.3%
0,8 < VE ≤ 1,0	0	0.0%	VE > 1	3	4.2%
VE > 1	3	4.2%	TOTAL	72	100.0%
TOTAL	72	100.0%			

Panel C: VE and AVE Distributions Based on the P/S Method

Distribution of VE	Number of Company	Cumulative Percentage	Distribution of AVE	Number of Company	Cumulative Percentage
VE ≤ -1,0	0	0.0%	VE ≤ 0,1	5	6.9%
-1,0 < VE ≤ -0,8	24	33.3%	0,1 < VE ≤ 0,2	5	6.9%
-0,8 < VE ≤ -0,6	13	18.1%	0,2 < VE ≤ 0,3	4	5.6%
-0,6 < VE ≤ -0,4	9	12.5%	0,3 < VE ≤ 0,4	5	6.9%
-0,4 < VE ≤ -0,2	6	8.3%	0,4 < VE ≤ 0,5	3	4.2%
-0,2 < VE ≤ 0	7	9.7%	0,5 < VE ≤ 0,6	7	9.7%
0 < VE ≤ 0,2	3	4.2%	0,6 < VE ≤ 0,7	4	5.6%
0,2 < VE ≤ 0,4	3	4.2%	0,7 < VE ≤ 0,8	9	12.5%
0,4 < VE ≤ 0,6	1	1.4%	0,8 < VE ≤ 0,9	6	8.3%
0,6 < VE ≤ 0,8	0	0.0%	0,9 < VE ≤ 1	19	26.4%
0,8 < VE ≤ 1,0	1	1.4%	VE > 1	5	6.9%
VE > 1	5	6.9%	TOTAL	72	100.0%
TOTAL	72	100.0%			

Source: Research data, 2024

The P/E valuation method exhibits a more balanced VE distribution, with notable undervaluation and overvaluation range concentrations. The interval -1.0 < VE ≤ -0.8 contains the highest concentration at 26.4%, indicating a strong tendency towards overvaluation. However, there are instances of undervaluation errors (VE > 1), though they are less frequent but still notable for some companies. The AVE for P/E is distributed across various intervals, with a significant peak at 0.6 < VE ≤ 0.7, covering 15.3% of the companies. This dispersion reflects the method's variable accuracy, with some instances of substantial errors.

The P/S valuation method displays a pronounced concentration of VE in the negative range, particularly within -1.0 < VE ≤ -0.8, which includes 33.3% of the companies, indicating a strong inclination towards overvaluation. The AVE distribution shows a significant peak at 0.9 < VE ≤ 1, with 26.4% of the companies, suggesting that while the absolute errors are relatively large, they are consistently large across a significant portion of the companies evaluated.

In comparison, all three methods tend to overvalue, with the P/B and P/S methods showing the strongest biases. The P/E method, while also displaying a tendency towards overvaluation, presents a more balanced error distribution with occasional undervaluation. Previous research supports these findings, indicating that IPOs are generally overvalued, with median IPOs being overvalued by 14-50% at the offer price (Swaminathan, 2002; Purnanandam, 2002). This overvaluation is often attributed to optimistic growth forecasts, low profitability, and

high accruals (Swaminathan, 2002). Among the methods, the P/B ratio generally exhibits more moderate absolute errors than P/E and P/S, which show higher variability in error magnitudes.

Valuation Errors Based on Industry

Valuation errors across different industries using Price-to-Book (P/B), Price-to-Earnings (P/E), and Price-to-Sales (P/S) methods reveal significant patterns influenced by the specific characteristics of each sector. The P/B method, which bases a company's valuation on its book value, tends to be more accurate in sectors with stable and tangible assets. For instance, the "Consumer Non-Cyclicals" sector demonstrates relatively low valuation errors, as companies within this sector often possess substantial physical assets that make book value a reliable measure of their worth. Conversely, the "Industrials" and "Basic Materials" sectors exhibit high mean errors with the P/B method. This is largely due to the substantial investments in machinery and raw materials within these sectors, whose market values are prone to fluctuate with economic cycles and commodity prices, leading to discrepancies between book value and market value.

Table 3. Valuation Errors Based on Industry

No	Industry Sector	Number of Company	P/B			P/E			P/S		
			Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
1	Energy	8	44.59%	17.78%	65.08%	48.99%	16.71%	90.51%	36.11%	8.50%	93.10%
2	Basic Materials	6	52.71%	15.16%	78.71%	78.03%	8.64%	134.13%	120.28%	6.79%	411.98%
3	Industrials	7	55.06%	34.93%	72.12%	61.35%	6.19%	96.72%	65.84%	19.59%	94.48%
4	Consumer Non-Cyclicals	11	42.07%	3.40%	75.34%	61.70%	0.73%	95.99%	76.66%	23.66%	95.22%
5	Consumer Cyclicals	10	56.15%	27.17%	75.56%	61.04%	9.62%	86.19%	72.57%	12.95%	135.00%
6	Healthcare	3	48.68%	31.92%	59.40%	115.13%	29.71%	242.67%	515.83%	10.37%	1343.33%
7	Properties & Real Estate	8	70.42%	52.50%	88.76%	65.63%	23.45%	98.83%	74.35%	33.48%	93.28%
8	Technology	9	41.96%	27.13%	57.58%	61.99%	15.10%	149.24%	75.41%	0.13%	195.47%
9	Infrastructures	5	63.71%	26.06%	90.35%	54.17%	23.32%	96.99%	59.23%	18.91%	94.50%
10	Transportation & Logistic	5	38.53%	8.20%	58.58%	48.66%	2.46%	81.67%	44.81%	32.51%	56.90%

Source: Research data, 2024

The P/E method, which values earnings-based companies, is more effective in industries with stable profit margins. The "Energy" sector exemplifies this with a minimum error of 16.71%, as energy companies often enjoy predictable earnings due to consistent demand and relatively stable pricing. On the other hand, the "Properties & Real Estate" sector shows high mean errors with the P/E method, which can be attributed to the variability in earnings driven by fluctuations in property values and economic conditions. The "Healthcare" sector, with a maximum error of 242.67%, further underscores the volatility in earnings within industries heavily influenced by regulatory changes and significant R&D costs, making the P/E method less reliable in these contexts.

The P/S method, which relies on sales figures, is particularly useful in sectors where sales are a more accurate performance indicator than earnings or book value. The "Technology" sector benefits from this method, with a minimum error of 0.13%, as sales figures better reflect the rapid growth and market adoption of technological products. However, the "Basic Materials" and "Industrials" sectors exhibit substantial inaccuracies with the P/S method due to fluctuations in sales volumes and pricing power, which are closely tied to commodity prices and economic cycles. The extreme maximum error of 1343.33% observed in the "Healthcare" sector indicates that sales alone are insufficient for accurate valuation in this industry, where high research costs and regulatory factors play a significant role.

Overall, the P/B ratio is the most commonly employed metric for minimizing valuation errors, used by 33 companies in the sample. The P/E ratio follows with 20 companies, and 19 companies use the P/S ratio. This suggests that the P/B ratio is generally a more reliable indicator of valuation accuracy across various industries than other metrics. These findings align with the research by (Brahmana and Hooy, 2011), which found the P/B method to be more accurate than P/E and P/S across numerous industrial categories, although pooled data sometimes show that the P/E method can outperform in terms of accuracy.

Significance Testing of Valuation Errors Differences

To assess significant differences in valuation errors between the Price-to-Book (P/B), Price-to-Earnings (P/E), and Price-to-Sales (P/S) methods, the author uses the Kruskal-Wallis test. The hypothesis framework is structured as follows: the null hypothesis (H_0) posits no significant difference in valuation errors among the three methods, implying that the median errors for P/B, P/E, and P/S are equal. Conversely, the alternative hypothesis (H_1) suggests a significant difference in valuation errors, indicating that at least one of the methods has a median error that differs substantially from the others. This non-parametric test is suitable for comparing the distribution of errors across the three valuation methods without assuming normality, providing insights into which method may offer more consistent or accurate valuations.

Table 4. Kruskal-Wallis Test of Valuation Errors

Variable	Observation	Rank Sum	Chi-square	Prob
P/B	72	6397.00	11.709	(0.0029)*
P/E	72	8139.00		
P/S	72	8900.00		

Source: Research data, 2024

The Kruskal-Wallis test was performed to determine whether there are significant differences in valuation errors across the three methods: Price-to-Book (P/B), Price-to-Earnings (P/E), and Price-to-Sales (P/S) ratios. The test resulted in a chi-squared statistic of 11.709 with 2 degrees of freedom and a p-value of 0.0029. This p-value is substantially below the traditional significance threshold 0.05, providing strong evidence against the null hypothesis. Thus, the null hypothesis is rejected, indicating statistically significant differences in the ranks of valuation errors among the three methods. Specifically, this result suggests that the distribution of valuation errors is not uniform across the methods, with at least one method demonstrating significantly different error levels compared to the others. In summary, the Kruskal-Wallis test highlights that the choice of valuation method—whether P/B, P/E, or P/S—substantially affects the ranking of valuation errors. This finding is consistent with Inezwari (2013), who also identified significant calculation errors in relative valuation models in the Indonesian market, underscoring the critical role of method selection in financial analysis and decision-making.

Modelling IPO Offering Prices

To examine the extent to which the pricing determinations of public offering firms using Price-to-Book (P/B), Price-to-Earnings (P/E), and Price-to-Sales (P/S) ratios explain the actual public offering prices of stocks, researchers employed simple linear regression analysis. Unlike Berkman et al. (2000), who investigated industry and market-based pricing separately, this study integrates forecasted prices derived from the three valuation methods as independent variables. The actual public offering prices of the stocks are used as the dependent variable in the regression models. This approach allows for a direct assessment of how well each valuation method's predictions align with the realized stock prices, providing insights into the effectiveness of these valuation techniques in forecasting IPO prices.

$$Offer\ Price = \alpha + \beta\ Price\ with\ specified\ P/B + \varepsilon$$
$$Offer\ Price = \alpha + \beta\ Price\ with\ specified\ P/E + \varepsilon$$
$$Offer\ Price = \alpha + \beta\ Price\ with\ specified\ P/S + \varepsilon$$

Table 5. Simple Linear Regression Result

Method	Constant (α)	Coefficient (β)	Standard Deviation	t-statistic (p-value)	Adjusted R^2	F-statistic (p-value)	N
P/B	32.15767	1.772181	0.11103	15.96 (0.000)*	0.781400	254.77 (0.000)*	72
P/E	109.1933	0.6923079	0.0491986	14.07 (0.000)*	0.735100	198.01 (0.000)*	72
P/S	156.9088	0.4543976	0.0934624	4.86 (0.000)*	0.241800	23.64 (0.000)*	72

Source: Research data, 2024

The regression analysis reveals that each pricing method—Price-to-Book (P/B), Price-to-Earnings (P/E), and Price-to-Sales (P/S)—demonstrates significant relationships with the offer prices of stocks in public offerings. Specifically, both P/B and P/E ratios exhibit strong statistical significance with p-values less than 0.001 and high t-statistics (15.96 for P/B and 14.07 for P/E), indicating robust associations between these ratios and offer prices.

These ratios also show substantial adjusted R^2 values (0.781 for P/B and 0.735 for P/E), suggesting that they account for a significant portion of the variance in offer prices.

In contrast, while the P/S ratio is still statistically significant ($p = 0.2418$), it presents a lower adjusted R^2 value (0.242) and a lower t-statistic (4.86), indicating weaker explanatory power relative to the P/B and P/E ratios. Among the methods analyzed, the P/B ratio is the most effective for predicting stock offer prices, supported by its higher coefficient ($\beta = 1.772$) and stronger statistical significance. This indicates that variations in the P/B ratio have a more pronounced effect on offer prices. Additionally, the P/B ratio's highest adjusted R^2 (0.781) reflects its superior ability to explain the variability in IPO offer prices compared to the P/E and P/S ratios.

D. CONCLUSION

The Price-to-Book (P/B) method consistently reveals a tendency to overvalue stocks, though this overvaluation tends to be moderate and relatively predictable in magnitude. On the other hand, the Price-to-Earnings (P/E) method demonstrates a more varied distribution of errors, oscillating between undervaluation and overvaluation, while the Price-to-Sales (P/S) method shows a pattern of consistent overvaluation with larger absolute errors. Industry analysis further highlights that the P/B ratio is the most frequently employed metric for reducing valuation errors across most sectors.

In conclusion, the P/B method stands out for its exceptional valuation accuracy due to its inherent stability and reliability. It provides a clearer view of the intrinsic value of IPO stocks, which is particularly advantageous within the Indonesian market. Its more stable and manageable error patterns make it a preferable framework for evaluating IPO stock valuations compared to the P/E and P/S ratios.

Future research should incorporate additional control variables that may influence IPO offer price predictions, such as market conditions, company size, company age, the percentage of issued shares, and the underwriter's reputation. Market sentiment can significantly affect offer prices, with bullish trends potentially leading to higher prices. Larger, more established companies may command higher prices due to perceived stability, while the reputation of underwriters can impact investor confidence. The available financial data constrain the current analysis and mainly focus on valuation method errors without accounting for macroeconomic factors. Expanding the analysis to include macroeconomic variables and extending the time frame could enhance the understanding of valuation accuracy. Future studies should also investigate the effectiveness of forward ratios in IPO valuations, considering their challenges due to limited historical data, and explore how sector-specific factors impact the accuracy of valuation methods.

REFERENCES

Agung Saputro, J., & Hartono, J. (2017). Improved Accuracy of Ratio Multiple Valuation. SHS Web of Conferences, 34, 03002. https://doi.org/10.1051/shsconf/20173403002

Alcaniz, L., Gomez-Bezares, F., & Ugarte, J. V. (2017). Efficiency in initial public offerings and intellectual capital disclosure. The European Journal of Finance, 23(12), 1129–1149. https://doi.org/10.1080/1351847X.2016.1151806

Alford, A.W. (1992) The Effect of the Set of Comparable Firms on the Accuracy of Price Earnings Valuations Method. Journal of Accounting Research, 30, 94-108. https://doi.org/10.2307/2491093

Berkman, H., Bradbury, M. E., & Ferguson, J. (2000). The Accuracy of Price-Earnings and Discounted Cash Flow Methods of IPO Equity Valuation. Journal of International Financial Management & Accounting, 11(2), 71–83. https://doi.org/10.1111/1467-646X.0005

BlanpainSophie. (2006). Adapting Fundamental Analysis for Cross-Border Valuation. https://api.semanticscholar.org/CorpusID:155493258

Brahmana, R. K., & Hooy, C.-W. (2011). The Equity Valuation Accuracy among Multiple Screening Models: A Study from an Emerging Stock Market. International Business Management, 5(2), 50–57. https://doi.org/10.3923/ibm.2011.50.57

Brealey, R. A., Myers, S. C., & Allen, F. (2020). Principles of Corporate Finance. McGraw Hill Education

Chang, C., Chiang, Y.-M., Qian, Y., Ritter, J. R., Li, W., Sherman, A., Tiwari, A., Yao, T., & Zhang, D. (2015). Pre-Market Trading and IPO Pricing Acknowledgements: We would like to thank Pre-Market Trading and IPO Pricing.

Choi, P. M. S., Choi, J. H., & Chung, C. Y. (2020). Do individual traders undermine firm valuation? Finance Research Letters, 36, 101567. https://doi.org/10.1016/j.frl.2020.101567

Cogliati, G. M., Paleari, S., & Vismara, S. (2008). IPO Pricing: Growth Rates Implied in Offer Prices. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.965450

Damodaran, A. (2009). Valuing Young, Start-Up and Growth Companies: Estimation Issues and Valuation Challenges. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.1418687

Deloof, M., de Maeseneire, W., & Inghelbrecht, K. (2002). The Valuation of IPOs by Investment Banks and the Stock Market: Empirical Evidence. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.298602

Deloof, M., de Maeseneire, W., & Inghelbrecht, K. (2009). How Do Investment Banks Value Initial Public Offerings (IPOs)? Journal of Business Finance & Accounting, 36(1–2), 130–160. https://doi.org/10.1111/j.1468-5957.2008.02117.x

DiGregorio, D. W. (2014). What accounting students should know about the price-earnings ratio. https://api.semanticscholar.org/CorpusID:154527811

Dittmann, I., & Weiner, C. (2005). Selecting Comparables for the Valuation of European Firms. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.644101

Dreman, D. N. (2000). Investor Overreaction and Contrarian Strategies. AIMR Conference Proceedings, 2000(3), 55–64. https://doi.org/10.2469/cp.v2000.n1.2990

Eberhart, A. C. (2004). Equity Valuation Using Multiples. The Journal of Investing, 13(2), 48–54. https://doi.org/10.3905/joi.2004.412306

Er, B., & Er, B. (2012). The Accuracy Of Price-Earnings Ratio And Discounted Cash Flow Methods In Predicting The Offer Price Of Ipo Stocks. http://www.internationalresearchjournaloffinanceandeconomics.com

Fadila, A., Utami, K., & Veteran Jakarta, U. (2020). Ipo underpricing di bursa efek indonesia. 2, 214–222. http://journal.feb.unmul.ac.id/index.php/INOVASI

FAMA, E. F. (1991). Efficient Capital Markets: II. The Journal of Finance, 46(5), 1575–1617. https://doi.org/10.1111/j.1540-6261.1991.tb04636.x

FAMA, E. F., & FRENCH, K. R. (1992). The Cross-Section of Expected Stock Returns. The Journal of Finance, 47(2), 427–465. https://doi.org/10.1111/j.1540-6261.1992.tb04398.x

Fernandez, P. (2004). 80 Common Errors in Company Valuation. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.545546

Fernandez, P. (2007). 120 Errors in Company Valuations (120 Errores en Valoraciones de Empresas). SSRN Electronic Journal. https://doi.org/10.2139/ssrn.962921

Forte, G., Gianfrate, G., & Rossi, E. (2020). Does relative valuation work for banks? Global Finance Journal, 44, 100449. https://doi.org/10.1016/j.gfj.2018.09.002

Gabrielli, L., & French, N. (2021). Pricing to market: property valuation methods – a practical review. Journal of Property Investment & Finance, 39(5), 464–480. https://doi.org/10.1108/JPIF-09-2020-0101

Gaca, R. (2018). Price as a Measure of Market Value on the Real Estate Market. Real Estate Management and Valuation, 26(4), 68–77. https://doi.org/10.2478/remav-2018-0037

Gottwald, R. (2013). The Use of the P / E Ratio to Stock Valuation. https://api.semanticscholar.org/CorpusID:3070393

Herawati, A., Achsani, N. A., Hartoyo, S., & Sembel, R. (2016). Model Penetapan Harga Ipo Berdasarkan Valuation. MIX: Jurnal Ilmiah Manajemen, 6(3), 154333

Inezwari, D. K. (2013). Relative Valuation Model Analysis of Idx. Journal of Applied Finance and Accounting, 6(1).

James, K. R., & Valenzuela, M. (2020). The Efficient IPO Market Hypothesis: Theory and Evidence. Journal of Financial and Quantitative Analysis, 55(7), 2304–2333. https://doi.org/10.1017/S0022109019000784

Jegadeesh, N., Noh, J., Pukthuanthong, K., Roll, R., & Wang, J. (2019). Empirical tests of asset pricing models with individual assets: Resolving the errors-in-variables bias in risk premium estimation. Journal of Financial Economics, 133(2), 273–298. https://doi.org/10.1016/j.jfineco.2019.02.010

KAPLAN, S. N., & RUBACK, R. S. (1995). The Valuation of Cash Flow Forecasts: An Empirical Analysis. The Journal of Finance, 50(4), 1059–1093. https://doi.org/10.1111/j.1540-6261.1995.tb04050.x

Keel, A. L., Lending, C. E., & Marshall, B. (2021). The impact of online buzz on internet IPO valuation. Journal of Strategic Marketing, 29(1), 24–46. https://doi.org/10.1080/0965254X.2019.1593222

Kim, M., & Ritter, J. R. (1999). Valuing IPOs. Journal of Financial Economics, 53(3), 409–437. https://doi.org/10.1016/S0304-405X(99)00027-6

Kuswanto, R. (2021). IPO Stock Performance amidst the COVID-19 Pandemic: Has It been Undervalued? Jurnal Dinamika Akuntansi Dan Bisnis, 8(1), 105–116. https://doi.org/10.24815/jdab.v8i1.19830

Lie, E., & Lie, H. J. (2002). Multiples Used to Estimate Corporate Value. Financial Analysts Journal, 58(2), 44–54. https://doi.org/10.2469/faj.v58.n2.2522

Liu, X. (Kelvin), & Wu, B. (2021). Do IPO Firms Misclassify Expenses? Implications for IPO Price Formation and Post-IPO Stock Performance. Management Science, 67(7), 4505–4531. https://doi.org/10.1287/mnsc.2020.3684

Markets Team, C. (2023). Indonesia IPO Markets Watch: 2023 Year in review.

Mînjina, D. (2009). Relative Performance of Valuation Using Multiples. Empirical Evidence on Bucharest Stock Exchange. The Review of Finance and Banking, 01, 35–53.

Mubarok, F., & Fadhli, M. M. (2020). Efficient Market Hypothesis and Forecasting of the Industrial Sector on the Indonesia Stock Exchange. Journal of Economics, Business, & Accountancy Ventura, 23(2), 160–168. https://doi.org/10.14414/jebav.v23i2.2240

Omran, M. F. (2011). The Valuation Premium of the Common Stocks of Islamic Financial Institutions. Journal of Business Valuation and Economic Loss Analysis, 6(1). https://doi.org/10.2202/1932-9156.1095

Ong, C. Z., Mohd-Rashid, R., & Taufil-Mohd, K. N. (2020). IPO valuation using the price-multiple methods: evidence from Malaysia. Journal of Financial Reporting and Accounting, 19(4), 540–570. https://doi.org/10.1108/JFRA-05-2020-0128

O'Shauhnessy, James P. 1998, What Works on Wall Street, McGraw Hill – New York

Park, Y. S., & Lee, J.-J. (2003). An empirical study on the relevance of applying relative valuation models to investment strategies in the Japanese stock market. Japan and the World Economy, 15(3), 331–339. https://doi.org/10.1016/S0922-1425(03)00019-7

Patatoukas, P. N., & Wang, A. Y. (2016). Short Sales Constraints and IPO Pricing. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.2789879

Penman, S. H. (2020). Pada Model Membandingkan Arus Kas Dan Akuntansi Akrual Untuk Digunakan Dalam Penilaian Ekuitas. (212), 1–20.

Penman, S. H., & Zhang, X.-J. (2002). Modeling Sustainable Earnings and P/E Ratios with Financial Statement Analysis. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.318967

Pétursson, E. (2016). Relative Valuation – Accuracy of Corporate Valuation Using Multiples. https://api.semanticscholar.org/CorpusID:168432154

Puspitaningtyas, Z., Sisbintari, I., Karyadi, H., & Dwimahendrawan, A. (2022). IS ACCOUNTING INFORMATION RELEVANT AS AN EARLY WARNING SIGNAL? Jurnal Akuntansi Multiparadigma, 13(2). https://doi.org/10.21776/ub.jamal.2022.13.2.22

Rahmawantari Mei, D. Puspitaningtyas, A. (2019). P/E Ratio Dalam Valuasi Saham Untuk Pengambilan Keputusan Investasi. Jurnal Ekonomi dan Industri.

Ritter, J. R., & Welch, I. (2002). A Review of IPO Activity, Pricing and Allocations. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.296393

Santhapparaj, S., & Murugesu, J. (2010). Impact of Risk Disclosure in the Prospectus on Valuation and Initial Returns of Initial Public Offerings in Malaysia. IUP Journal of Applied Finance, 16.

Sehgal, S., & Pandey, A. (2010). Equity valuation using price multiples: Evidence from India. Asian Academy of Management Journal of Accounting and Finance, 6.

Sharma, M., & Prashar, E. (2013). A Conceptual Framework for Relative Valuation. The Journal of Private Equity, 16(3), 29–32. https://doi.org/10.3905/jpe.2013.16.3.029

Shehzad, K., & Ismail, A. (2014). Value relevance of accounting information and its impact on stock prices: Case study of listed banks at Karachi Stock Exchange. Journal of Economic Info, 1(3), 6–9. https://doi.org/10.31580/jei.1i3.109

Sheikh, J., Shakeel Ahmed, W., Iqbal, W., & Tahir Masood, M. (2012). Pecking at Pecking Order Theory: Evidence from Pakistan's Non-financial Sector. Journal of Competitiveness, 4(4), 86–95. https://doi.org/10.7441/joc.2012.04.06

Shenoy, S. v., & Srinivasan, K. (2018). Relationship of IPO Issue Price and Listing Day Returns with IPO Pricing Parameters. International Journal of Management Studies, V(4(1)), 11. https://doi.org/10.18843/ijms/v5i4(1)/02

Skogsvik, K., & Skogsvik, S. (2001). P/E-ratios in relative valuation - a mission impossible? Investment Management & Financial Innovations, 5. https://api.semanticscholar.org/CorpusID:76652119

Su, C. (2018). The efficiency of IPO issuing mechanisms and market conditions: evidence in China. Review of Quantitative Finance and Accounting, 51(2), 461–495. https://doi.org/10.1007/s11156-017-0677-2

Walkshäusl, C. (2017). Expectation Errors in European Value-Growth Strategies*. Review of Finance, 21(2), 845–870. https://doi.org/10.1093/rof/rfw012

Wiltshaw, D. G. (1991). Valuation by comparable sales and linear algebra. Journal of Property Research, 8(1), 3–19. https://doi.org/10.1080/09599919108724017