IDENTIFICATION OF FIRM MULTIPLIER OF COMPARABLE FIRM VALUATION METHOD ON INDONESIAN IPO

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ABSTRACT

The aim of this research is to find the relevant valuation measurement, firm multiplier, which is utilized by issuers or underwriters during IPO. This research uses companies that conducted IPO, in the Indonesia Stock Exchange (IDX), within year 2001 to 2007, as the research sample. The hypotheses are developed to find the relevant valuation multiplier. The data are analyzed using One-Sample T Test, Kolmogorov-Smirnov (K-S) Test, and Binomial Test. The empirical results suggest that there are similarities and differences in valuation results when comparable firm valuation is utilizing different firm multiplier. Among the five methods, i.e. arithmetic mean, median, harmonic mean, closest ROA, and closest TA, the closest TA method performs the worst in Indonesia capital market during 2001-2007. There is no statistical difference between selecting arithmetic mean, median, and harmonic mean methods. The closest ROA method outperforms the arithmetic mean and closest TA methods; however it has similar performance to median and harmonic mean methods.

Keywords: *IPO, enterprise value/earnings before interest and taxes (EV/EBIT), multiple valuation, comparable firms, offering price.*

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INTRODUCTION

Initial public offering (IPO) occurs when an entity firstly sells its share to the public and lists its shares in the stock exchange. This action is a major financial and business strategy for an entity to rise funding from public equity market. Despite the financial advantages that an entity may obtain, some potential disadvantages of IPO have to be considered. One of them is the cost of IPOs. The cost of IPOs may involve Underwriting Fees, Underpricing, Legal fees, and public relation fees. Ritter (1987) notes the average transaction cost (underwriter fees and indirect cost of underpricing) are 21.22% for firm commitment offers and 31.87% from best effort offers; the expenses are in the percentage of the realized market value of the securities issued. By looking at these cost components, potential issuers will have to carefully calculate and determine the best offering price to maximize the financial benefit from IPO.

Over the years, financial analysts, fund managers, and academicians have developed several models for equity valuation techniques. Equity valuation is the process of estimating the market value of shares. Penman (2007, p.18) classifies these models into two categories: ones that involve forecasting and ones that do not. It is claimed that ones that do not involve forecasting, e.g. method of comparables, multiple screening, or asset-based valuation, may have an advantage in simplicity and low cost. However, extra precaution has to be exercised as the model may ignore important elements due to its simplicity. On the other hand, valuation methods that involve forecasting uses more information that are available; hence, it is more favorable. The main challenge in this method is to clearly classify the information. To enhance the predictability of the forecast, analysts should be able to differentiate between which information is known for concrete and which is speculative.

Simple approaches of valuation, i.e. that do not include forecasting in their computation, play an important role and gain popularity among the valuation practitioner. A recent research by Damodaran (2006, Chapter 7 p. 2), in the first half of 2001, conducted on 550 equity research reports in the United States, London, and Asia showed that the ratio of relative valuation (multiples) to discounted valuation is 10:1. A similar investigation showed that 67% of valuation models used in analyst reports is using multiples (Demirakos et al 2006). Few assumptions and its uncomplicated calculation ease analysts in explaining their justification of valuation to their clients. Furthermore, data availability and regular update of multiples can be obtained from financial news.

Valuation based on multiple, also known as multiples or comparables, is a technique that estimates an entity's value by looking at the values of other entities that has similar characteristics. Penman (2007, p. 76) defines multiples as the ratio of market price (price of shares or the market capitalization of a company) to a particular important number in financial statement (earnings, book values, sales, or cash flow). There are four steps in multiple valuation (Shreiner, 2007, 49-53). The first 2 steps involve in determining the relevant value measurement, which figure from financial statement that might best perform as valuation multiple, and peer group, entities or competitor that have similar financial and operating characteristic. The last steps are to estimate the synthetic peer group multiples and multiple it with the relevant value driver. The simple calculation method leaves many open questions; such as which value driver will be the most relevant to use, equity or entity value multiples? How to improve the comparability of the peer group and what is the optimal size of the group?

Prior researches on valuation by multiple are mainly performed on developed capital market and only limited studies are made on emerging capital market (ECMs). The growth in emerging capital markets is significant; S&P Global Stock Market Factbook 2007 shows that the market capitalization percentage to world capitalization increase from 9.35% at the end of 1997 to 19.3% at the end of 2006 . This phenomenon signifies the growing importance of IPOs valuation. Optimal valuation techniques may benefit not only domestic or foreign investors but also the well being of capital market in the particular country.

Realizing the challenge and gaining popularity of multiple valuation as well as the development of capital market, the author is interested to analyze the practicability of multiple valuation in Indonesian capital market. The basic research question will cover the topic which multiple valuation techniques result in the most optimal valuation. On this subject, the author decided to explore IPO valuation in Indonesian capital market in this thesis, which entitled **"Identification of Firm Multiplier of Comparable Firm Valuation Method on Indonesian IPO."**

LITERATURE REVIEW

Geddes (2003, p. 1) defines IPO as the first sale of company's share to the public and the listing of shares in the stock exchange. He also suggests that IPOs, or known as floatation in UK, could be the resources for company to survive. In order for businesses to survive, they need to grow; i.e. growth in market share or growth in customer base. These growth will require considerable amount of liquidity; which can be obtained from the IPOs proceed. The decision to raise capital, by issuing new shares, for the company use is know as primary offering. On the contrary, secondary offering implies that the company sells the existing share of the shareholder's to the public to raise capital for the 'old' shareholder (Geddes 2003 p. 6).

Offering price is the price proposed by issuers to prospective investors when the company firstly enters the equity market. Finding optimum offering price will be challenging as overpricing will cause the share to be unattractive to the investors while underpricing will cause the company not to maximize cash proceed on going public. The challenge can be responded by valuation; it is a process of finding the value of the asset by inferring information that is available into number. Ones may perceive valuation from different angel. From one perspective, it is a hard science; where there is little room for analyst opinion or human error (Damodaran 2002, Chapter 1, p. 2). Others may say that it is an art, where valuators involve their own judgment and how they perceive and asset to come up with a number that might different from one another. The truth may lie in the middle between these two extremes when we consider two components of valuation process: bias in valuation and uncertainty in valuation.

In discounted cash flow valuation, the value of a company is the present value of the future expected cash flow, discounted back at a discount rate to present level of risk in cash flow. DCF valuation is the most reliable in theoretical point of view; but in practice, it is hard to estimate the future cash flow and appropriate discount rate especially for young firm (Kim & Ritter 1999). Geddes (2003, p. 84) suggests five steps in determining company's value through DCF:

1. Forecast future cash flow over the next business cycle.

2. Make an estimate of the value of the company beyond forecast period (terminal value).
3. Use an appropriate discount rate.
4. Add any excess cash and non-operating assets to determine company's enterprise value (EV).
5. Adjust the outstanding debt to determine the equity value.

Residual income measures the value of a company by combining the book value of the entity with the present value of future earnings. This method is similar to DCF valuation in the sense that some forecast has to be performed; in this model, earnings have to be forecasted instead of cash. Unlike DCF model, there will be no terminal value computation as earnings are expected to erode over time when the company's competitive advantage erodes. The model is best applied when it is hard to predict future cash flow. In addition, the valuation protects users from paying too much attention on earning growth as value is generated when earning exceeds the cost of capital (Penman 2007, p. 185). On the contrary, its reliance on available and accuracy accounting information is the main drawback; i.e. accounting information is more subject to manipulation.

Relative valuation is a method of valuing by comparing the value of similar asset in the market. The underlying idea in relative valuation is the value of identical companies can be compared by multiple. Multiple is the ratio of market price to particular figure in the financial statement. Valuation by multiple is gaining popularity and has become substitute for complex valuation techniques (Lie & Lie 2002, p. 44). Damodaran (2002, Chapter 7 p. 3) mentioned the popularity of relative valuation may due to the following factors:

1. *Less time and resource incentive*
   Compared to the sophisticated method, where forecasting and more assumption are needed, relative valuation requires substantially less time and resources.

2. *Easy to sell*
   Potential investors' decision to buy the share is based on their understandability of the justification made by the analyst. Relative valuation is easy to understand and may increase the likelihood of purchase. In addition, in cases where potential investors are busy and relatively have limited time for explanation, simple valuation might excel compared to complex valuation.

3. *Easy to defend*
   When analysts are required to justify their valuation, relative valuation is easy to defend. First, it involves uncomplicated calculation and less assumption. Secondly, and most importantly, the valuation is based on how the market perceives similar assets. It can be argued that the burden of the responsibility in a relative valuation is borne by financial markets
4. *Market imperatives*
   Relative valuation is more likely to reflect the current mood of market since it measures relative and not intrinsic value. Damodaran also states that relative valuation will generally yield values that are closer to market price compared to DCF valuation.

Many of valuation studies are investigating the appropriate selection criteria for comparable firms or peer group. A proper determination of peer group will be essential as multiple valuation is derived from the average of certain value driver in the group. A comprehensive investigation during 1993 to 2002 in Europe by taking 67,433 firms as

sample indicated that firms to be used as comparable should have similarity in return on assets (ROA) (Dittmann & Weiner 2005). The study was extended to US market and they found that grouping the firms based on ROA and total assets could be further improved rather than using ROA alone. Herrmann and Richter (2003) suggested using relevant fundamentals criteria rather than using classification based on SIC. This study shows that predictions of considerably higher accuracy can be achieved if comparable firm selection is based on growth, profitability, risk, and ROE. This relation holds true if long-term earnings growth is estimated via a measure such as historic sales growth rates.

Liu, Nissim, and Thomas (2001) provided another insight into multiple valuation on current stock price. They examined that the valuation performance of a comprehensive list of value drivers and found that multiples derived from forward earnings explain stock prices remarkably well for most firms: pricing errors are within 15 percent of stock prices for about half of their sample. In addition, it was stated that the following ranking were observed consistently each year: forward earnings measures are followed by historical earnings measures, cash flow measures and book value of equity are tied for third, and sales performs the worst. Similar to current stock valuation, forecasted earning may increase the performance of IPO offerings valuation compared to the use of historical earning (Kim and Ritter 1999). The study showed that on the basis of price to earning, price to sales, enterprise value to sales, and enterprise value to operating cash flow ratio, forecasted earning outperformed historical earning.

Some of the studies focus on finding the appropriate method to find the average of multiple factor. Baker and Ruback (1999) tested the performances of simple mean, harmonic mean, value-weighted mean, and median in 22 industries of S&P 500 in 1995. As the average error level was the most consistent in harmonic mean, they argued that harmonic mean would increase the valuation accuracy. In addition, using harmonic means will be consistent with prudence approach or avoiding overpricing as theoretically harmonic means will always give a result lower than simple mean. Similar finding was also mentioned by Beatty, Riffe and Thompson (1999); the absolute performance of median multiples is worse than that for harmonic mean multiples.

RESEARCH METHODOLOGY

There are 112 IPO companies from 9 industry group from period 2001-2007 for this research. From the 9 industry group, the classification can be specified into 34 sectors to be used as a base for selecting comparable firm. The study period setting is set as 2001 to 2007 and the comparable firms data (from financial report) is taken one year prior to the IPO year to be evaluated, e.g. if a firm go public in 2001, the data used as comparable firm is based on 2000 annual report. In addition, the period is selected to avoid bias in valuation cause by Asian crisis in 1998 and Subprime Mortgage crisis in 2008. Starting with 112 initial samples, the samples have to fulfill the following requirement to be used as final sample:

1. Not classified as a financial company.
   Financial companies are excluded from the research as they have differences in business operation and in financial reporting presentation. As a result, 28 IPO companies coming from financial sectors are excluded.
2. Have at least 5 comparable firms
   To assure the accuracy of comparable firm, the research requires at least 5 public listed firms in the same sector (Dittmann and Weiner, 2005). Furthermore, the

financial reports of the firms has to have a complete information regarding Cash and cash equivalent, short term investment, total assets, total debts, Earning before interest and tax (operating profit), number of outstanding share, and share price as of end of year. Due to this requirement, 47 companies are excluded.

In total, there are 75 samples excluded from the initial samples. As a result, the research used 37 IPO companies from 11 sectors during 2001-2007.

In this research, the following procedures are conducted:

1. Determine Enterprise Value per Earning Before Interest and Taxes (EV/EBIT).
   Relative valuation practitioners have developed many ratios to be used as multiplier; i.e. ratios based on Cashflows, Sales, or Earnings. Previous studies show that using Earning as the basis of calculating multiples leads to lower forecast errors than book values or sales (Liu et al 2002 and Herrmann and Richer 2003). Damodaran (2002 Chapter 7, p.8) urges that consistency has to be maintained in determining the ratio, i.e. if the numerator is firm value (e.g. EV) then the denominator should be firm value (e.g. operating income, EBIT or book value of capital) and vice versa. On this ground, the multiplier to be used is Enterprise Value per Earning Before Interest and Taxes (operating income).

   $$\mathbf{EV = MC + TD - C - SI} \qquad \mathbf{(1)}$$

   Where,
   EV = Enterprise Value
   MC = Market Capitalization, the product of number of outstanding share with market share price at the end of year.
   TD = Total Debt, the book value of total liabilities
   C = Total Cash, amount of cash and cash equivalent and the short term deposit.
   SI = Short term Investment

   Since the peer group identification focuses on operating activities only, cash and short term investment is excluded from Enterprise Values.
2. Calculate specific group EV/EBIT multiplier.
   The EV/EBIT ratios will be taken from at least 5 public listed firms. In relation to the second hypothesis, some of the multiplier will be determined by the arithmetic mean, median, and harmonic mean of the EV/EBIT ratios of peer groups. The definitions of the three methods are as the following:
   Arithmetic mean = $\frac{1}{n}\sum_{i=1}^{n} x_i$
   Median = Central [illegible] he sample
   Harmonic mean = $\frac{n}{\sum_{i=1}^{n} 1/x_i}$
   Dittmann and Weiner (2[illegible]at the valuation performances can be optimized when ROA is used as the base of classification. ROA, a measurement of operating profitability, is commonly calculated as net income divided by total assets (Keown et al 2005, p.77). However, for the purpose of relative valuation, the following ROA calculation is utilized:

   $$ROA = \frac{EBIT}{TA} \qquad \mathbf{(2)}$$

Where,
EBIT = Earning Before Interest and Taxes or operating income
TA = Total Assets

EBIT is used instead of net income as it measures the 'true' operating profitability of total assets as net income figure is affected by financing decision, tax regulation, and extraordinary accounts, e.g. gain on sale or loss of assets.

3. Predict the Enterprise Value and Offering Price.
After determining the multipliers, the next procedure is to predict the enterprise value based on the five methods of multipliers. The predictive value based on arithmetic mean is as follow:

$$\hat{EV} = \left[\frac{1}{n} \sum_{j=C_i} \left(\frac{EV_j}{EBIT_j} \right) \right] \bullet EBIT_i$$

(3)
The predictive value based on median is as follow:

$$\hat{EV} = \mu_{1/2} \left(\frac{EV_c}{EBIT_c} \right) \bullet EBIT_i$$

(4)
The predictive value based on harmonic mean is as follow:

$$\hat{EV} = \left[\frac{n}{\sum_{j=c_i}^{n} \left(EBIT_j / EV_j \right)} \right] \bullet EBIT_i$$

(5)
The predictive value based on closest ROA is as follow:

$$\hat{EV} = \frac{EVs}{EBIT_s} \bullet EBIT_i$$

(6)
The predictive value based on closest TA is as follow:

$$\hat{EV} = \frac{EVt}{EBITt} \bullet EBIT_i$$

(7)
Where,

EVj	is the enterprise value of firm *j* (comparable firm)
EBITj	is the EBIT of firm *j*
EBITi	is the EBIT of firm *i (*firm to be valued*)*
Ci	is the set of comparable firms used for valuing firm *i*
$\mu_{1/2}$	is the median
n	is the number of firms in the set *Ci*

EVs/ EBITs is the EV/EBIT ratio's of firm the has the closests ROA to firm *i*
EVt/ EBITt is the EV/EBIT ratio's of firm the has the closests TA to firm *i*

The equations above will be used to compare the valuation accuracy from the five methods. To compute the predicted offering price, the formula is as follow:

$$\hat{OP}_i = \frac{\hat{EV} - TD_i + C_i + IS_i}{OS_i} \quad \textbf{(8)}$$

Where,
OP = Predicted offering price
TD*i* = Total debt of company *i*
Ci = Total cash and cash equivalent of company *i*
ISi = Total short term investment of company *i*
OSi = Number of outstanding share of company *i*

4. Test and determine the average error level.
The last step is to calculate the average error level. The error level is taken in absolute amount by the following formula:

$$\varepsilon = \left| \frac{\hat{OP}_i - OP_i}{OP_i} \right| \quad \textbf{(9)}$$

After all the error level from each sample has been calculated; firstly, the normality of distribution is examined. Parametric test is utilized is the data is normal while non-parametric test is utilized when the data is not normal. Measurement of the lowest error level from the five methods can be obtained and the hypothesis can be answered.

FINDINGS AND DISCUSSION

The goodness of fit test is performed to test whether the distribution of sample follows specified theoretical distribution; in this case, normal distribution. By looking at the p value, in table 1, there is overwhelming statistical evidence to infer that the null hypothesis is rejected at less than the 1% percent level. Therefore, it is concluded that the variables (absolute valuation errors) in this study are not normally distributed. Consequently, one cannot put too much faith on the results of any statistical tests based on normality assumption. Though non-parametric test is the main test on this research, parametric test or Student t test is performed on this research for the completeness requirement and as sensitivity analysis.

Table 1. One-Sample Kolmogorov-Smirnov Test

		Arith. Mean (Error)	Median (Error)	Harm. Mean (Error)	Closest ROA (Error)	Closest TA (Error)
N		37	37	37	37	37
Normal Parameters(a,b)	Mean	4290%	353%	1129%	1414%	5064%
	Std. Deviation	22089%	1337%	5829%	6107%	23984%
Most Extreme Differences	Absolute	.452	.418	.488	.486	.440
	Positive	.452	.418	.488	.486	.440
	Negative	-.423	-.399	-.423	-.409	-.416
Kolmogorov-Smirnov Z		2.750	2.543	2.970	2.957	2.678
Asymp. Sig. (2-tailed)		.000	.000	.000	.000	.000

a Test distribution is Normal.
b Calculated from data.

Table 2 shows the comparison between arithmetic mean and other methods based on binomial test. The result is categorized into two groups; group one is the number of observation probability that arithmetic mean outperforms the other method; i.e. the absolute error level of arithmetic mean is less than the other method. Consequently, the result on group two indicates number of observation probability that the other method outperforms arithmetic mean. Based on the results, arithmetic mean may provide the same absolute error level with median, harmonic, and closest TA. However, it underperforms when compared to closest ROA. The advantage of using arithmetic mean is its simplicity. Despite its simplicity, arithmetic mean is not stable and may lead to unreliable result when some of the comparables' multiplier is excessive. Moreover, the absolute error level tend to be biased upward (overvalued), which is caused by the outliers. Researchers may attempt to eliminate the outliers when they pursue arithmetic mean as the method of averaging; however, problems may arise when there are no enough comparables firms due to the elimination.

Table 2. Binomial test, error of arithmetic mean vs. others

		Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
Arith - med	Outperforms	.49	.50	1.000(a)
	Underperforms	.51		
Arith - harm	Outperforms	.51	.50	1.000(a)
	Underperforms	.49		
Arith - ROA	Outperforms	.27	.50	.008(a)
	Underperforms	.73		
Arith - TA	Outperforms	.59	.50	.324(a)

	Underperforms	.41		

a. Based on Z approximation

The binomial testing, from table 3, reveals that harmonic mean outperforms closest TA but is not better or worse than arithmetic mean, median, and closest ROA. Mathematically, the result of harmonic mean will always be lower than arithmetic mean. When arithmetic mean tends to overvalue valuation, harmonic mean tends to undervalue valuation as harmonic mean is the sum of the inverse of each EV/EBIT ratio. Some researchers may favor harmonic mean as it avoids upward bias provided by arithmetic mean (Baker & Ruback 1999). In addition, those who are conservative and believed that market will punish overvaluation more than undervaluation may utilize this method.

Table 3. Binomial test, error of harmonic mean vs. others

		Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
Harm - Arith	Outperforms	.49	.50	1.000(a)
	Underperforms	.51		
Harm - Median	Outperforms	.46	.50	.743(a)
	Underperforms	.54		
Harm - ROA	Outperforms	.41	.50	.324(a)
	Underperforms	.59		
Harm - TA	Outperforms	.73	.50	.008(a)
	Underperforms	.27		

a. Based on Z approximation

The hypothesis testing, from table 4, indicates using firm multiplier based on median may lead to similar of result based on arithmetic, harmonic mean, and closest ROA. There is overwhelming statistical evidence that the median outperform closest TA. Thought the result suggests the performance of median is similar to harmonic mean and arithmetic mean, unlike the two methods, it may not result in biases of overvaluation of undervaluation in the presence of outliers.

Table 4. Binomial test, error of median vs. others

		Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
Med - Arith	Outperforms	.51	.50	1.000(a)
	Underperforms	.49		
Med - Harm	Outperforms	.54	.50	.743(a)
	Underperforms	.46		
Med - ROA	Outperforms	.39	.50	.296(a)
	Underperforms	.61		

Med - TA	Outperforms	.75	.50	.004(a)
	Underperforms	.25		

a. Based on Z approximation

The statistical test on table 5 shows overwhelming evidences that closest ROA performs better than arithmetic mean or closest TA. There are indications that closest ROA performs better than median or harmonic mean, given that the probability of closest ROA outperforms the others are bigger than when it underperforms. However, there is no enough statistical evidence to infer the previous statement is valid.

Table 5. Binomial test, error of closest ROA vs. others

		Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
ROA - Arith	Outperforms	.73	.50	.008(a)
	Underperforms	.27		
ROA - Med	Outperforms	.61	.50	.296(a)
	Underperforms	.39		
ROA - Harm	Outperforms	.59	.50	.324(a)
	Underperforms	.41		
ROA - TA	Outperforms	.81	.50	.001(a)
	Underperforms	.19		

a. Based on Z approximation

CONCLUSION AND RECOMMENDATION

The study is performed to investigate the best firm multiplier for relative valuation (valuation by comparables) using Enterprise value to Earning before Interest and Tax ratio (EV/EBIT). The study works with 37 samples that meet the sample selection criteria during 2001-2007. Among the five methods, i.e. arithmetic mean, median, harmonic mean, closest ROA, and closest TA, in calculating the comparable multiplier, closest TA performs the worst in Indonesia capital market during 2001-2007. Arithmetic mean and harmonic mean has weaknesses and they tend to bias the result due to outliers. The result of averaging tends to bias upwards for arithmetic mean and bias downward for harmonic mean. Median does not cause any biases but has equal performance with arithmetic mean and harmonic mean. Despite its advantage in valuation compared to arithmetic mean and closest TA, there is no statistical evidence to argue that closest ROA is different from median and harmonic mean.

Based on the research conducted, the following recommendations are offered:

1. Understand the valuation process. Some analyst may provide software to calculate the best offering price while some may provide the ratios. Valuation practitioner

should avoid black box syndrome: blindly input the variables and accept the output (offering price) without understanding the process.

2. Do not use relative valuation when there are no sufficient peers. Number of peer is the main essence of relative valuation, recalling that the first step on relative valuation is peer identification. Without sufficient comparable firms, definitely the valuation will not be optimal.

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