ความแม่นยำในการประเมินราคาหุ้นด้วยเทคนิค Price Multiple ในประเทศไทย

Valuation Accuracy Using Price Multiple in Thailand

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บทคัดย่อ

Stock price multiple เป็นเทคนิคการประเมินมูลค่าหุ้นที่รู้จักอย่างแพร่หลายในสาขาการเงิน คำนวณโดยการนำสัดส่วนของราคาหุ้นต่อปัจจัยที่มีผลต่อราคาหุ้น (value driver) คูณด้วยปัจจัยที่มีผลต่อราคาหุ้น (value driver) ปัจจัยที่มีผลต่อราคาหุ้นอาจจะเป็นรายได้ ยอดขาย หรือ มูลค่าหุ้นทางบัญชี แม้ว่าจะมีการใช้ Stock price multiple เทคนิคกันอย่างแพร่หลายในต่างประเทศ แต่การศึกษาราคาหุ้นในประเทศไทยโดยเทคนิค Stock price multiple ยังมีอยู่น้อย วัตถุประสงค์ที่หนึ่งของการศึกษาเพื่อประเมินมูลค่าของบริษัทที่อยู่ในตลาดหลักทรัพย์แห่งประเทศไทยโดยใช้ Price multiple เทคนิค วัตถุประสงค์ที่สองเพื่อเปรียบเทียบความแม่นยำในการประเมินราคาหุ้นของแต่ละปัจจัยที่ที่มีผลต่อราคาหุ้น (value driver) เพื่อหาปัจจัยที่ประเมินราคาหุ้นได้แม่นยำที่สุด จากข้อมูล รายได้ มูลค่าทางบัญชี และรายได้ก่อนหักดอกเบี้ย ภาษี ค่าเสื่อมและค่าจัดจำหน่าย ของบริษัทที่จดทะเบียนในตลาดหลักทรัพย์แห่งประเทศไทย 580 บริษัท แบ่งออกเป็น 8 กลุ่มอุตสาหกรรม 28 ภาคส่วนอุตสาหกรรม ตั้งแต่เดือนมกราคม ปีพ.ศ. 2544 ถึงเดือน ธันวาคม ปีพ.ศ. 2561 การทดสอบเริ่มจากการเลือกบริษัทในภาคส่วนอุตสาหกรรมเดียวกันเพื่อคำนวนหาค่า Price Multiple ของบริษัทเปรียบเทียบ นำปัจจัยที่ที่มีผลต่อราคาหุ้นของบริษัทที่ทำการศึกษาคูณกับค่า Price Multiple ของบริษัทเปรียบเทียบเพื่อประเมินราคาหุ้นของบริษัทที่ทำการศึกษาและเปรียบเทียบกับราคาหุ้นปัจจุบัน การศึกษาพบว่าความแม่นยำในการประเมินมูลค่าหุ้นของเทคนิค price multiple แตกต่างกันในแต่ละภาคส่วนอุตสาหกรรม เทคนิค EBITDA price multiple ประเมินมูลค่าหุ้นได้แม่นยำที่สุดใน 14 ภาคส่วนอุตสาหกรรมจากทั้งหมด 28 ภาคส่วนอุตสาหกรรม

คำสำคัญ: Price multiple, ความแม่นยำในการประเมินมูลค่าหุ้น, ปัจจัยที่มีผลต่อราคาหุ้น ตลาดหลักทรัพย์แห่งประเทศไทย

Abstract

Stock price multiple, measured by multiplying “the ratio of stock price to a value driver” by a value driver (e.g. earning, sales, book value of the company), is a well-known equity valuation technique used in finance field. However, the studies on the application of stock price multiple technique in Thailand is still limited. Therefore, the present study is conducted to serve two major objectives. The first objective is to apply price multiple valuation method to examine the value of various firms listed in the Stock Exchange of Thailand. The second objective is to compare valuation accuracy of different value drivers of price multiple (i.e. EPS, BV, and EBITDA) in order to identify the most accuracy value drivers of price multiple technique. Data on EPS, BV and EBITDA are collected from 580 companies listed in the stock exchange of Thailand from January 2001 to December 2018. Data are classified into eight industrial groups and twenty-eight sectors. The test procedure starts with the selection of comparable firms within the same industry to calculate the price multiple ratio of comparable firms. The price multiple ratio of comparable firms is then multiplied by target firm’s corresponding value driver to calculate the estimated equity value.

Finally, the estimated equity value is then compared with the equity price to see valuation errors. Results indicated that the accuracy of price multiple valuations differs for companies in different sectors in the Stock Exchange of Thailand. EBITDA provides the highest valuation accuracy among three value drivers for 14 out of 28 industrial sectors.

Keywords: Price multiple, Valuation accuracy, Value driver and Stock Exchange of Thailand
Paper Type: Research

1. Introduction

Over decades, academicians and practitioners have worked extensively to evaluate firms' intrinsic value and forecast earning and price of stocks. A variety of methods (e.g. stock price multiple, discount cash flow, economic value added, asset-based valuation) has been proposed to measure firm's value and forecast stock price (Nel, 2009) Price multiple is one of the most well-known technique for equity evaluation (Yoo, 2006) The popularity of this technique lies in its comprehensiveness and simplicity as it does not require detailed multi-year forecasts of profitability, growth, and the cost of equity (Yoo, 2006) Price multiple is based on the assumption that equity value is an on increasing function of future return and a decreasing function of risk (Liu et al., 2002; Yoo, 2006)

Although, the studies on price multiple valuation technique have been prevalent in developed stock markets (Liu et al., 2002; Yoo, 2006) there is limited research on price multiple valuation in emerging equity markets, particularly in Thailand. Since the technique is proven and applied by analysts or practitioners internationally, it is interesting to apply and test price multiple technique with listed companies in Stock Exchange of Thailand. Therefore, the present study contributes to existing literature in equity valuation by applying price multiple valuation technique to estimate the equity prices of listed companies in Stock Exchange of Thailand during 2001-2018.

The present study includes three major value drivers (i.e. earning per share (EPS), book value of equity (BV), and earnings before interest, taxes, depreciation and amortization (EBITDA) and examine the accuracy of these three value drivers in forecasting future stock prices.

By analyzing data on earnings, book value of equity and EBITDA of 580 companies listed in the Stock Exchange of Thailand from January 2001 to December 2018, findings indicated that the accuracy of price multiple valuations differs for companies in different sectors in the Stock Exchange of Thailand. EBITDA provides the highest valuation accuracy among three value drivers for 14 out of 28 industrial sectors. The valuation errors measured by the percentage mean of absolute valuation error are 0.77 for EBITDA price multiples, 0.83 for earning price multiples, and 0.87 for book value of equity price multiples. Results from this study can be implemented by academicians, investors, and securities companies in order to select the most accuracy measurement of the values of the firms, forecast future equity prices and recommend stocks to be invested.

2. Objectives

The present study is conducted to serve two major objectives. The first objective is to apply price multiple valuation method to examine the value of various firms listed in the Stock Exchange of Thailand. The second objective is to compare valuation accuracy of different value drivers of price multiple (i.e. EPS, BV, and EBITDA) in order to identify the most accuracy value drivers of price multiple technique. P/E and P/EBITDA ratios are expected to provide accurate valuation for stable sectors and sectors where earnings mainly come from goods sold like agribusiness, automotive, commerce, construction material, electronic components, fashion, food & beverage, home and office products, industrial materials & machinery, information& communication and technology, media & publishing, packaging, pharmaceuticals, petrochemicals & chemicals, professional services, steel and tourism & leisure. In these sectors, P/EBITDA should perform better than P/E in businesses that have high debt ratio as it indicates the ability of firms to generate profit better than P/E. The P/BV is expected to provide accurate valuation for companies in the stable earnings growth and high fixed assets like banking, construction services, finance, health care services insurance, property development, Property Fund & REITs, utilities and transportation & logistics.

3. Literature Review

In the world of uncertainty, Fama (1965) indicated that there is no chance to forecast exact stock's intrinsic value. Thus, investors can have different views on intrinsic value. Different views will cause differences between market prices and intrinsic values. Fama (1965) says that, in an efficient market, the investors' decisions should cause the market price of a security to wander around its intrinsic value. Liu et al. (2002) and Alford (1992) studied price multiple valuation method to find the gap of the actual price and intrinsic value.

Price multiple as a relative valuation assumes that market prices stock correctly on average and markets may price individual stocks incorrectly. It is possible that sometime markets make mistake as markets constantly respond to new information and could be overreact and under react. Approximately 90% of valuations are relative valuations and 50% of acquisition valuations use a combination of multiples and comparable companies (Damodaran 2007).

Previous studies have recommended several valuation methods to access the valuation of the stock performance. Nel (2009) indicated that there are five major approached used to evaluate stock performance including price multiple method, discounted cash flow method (DCF), economic value-added model (EVA), net asset base valuation (NAV), and rule of thumb valuation (ROT). Price multiple, DCF, and NAV method are the three popular methods among academicians and investment practitioners (Nel, 2009) Sayed (2016) conducted an in-depth analysis on 392 equity research reports. Results have shown that price/earnings multiple methods provide significantly better short-term outcomes than DCF method. Yoo (2006) indicated that price multiple valuation technique has widely studied in determining the equity prices because of its comprehensiveness, simplicity, and more accuracy than other financial ratios.

According to Liu et al. (2002), stock price multiple can be calculated by multiplying "the multiple" by value drivers. The multiple defines as the ratio of stock price of the company by value drivers. The simple price multiple can be calculated as follows:

$$EV_{it} = \left(\frac{P}{X}\right) Com_{it} \times X_{it} \qquad (1)$$

where EV_{it} is the estimated equity value of firm i in year t, $\left(\frac{P}{X}\right) Com_{it}$ is the harmonic mean of the stock price (P) multiple to a value driver (X) of the comparable firms for firm i in year t, and X_{it} is the value driver of firm i in year t. Value drivers can be earnings, sales, book value of the company or other accounting performance measurements (Liu et al., 2002)

Previous studies have suggested finding stock price multiple through different value drivers. Boatsman & Baskin (1981) studied valuation accuracy of price multiples to earning of the firms in the same industry and find that valuation accuracy increases when comparable firms have similar past earnings growth. This method increases valuation accuracy over comparable firms compared to other selection methods such as industry and sizes matches. Bhojraj & Lee (2002) suggested using price multiple to sales and price multiple to book value of equity to examine firms' value. Kaplan & Ruback (1995) suggested using price multiples to EBITDA. This technique provided accuracy as discount cash flow valuation technique. Baker & Runback (1999) studied the relative performance of EBITDA, EBIT and sales as value drivers of price multiples. Results indicated that industry-adjusted EBITDA provides higher valuation accuracy than EBIT and sales. Using forecast earnings, Kim & Ritter (1999) found that price multiple to forward P/E provides highest valuation accuracy over other value drivers of price multiples. They also indicated that EPS forecast for next year provides higher valuation accuracy than the current year EPS forecast. Liu et al. (2002) found that price multiple to forward earning provides higher valuation accuracy over other value drivers of price multiples.

Moreover, Liu et al. (2002) also indicated that earnings, cash flows, and sales do not perform well for absolute valuation performance and suggest using harmonic mean for multiples to improve the valuation accuracy. Beatty, Riffe & Thompson (1999) confirmed the benefits of applying harmonic mean and introduce the priced-scaled regressions. They found that the using weights from harmonic mean of book value to price multiples and earnings to price multiples provide high accuracy in measuring firms' value.

Based on the above mentioned literatures, three value drivers of price multiple are selected to examine

firms' value and the accuracy of these three value drivers are investigated in the present study.

4. Methodology

4.1 Sources of Data and Collection of Data

Data are collected from Thomson Reuters Database. Population included 580 listed companies in the Stock Exchange of Thailand. Only firms that have positive values for any value drivers are included in the sample. Value drivers in this research include earnings, book value of equity and EBITDA. Data are classified into twenty-eight sectors industry groups. The study period is from January 2001 to December 2018. Alford (1992) and Cheng & McNamara (2000) suggested to select comparable firms using industry classification criteria and this paper applies the suggested method.

According to Liu et al. (2002) share prices as of last trading day of April each year are analyzed and firm-years with following criteria are included: (1) financial statement must include earnings, book value of equity and EBITDA (earnings before interest, taxes, depreciation and amortization), (2) all stock price to value driver ratios lie within the first and 99th percentiles of the pooled distribution, (3) stock prices on the last trading day in April each year are greater than or equal to THB 2, (4) only positive valuation multiples are included in the study, and (5) each industry-year combination has minimum five observations. The fourth condition ensures negative valuation outcomes are excluded, and the fifth condition avoids small comparable groups (Liu et al., 2002)

Using the approach recommended by Liu et al. (2002) the final sample included 16,669 firm-years of 31,320 firms between 2001 and 2018. Annual data are used since they are not affected by seasonality. The equity valuation of the firms at the end of April each year is conducted as most firms release December fiscal year-end annual results at least until late March. This measurement allows the market at least 1 month to reflect value-relevant information of the annual results.

4.2 Measurement of Variables

4.2.1 Earnings Price Multiple

The stock price multiples to earning is calculated as follows:

$$EV_{it} = \left(\frac{P}{E}\right) Com_{it}\, x\, EPS_{it} \qquad (2)$$

where EV_{it} is the estimated equity value of target firm i in year t. $\left(\frac{P}{E}\right) Com_{it}$ is the harmonic mean of the stock price (P) multiple to earnings per share (E) of the comparable firm i in year t. EPS_{it} is earnings per share of target firm i in year t. Lastly, the harmonic mean of PE ratio of comparable firms is multiplied by earnings per share of target firm to be expected equity value of target firm.

4.2.2 Book Value of Equity Price Multiple

The stock price multiples to book value of the firm is calculated as follows:

$$EV_{it} = \left(\frac{P}{BV}\right) Com_{it}\, x\, BV_{it} \qquad (3)$$

where EV_{it} is the estimated equity value of firm i in year t. $\left(\frac{P}{BV}\right) Com_{it}$ is the harmonic mean of the stock price (P) multiple to a book value per share of comparable firms i in year t. BV_{it} is the book value per share of firm i in year t. Lastly, the harmonic mean of price over book value ratio of comparable firms is multiplied by the book value per share of target firm to be expected equity value.

4.2.3 Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) Price Multiple

The procedure to calculate stock price multiple to EBITDA is as follows:

$$EV_{it} = \left(\frac{P}{EBITDA}\right) Com_{it}\, x\, EBITDA_{it} \qquad (4)$$

where EV_{it} is the estimated equity value of target firm i in year t. $\left(\frac{P}{EBITDA}\right) Com_{it}$ is the harmonic mean of the stock price (P) multiple to a EBITDA per share of comparable firms i in year t. $EBITDA_{it}$ is the earnings before interest, taxes, depreciation and amortization per share of target firm i in year t. Lastly, the harmonic mean of price over EBITDA ratio of comparable firms is multiplied by the EBITDA per share of target firm to be expected equity value.

4.3 Measurements of Valuation Accuracy

Since the objective of the present study is to find the accuracy of each price multiple method, after finding the expected equity value from each price simple multiple valuation, the valuation accuracy is calculated. According to previous study of Liu et al. (2002), valuation accuracy is measured by taking the equity price less expected equity value divided by equity price. The valuation accuracy calculation for each value driver is calculated to examine the distribution of the percentage valuation errors. The least the percentage difference between the equity price and the expected equity price, the higher the valuation accuracy is.

In the present study, three statistical methods are used to measure the accuracy of each value driver of price multiple. Each one measures the magnitude of the valuation errors in different ways. The three measurement of valuation accuracy includes (1) the mean of absolute valuation errors (MAVE), (2) the interquartile range of valuation errors (IQRVE), and (3) the percentage of sample whose absolute percentage valuation error is over 15 per cent (15% AVE).

MAVE is used by Beauty et al. (1999), IQRVE is used by Liu et al. (2002) and 15 per cent AVE is used by Kim and Ritter (1999) Since each measure has its shortcoming when the valuation error distribution has some extreme values or serious skewedness, all of the three measures are considered to address the potential limitation of each valuation accuracy measure.

4.3.1 Mean Absolute Valuation Error (MAVE)

MAVE is the average of all absolute valuation errors. It is the absolute value of the difference between the forecasted equity value and the actual equity value. MAVE indicated how big of an error from the forecast on average. The formula to calculate MAVE is as follows:

$$MAVE = \frac{1}{n}\sum_{i=1}^{n}|x_i - x| \quad (5)$$

where n is the number of errors, x_i is the actual equity value, x is the forecasted equity value, and $|x_i - x|$ is the absolute errors.

4.3.2 Interquartile Range

The interquartile range measures where the “middle fifty” is in a data set from 2001 - 2018. To calculate the interquartile range for this example set of data 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, the median of the data set is identified and the parentheses are put around the numbers above and below the median (1, 2, 3, 4, 5), 6, (7, 8, 9, 10, 11). Q1 is a median in the lower half of the data and Q3 is a median for the upper half of data. The interquartile range formula is the first quartile subtracted from the third quartile; IQR = Q3 – Q1. An interquartile range of above example is 9 – 3 = 6.

4.3.3 The Percentage of Sample Whose Absolute Percentage Valuation Error Over 15%

The percentage valuation error is calculated by

$$PVE_{it} = \frac{P_{it} + EV_{it}}{P_{it}} \quad (6)$$

where PVE_{it} is percentage valuation error of firm i in year t, P_{it} is equity price of firm i in year t, EV_{it} is expected value of firm i in year t. If 50 percent of sample has absolute percentage valuation error over 15%, it indicated that the accuracy of price multiple is low as 50% of the sample has the valuation error over 15%.

5. Results

5.1 Descriptive Statistics

Table 1 shows descriptive statistic of the sample of firms using in the analysis. The mean of earnings per share is 2.34 with the maximum value of 236.68 of Thai-German Product PLC in steel sector in 2004 and the minimum value 0.01 of Areeya Property Public Company Limited in property development sector, Advance Connection Corporation Public Companies Limited in home & office products and several firms in different sectors in different years. The median of earnings per share is 0.58. The standard deviation of book value of equity is highest among the three value drivers. The mean of book value of equity per share is 17.19 with the maximum value of 10,360.12 of PM Thoresen Asia Holdings Public Company Limited in 2012 in petrochemicals & chemicals sector and the minimum value 0.001 of U City Public Company Limited in 2009 in property development sector. The mean of

earnings before interest, taxes, depreciation and amortization per share is 5.32 with the maximum value of 7073.24 of Thitikorn Public Company Limited in 2002 in finance & securities sector and the minimum value 0.00004 of Bangkok Post Public Company Limited in 2014 in media & publishing sector.

Table 1: Descriptive Information of Value Drivers

Unit per share	**EPS**	**BV**	**EBITDA**
Mean	2.34	17.19	5.32
Median	0.58	3.37	0.88
Mode	0.02	0.66	0.93
Min	0.01	0.001	0.00004
Max	236.68	10360.12	7073.24
Standard Deviation	7.26	139.02	95.87
Number of Observations	5,636	7,649	6,812

Note: EPS is earnings per share, BV is book value of equity per share and EBITDA is earnings before interest, taxes, depreciation and amortization per share.

Table 2: Descriptive Information of Prices to Value Drivers

Unit per share	**P/EPS**	**P/BV**	**P/EBITDA**
Mean	68.67	7.87	65.24
Median	16.69	2.00	9.08
Mode	10.00	65.70	NA
Min	0.15	0.10	0.03
Max	28466	2707	145652
Standard Deviation	450.13	46.64	1998.32
Number of Observations	5,086	6,078	5,505

Note: P/EPS is the equity price divided by earnings per share, P/BV is the equity price divided by book value of equity per share and P/EBITDA is the equity price divided by earnings before interest, taxes, depreciation and amortization.

Table 2 shows the equity price divided by value drivers. The mean of the equity price divided by earning per share is rather high at 68.67 with the maximum value 28,466 of Siam Cement in construction material sector in 2002 and the minimum value 0.15 of TCJ Asia Public Company Limited in industrial materials & machinery sector in 2004. This data indicates that the earnings are relatively low comparing to the equity prices. The median is 16.69 and the standard deviation is extremely high 450.13. The mean of price over book value of equity per share is also very high 7.87 with the maximum value 2,707 of Thai Wire Products in steel sector in 2002 and the minimum value 0.10 of Asia Fiber Public Company Limited in fashion sector in 2009. The medians of all three value drivers are slightly high and the standard deviation of P/EBITDA is highest among the three value drivers. The mean of price over earnings before interest and taxes depreciation and amortization is rather high 65.24 with the maximum value 145,652 of Bangkok Post Public Company Limited in media & publishing in 2014 and the minimum value 0.03 of Apex Development Public Company Limited in property development sector in 2003. The ratio is quite high. The median is 9.08 and the standard deviation is high 1,998.32.

5.2 Comparison among the Three Value Drivers

Table 3 provides the comparing among the three value drivers using mean average valuation errors (MAVE) as the measurement of valuation accuracy. The best value driver for each sector is different. The price multiple using earnings per share (EPS) as the value driver provides the lowest valuation error among three value drivers for the following sectors; automotive 0.58, banking 0.34, electronic components 0.75, fashion 0.69, finance & securities 0.58 and personal products & pharmaceuticals 0.27. The price multiple using book value of equity (BV) as a value driver provides the lowest valuation error for the following sectors; energy & utilities 0.56, home & office products 0.84, packaging 0.76, property development 0.69, property Fund & REITs 0.23 and transportation & logistics 0.77. Lastly, the price multiple using EBITDA as a value driver provides the lowest valuation error for the following sectors; agribusiness 0.71, commerce 0.83, construction materials 0.71, construction services 0.65, food & beverage 0.69, health care services 0.76, industrial materials & machinery 0.55, information & communication technology 0.52, insurance 0.61, media & publishing 0.59, packaging 0.76, petrochemicals & chemicals 0.49, steel 0.61 and tourism & leisure 0.65. In conclusion, results have shown that the best value driver of price multiple is different according to different industrial sectors.

Table 3: MAVE of the Stock Price Multiple to the Three Value Drivers

MAVE	P/EPS	P/BV	P/EBITDA
All Sectors	0.83	0.87	0.77
Agribusiness	1.09	0.92	0.71
Automotive	0.58	0.75	0.63
Banking	0.34	0.38	0.47
Commerce	1.16	1.67	0.83
Construction Materials	0.86	0.85	0.71
Construction Services	0.73	0.97	0.65
Electronic Components	0.75	0.96	1.08
Energy & Utilities	0.63	0.56	0.64
Fashion	0.69	0.80	0.75
Finance & Securities	0.58	0.63	1.05
Food & Beverage	0.76	0.86	0.69
Health Care Services	1.07	1.06	0.76
Home & Office Products	0.85	0.84	1.03
Industrial Materials & Machinery	1.24	0.78	0.55
Information & Communication Technology	0.67	0.72	0.52
Insurance	0.68	0.81	0.61
Media & Publishing	0.66	0.81	0.59
Mining	NA	NA	NA
Packaging	0.83	0.81	0.81
Paper & Printing Materials	NA	NA	NA
Personal Products & Pharmaceuticals	0.27	7.18	0.58
Petrochemicals & Chemicals	0.71	0.66	0.49
Professional Services	NA	NA	NA
Property Development	1.61	0.69	1.48
Property Fund & REITs	0.50	0.23	0.68

MAVE	P/EPS	P/BV	P/EBITDA
Steel	1.06	0.67	0.61
Tourism & Leisure	0.81	1.05	0.65
Transportation & Logistics	0.82	0.77	0.92

Note: The percentage valuation errors are defined by the stock prices minus the estimated equity values deflated by stock prices. This table shows the percentage valuation errors of the mean of absolute valuation error of the simple multiple valuation using the stock price multiple to earnings, book value of equity and earnings before interest, taxes, depreciation and amortization during 2001 – 2018.

Table 4 shows that the mean of absolute valuation errors of price multiple using EBITDA as a value driver is the lowest at 0.77, followed by EPS at 0.83 and BV at 0.88. The most accurate value driver is different form the finding of Liu et al. (2002) and Yoo (2006) in which earning provided the highest valuation accuracy among historical value drivers. The least accurate value driver, BV, is same as Liu et al. (2002) and Yoo (2006). The inter-quartile valuation errors of the three value drivers are about 0.61 which is close to the average of the study of Yoo (2006) at 0.59. It indicates that bulk of the valuation error lie in this range. All of the three value drivers and composite value drivers have sample whose absolute percentage valuation error over 80 percent of the data which is close to the study of Yoo (2006) showing 73 percent of equity prices has valuation error greater than 15 percent. The means of non-absolute valuation errors are 0.21, -0.24 and -0.20 for earnings, book value of equity and EBITDA respectively. The results are quite different from Liu et al. (2002) and Yoo (2006) where the figures are close to zero. This shows that the actual equity prices are different from the expected equity prices approximately 20%. The median valuation errors are all positive which mean that the equity value is averagely overpriced around 13%. The results are consistent with the study of Liu et al. (2002)

Table 4: Distribution of Percentage Valuation Errors of the Three Value Drivers of Stock Price Multiples

Percentage Valuation Error	MAVE	IQRVE	15% AVE	Mean	Median	Std. Dev.
EPS	0.83	0.63	0.83	-0.21	0.14	4.84
BV	0.88	0.61	0.84	-0.24	0.17	6.12
EBITDA	0.77	0.61	0.84	-0.20	0.09	4.69

Note: The percentage valuation errors are defined by the stock price less the estimated equity values divided by stock prices. This table shows the percentage valuation errors of the simple multiple valuation using the stock price multiple to earnings, book value of equity, earnings before interest, taxes, depreciation and amortization and composite value drivers. MAVE is the mean of absolute valuation errors. IQRVE is the inter-quartile range of valuation errors. 15% AVE is the percentage of sample whose absolute percentage valuation error is over 15 percent. Mean is the mean of non-absolute valuation error. Median is the median of non-absolute valuation error. Standard deviation is the standard deviation of non-absolute valuation error.

6. Conclusion

This study examines the applicability of price multiple valuation approach to listed companies on the Stock Exchange of Thailand from the year 2001 to 2018. The findings show that best price multiple valuation accuracy differs for companies in different sectors in the Stock Exchange of Thailand. P/E price multiple provides highest valuation accuracy for automotive, banking, electronic

components, fashion, finance & securities and personal products & pharmaceuticals sectors. Majority of these sectors have low debt ratio compared to other sectors and it is possible that investors, analysts or practitioners look at the financial performance on EPS. P/BV price multiple provides highest valuation accuracy for energy & utilities, home & office products, property development, property Fund & REITs and transportation & logistics. Except, home & office products, these sectors have high fixed assets and BV provides, by theory, the good explanation as BV captures the value of fixed assets. P/EBITDA price multiple provides highest valuation accuracy for agribusiness, commerce, construction materials, construction services, food & beverage, health care services, industrial materials & machinery, information & communication technology, insurance, media & publishing, packaging, petrochemicals & chemicals, steel and tourism & leisure. Since capital structure of these sectors are different and earnings mainly come from products sold, EBITDA is, then, a possible most accurate evaluator to reflect the ability of firms' financial performance. The price multiple valuation using EBITDA provides the highest valuation accuracy for 14 out of 28 sectors and the price multiple valuation using EPS and BV provides the highest valuation accuracy for 6 sectors industrial groups. The valuation errors measured by the percentage mean of absolute valuation error are 0.77 for EBITDA price multiples, 0.83 for earnings price multiples, and 0.87 for book value of equity price multiples. Since most of the sectors, by nature and theory, are more suitable to be estimated by earnings and few sectors have characteristics associated with BV, EBITDA is best for checking the earnings before allocations and it is then the best value driver for this study.

6.1 Implications

This study provides several implications for practitioners, academician, and policy makers. Firstly, for practitioners and investors, since the valuation method is crucial for investors and financial counselors in examining companies' intrinsic value and equity price forecasting, findings from the present study should be beneficial for investors and financial counselors to select the most accurate and most applicable valuation method that is appropriate with Thai context. Thai investors could use price multiple valuation technique with various value drivers to determine the equity value of the targeted firms and compare with companies in the same sectors or firms that are similar in term of risk, growth of cash flow and cash flow. In addition, the present study analyzes and shows the value of the companies listed in the Stock Exchange of Thailand in which results can reduce resources and time of practitioner and investors in acquiring information on firm value and assist investors and practitioner in making financial decisions.

Secondly, for academically, although the price multiple is one of the subjects taught in finance class, it had received less attention than other valuation methods and the research on this subject in Thailand is limited. Findings from the present study should provide additional information for the class discussion on price multiple valuation method in an attempt to increase the interest and its applicability through the improvement of the valuation accuracy results. In addition, the present study attempts to raise concern on the measurements of value of Thai companies listed in stock exchange of Thailand. The present study also compares and identifies the most accurate value drivers of price multiple method. Based on results of the present study, academicians and practitioners can adopt the most valuation accuracy method to further find the value of the firms.

Finally, the present study also provides contribution to policy makers in examining the intrinsic value of the firms. Accurately calculate value of the firms allow policy makers to better formulate and implement policies to stabilize the stock market. With more accuracy valuation method, policy markets can predict the equity price level more accurately. Better valuation methods assist policy maker in designing and implementing policies to promote the capital market investment and control overpriced or bubble situations. Insights from the study are expected to render deeper understanding and assist policymakers in formulating effective policies to stabilize the financial sector.

6.2 Limitations and Suggestions for Future Research

The present study is subjected to some limitations. First, there are missing data in analyzing the value of equity. The missing information is 47% and this could cause the overall low valuation accuracy. Future research may incorporate more data on firms and years to increase valuation accuracy.

Second, the present research examines only three value drivers of price multiple technique. Future

research may examine other value drivers of price multiple, such as forecast future earning, sales, or composite index of firm performance, in order to measure value of the firms and compare the accuracy of different value drivers. Non-linear combination of the simple multiple valuation outcomes based on both forward earnings multiple and historical multiples may be able to improve the valuation accuracy of the simple multiple valuation.

Finally, future research may apply price multiple technique to measure value of the firms in other emerging stock markets since there is few existing studies of price multiple valuation in emerging equity market.

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