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ALTERNATIVE ANALYSES OF MARKET VALUE ADDED: A CASE STUDY OF THAILAND

Abstract

This paper examines the market value added (MVA) of listed companies in Thailand. It is known that the major drawbacks of MVA are size and market return effects. Using the two additional approaches to improve MVA study – MVA change, and the market return adjusted of three-year growth rate of MVA – the better interpretations of MVA in the Thai market during 1999–2018 are obtained. The first approach reduces the market capitalization bias, while the second diminishes the effect of the overall market trend and the stability of firm's current performance. This study finds that when the two alternative techniques are applied, the annual results of the MVA rankings are not consistent with those of the traditional MVA and thus lead to a new insight into such indicator. Therefore, this study advances the understanding of the market value added and value creation indicators.

Keywords

market value added (MVA), MVA's drawbacks and improvements, market capitalization effect, market condition effect, MVA change, market return adjusted of three-year growth rate of MVA, performance measurement, value-based analysis, shareholder wealth maximization, Thai's listed companies, Stock Exchange of Thailand (SET), Market for Alternative Investment (MAI)

JEL Classification F21, G15, G32, L21

INTRODUCTION

The owner's wealth maximization is the ultimate goal of any business. For listed companies, a stock return is the most accessible tool, which boosts shareholders' prosperity. In order to reach a sustainable growth of stock price, management's decisions should rely on not only stock price appreciation, but also a viable progress that does not ruin the company's value in a long run. By maximizing value of the firm, corporate stakeholders, such as employees, customers, suppliers, and society, are also better off. These are the fundamental elements of corporate governance, which serve as a guideline to direct an organization. The principle implies that the long-term value of a firm is the key performance measurement of business. Earnings before interest, taxes, depreciation and amortization (EBITDA), net operating profit after taxes (NOPAT), free cash flows (FCF), and economic value added (EVA) are some examples of performance indicators. However, evaluation processes are difficult and most indicators reflect only a single period performance.

Fortunately, calculation of a market value added does not require complicated data and methodology. MVA represents a firm's performance based on stock price, which is publicly accessible. MVA is the difference between invested capital and the company's market value. It illustrates the stockholder's wealth creation capability during the entire company's life. Sales growth, operating profitability, capital re-

quirement, and cost of capital are the core value drivers. MVA can also be considered as a proxy of operation proficiency, investing competency, and financing efficiency.

An enterprise's value is created when the benefits from corporate decision exceed costs incurred. The continuation of effective management and strong operation enhance the firm's value, resulting in a positive market value added. However, depreciate stock price, temporary solution and poor action lead to negative MVA. MVA also reveals the market perception regarding the future prospect of the business.

As financial theories suggest that investors should diversify their portfolios across countries, emerging markets have gained popularity due to their low correlations with developed markets. Thailand has been a prominent emerging economy and the Thai stock market has become a foreign investment portfolio target. Moreover, the number of local unsophisticated investors has increased during the past few years. Thus, it is crucial for investors to gain insights into wealth creation investments. Also, companies should be aware of the efficiency in terms of capital utilization. Unfortunately, studies of Thai listed firms' performance measurement are limited, and Thai investors are unaware of the usefulness of value added indicator. Since MVA is straightforward, this paper intends to offer one of the simplest tools for stock analysis, which benefits investors, corporations, and the market as a whole.

This paper investigates MVA of listed and delisted companies in Thailand from 1999 to 2018. With the relatively long period, it provides comprehensive assessments of firms' performance through different periods and different market circumstances. By modifying prior research methodologies, the effects of size, historical success, and market movement can be reduced. Generally, young companies have low market capitalizations and small firms, although with high growth potential, are unlikely to have high market value added. In order to solve the size effect, the scaling transformation should be utilized, as it delivers more sensible comparative examinations. Moreover, the three-year growth rate of market adjustment MVA version adds a different dimension to the investigation. It offers a longer perspective showing the stability of firm capability and mitigates the influence of the market conditions. The reason is that a stock price can easily be driven by the overall market movement resulted in an inaccurate interpretation of the MVA. To sum up, this study underlines the problems, offers the modifications, and provides the improvements by using the three MVA analysis methods. Thus, this paper furthers the understanding of MVA and the overall firm performance measurement in Thai listed companies.

1. LITERATURE REVIEW

Value added measures, such as economic value added (EVA) and market value added (MVA), estimate the change in a firm's value, which accounts for all business fundamentals. Similar to capital budgeting techniques, EVA and MVA assess the effectiveness of decision-making, considering the costs. However, EVA and MVA evaluate the entire firm performance rather than a specific project. Also, capital budgeting is frequently made before an investment. EVA is the difference between the operating profit and the cost of capital, proposing the economic profit instead of accounting profit. It reflects the current economic situation by introducing cost of capital to the model. EVA can be calculated as follows:

$$EVA = NOPAT - \text{Capital Charge},$$

$$EVA = (ROIC \cdot \text{Invested Capital}) - \\ - (WACC \cdot \text{Invested Capital}),$$

$$EVA = (ROIC - WACC) \cdot \text{Invested Capital},$$

where *NOPAT* – the net operating profit after taxes, *WACC* – the weighted average cost of capital, *ROIC* – the return on invested capital.

Anthony and Ramesh (1996) propose that firm performance is affected by business cycle. Each stage capability of company should handle with suitable measurement figure. While EVA is a single period measure, MVA depicts firm performance over the

entire life. Even though both of them are related to financial figures, which are sensitive to accounting practices, EVA requires more complex assumptions and approximations, which vary across companies and assessors. Biondi (2011), Biondi and Righi (2016) denote that financial markets are not always efficient and stock prices can be influenced by various factors. Thus, if the market value deviates from equity's fundamental, then the current value analysis should be used with caution. Although EVA evaluates corporate performance better than MVA (Young, 1997), it is a resource-consuming analysis. While EVA can be used in any level of business, MVA is restricted to the consolidated level. Since MVA is the difference between the market value of capital and the invested capital, stock price is an important variable in the estimation. While MVA is more forward-looking method (P. Peterson & D. Peterson, 1996), it cannot be used with non-listed firms.

The estimation of MVA is as follows:

$$MVA = \text{Market Value of Equity} - \\ - \text{Book Value of Equity},$$

$$MVA = (\text{Share Outstanding} \cdot \text{Stock Price}) - \\ - \text{Total Book Value of Common Equity},$$

Since MVA is theoretically equivalent to the present value of expected future EVAs, the two are closely connected. Still, EVA and MVA are normally unequal in reality.

$$MVA = \sum_{t=1}^{\infty} \frac{EVA_t}{(1+WACC)^t},$$

$$MVA = \sum_{t=1}^{\infty} \frac{(ROIC_t - WACC) \cdot \text{Invested Capital}_t}{(1+WACC)^t}.$$

The validity of EVA has been extensively examined; however, the findings are mixed. O'Byrne (1997) suggests that EVA explains the market value and the shareholder return better than NOPAT and free cash flows (FCF). Conversely, Kramer and Peters (2001) and Kim (2006) show conflicting results. They find that the marginal cost of constructing EVA is higher than the marginal benefit. Considering the change of EVA in the model, Chen and Dodd (1997) indicate that old-

fashioned measures of accounting profits, such as earnings per share, return on assets, and return on equity, can provide additional information in explaining stock return. Also, EVA and that of the original residual income explanatory power are almost the same. Stark and Thomas (1998) work on the benefit of residual income and conclude that it has a stronger correlation with the market value than earnings.

The connection between EVA and MVA has been widely investigated in various aspects. Stewart (1991) signifies that a positive EVA is a clue to a positive MVA. Furthermore, EVA maximization is the best approach to maximize MVA. By using the chief executive officer turnover rate as a strategic change proxy, Lehn and Makhija (1996) point out that EVA and MVA may signal the change of the firm strategy and that EVA and MVA are associated with stock return. Banerjee (1999, 2000) presents that MVA is a representative of shareholder's wealth, while EVA is the most significant variable that explains the change of MVA. Alipour and Pejman (2015) and Altaf (2016) argue that traditional accounting profits describe MVA better than EVA. On the other hand, EVA and MVA are positively associated with executive compensation (Sheikholslami, 2001). Baum et al. (2004) denote that executive compensation is more related to MVA than to EVA. Kim et al. (2004) find a stronger association between EVA and MVA during recessions.

Most prior studies have focused on EVA rather than MVA. Thus, the understanding of MVA is limited. Peterson and Peterson (1996) suggest that MVA suffers from market capitalization. The bias is reduced when the percentage change in MVA is used. However, MVA estimation is still affected by market movement, which is outside the control of the manager. The findings are supported by Zaima et al. (2005). They indicate that gross domestic product (GDP), as a proxy of economic condition, influences MVA's variation. As MVA is a present value of EVA, it is economically equivalent to net present value (Hartman, 2000). He concludes that MVA can be utilized in project analysis. Hillman and Keim (2001) suggest a positive relationship between MVA and proxies of stakeholder management. Hence, stakeholder management enhances shareholder wealth. In

contrast, Yook and McCabe (2001) find a negative association between MVA per share and average stock return. Consequently, low MVA is an indicator of underprice, resulting in a positive future return. The studies of MVA in Thailand have been conducted since 2005. Unfortunately, the methodologies are suffered from the size effect and market movement. This study tries to fill the research gap by proposing simple methods to mitigate such effects.

2. DATA AND METHODOLOGY

Similar to an equity market index, annually market capitalizations and market-to-book values of listed and delisted companies in the Stock Exchange of Thailand (SET) and the Market for Alternative Investment (MAI) were taken from Thomson Reuters Datastream. The study period was between 1999 and 2018. Due to the availability of the data, the modified annually market value added was calculated as follows:

$$MVA_{i,t} = MV_{i,t} - BV_{i,t} = MV_{i,t} - \left(\frac{MV}{BV} \right)_{i,t} MV_{i,t}$$

where $MVA_{i,t}$ – the market value added of firm i at the end of year t ; $MV_{i,t}$ – the market capitalization of firm i at the end of year t ; $BV_{i,t}$ – the book value of firm i at the end of year t ; $\left(\frac{MV}{BV} \right)_{i,t}$ – the market-to-book value¹ of firm i at the end of year t .

The book value BV is an accounting value of the company, which is recorded as the difference between total assets and total liabilities, whereas the market value MV is the business's value, which is determined by investors. Although the latter signifies the recent assessment of the firm's value better than the former, the book value is still vital in order to understand the development of the enterprise's performance. A high market-to-book value MV / BV suggests both past achievements and current growth prospects, which are assigned by

equity market. In addition, it can imply an erroneous book value. On the other hand, overvaluation can also be the source of high market-to-book value in inefficient markets. Nevertheless, a low market-to-book value specifies the opposite. The market value added rankings are as follows:

1. The traditional market value added ranking.
2. The change of market value added ranking.

$$\Delta MVA_{i,t} = \frac{MVA_{i,t} - MVA_{i,t-1}}{|MVA_{i,t-1}|}$$

where $\Delta MVA_{i,t}$ – the change of market value added of firm i at the end of year t .

3. The market return adjusted three-year growth rate of market value added ranking.

$$\begin{aligned} \text{Adjusted Growth}_{i,t} &= \\ &= \left[\sqrt[3]{(1 + \Delta MVA'_{i,t}) \cdot (1 + \Delta MVA'_{i,t-1}) \cdot (1 + \Delta MVA'_{i,t-2})} \right] - 1, \end{aligned}$$

$$\Delta MVA'_{i,t} = \Delta MVA_{i,t} - \text{Market Return}_t$$

where $\text{Adjusted Growth}_{i,t}$ – the market return adjusted three-year growth rate of market value added of firm i at the end of year t . $\Delta MVA'_{i,t}$ – the market return adjusted change of market value added of firm i at the end of year t . Market Return_t – the overall market return during year t .

3. RESULTS

3.1. Market value added ranking

Table 1 exemplifies the average MVA of decile portfolio, which is ranked by using end of the year MVA. Table 2 illustrates the top 50 MVA stocks based on their industrial sector. Even though the ranking has been changed over time, many firms are constantly in the top group.

1 Although, market-to-book value and price-to-book value P/B provide a similar conclusion. But their computation are different. As shown in MVA model, price-to-book value and MVA are closely linked. However, the former is a relative measure, while the latter is an absolute measure.

$$P/B = \text{Price per share} / \text{Book value per share}.$$

2 In order to control for the cases of negative MVA, absolute value of denominator has been used.

Table 1. Average MVA of MVA ranking portfolios (million Baht)

Decile	10th	9th	8th	7th	6th	5th	4th	3rd	2nd	1st
1999	40,588.00	4,082.21	1,196.01	361.44	41.01	-101.82	-216.16	-391.94	-676.43	-3,064.94
2000	18,597.20	1,481.39	337.60	14.19	-99.34	-213.39	-369.51	-609.07	-1,241.49	-4,513.81
2001	17,495.15	1,519.65	452.05	122.61	-37.50	-138.52	-253.49	-453.00	-912.39	-3,189.18
2002	17,662.54	2,230.12	789.47	348.25	107.86	-32.12	-155.25	-275.47	-564.97	-3,162.19
2003	55,510.32	7,676.18	3,700.38	1,924.98	1,118.44	638.27	275.97	28.39	-140.15	-865.23
2004	43,003.56	3,968.55	1,729.59	888.05	445.51	196.76	21.71	-147.48	-365.73	-1,995.34
2005	47,076.32	3,486.69	1,234.77	446.26	177.18	13.57	-96.41	-244.90	-466.77	-2,439.85
2006	38,667.24	3,779.74	1,313.57	522.91	216.57	32.52	-120.76	-295.25	-628.36	-3,653.03
2007	60,990.07	4,562.25	1,765.01	707.86	275.91	31.51	-108.66	-268.34	-596.38	-4,488.34
2008	19,871.24	935.81	179.81	-39.18	-181.73	-334.47	-566.18	-914.96	-1,826.86	-13,394.05
2009	43,133.26	3,031.99	920.83	344.63	104.83	-54.69	-202.52	-400.55	-870.46	-5,599.11
2010	73,390.87	6,717.95	2,180.37	932.50	411.99	165.97	10.71	-163.30	-463.79	-3,410.79
2011	72,244.61	6,069.12	2,226.88	736.35	297.22	118.06	-22.00	-230.95	-561.46	-4,169.41
2012	105,568.53	11,475.84	4,386.74	2,128.66	1,098.11	586.49	295.58	63.99	-268.09	-3,067.37
2013	87,156.07	9,361.01	3,555.25	1,526.59	788.96	426.61	186.41	-40.37	-425.86	-4,410.03
2014	101,594.12	12,941.84	5,593.46	2,845.71	1,644.94	862.81	417.70	150.49	-222.82	-3,405.41
2015	74,557.19	10,266.18	3,978.44	2,117.80	1,009.34	508.00	211.13	-43.67	-538.82	-7,937.18
2016	94,325.17	13,605.47	5,495.01	3,034.31	1,483.97	802.04	419.47	167.79	-180.18	-3,905.24
2017	111,692.91	15,463.57	5,377.26	2,870.68	1,461.81	763.24	391.65	137.18	-237.23	-2,751.29
2018	96,220.27	9,068.87	2,987.09	1,379.56	582.38	239.47	30.71	-230.50	-798.17	-4,411.83

Note: * Decile portfolio is based on annual MVA ranking.

They are well established with plenty of historical achievements. As for the business sector, most of the leading companies are banks, real estate investment and services, travel and leisure, oil and gas producers, and construction and materials.

On the other hand, most of the bottom group are small and distressed firms, which generate a negative MVA, because the businesses hardly continue owing to underperforming. Therefore, fewer and fewer corporations constantly remain in the low rank. The number of delisted companies has increased during the first decade. The figure is higher than the leading decile and it is reasonable. As ranking reveals general economic condition, it has severely affected MVA ranking, especially during the 2007–2008 global financial

crisis. However, strategic management can enhance firm performance. Thus, some losers can become winners. In fact, time is a mandatory factor for creating shareholder value. In conclusion, the key findings align with prior literature.

As mentioned earlier, the absolute value ranking signifies the overall wealth maximization performance. Nevertheless, this technique is affected by several factors, especially size effect and survivorship bias. As shown in Figure 1 and Table 3, the scatter plot and cross-sectional analysis of MVA and the market capitalization suggest a positive correlation between MVA and firm size. Although Figure 1 and Table 3 are from 2018 data, results from other periods also confirm such conclusion. Thus, an improved approach should be studied.

Table 2. Industrial sectors of the top 50 MVA stocks during 1999–2018

Sector	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Alternative energy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Automobiles and parts	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Banks	10	8	7	7	8	6	6	6	6	2	7	8	8	7	6	6	4	3	3	3
Beverages	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1
Chemicals	2	2	0	1	2	2	1	1	1	1	1	5	4	3	3	2	2	3	3	2
Construction and materials	4	4	4	4	7	4	5	4	3	3	3	3	3	4	3	2	5	3	3	3
Electricity	1	1	1	1	2	2	3	3	4	3	2	1	2	2	2	2	2	3	6	6
Electronic and electrical equipment	3	2	3	3	2	2	2	2	2	0	0	1	0	0	1	1	2	2	1	1
Financial services (sector)	5	1	3	4	3	3	3	1	1	0	0	0	0	0	0	0	2	1	2	3
Fixed line telecommunications	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Food and drug retailers	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Food producers	1	1	3	2	1	1	2	3	1	5	5	3	3	2	2	3	1	2	2	1
Forestry and paper	0	0	1	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0
Gas, water and multi-utilities	0	0	0	0	1	1	0	0	0	2	1	1	0	1	1	1	1	0	0	1
General industrials	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
General retailers	2	2	1	0	0	0	2	3	2	2	2	3	3	3	3	3	3	4	3	3
Health care equipment and services	1	1	1	1	0	2	2	2	2	5	3	2	3	2	2	2	2	2	2	2
Household goods and home construction	0	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Industrial engineering	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial metals and mining	0	1	2	1	2	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Industrial transportation	0	0	0	0	2	4	1	2	1	0	0	0	0	1	1	1	1	2	2	2
Leisure goods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Life insurance	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	2	2	1	1
Media	2	1	1	2	1	2	2	2	3	1	2	1	1	1	2	2	1	1	0	1
Mining	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
Mobile telecommunications	2	2	2	2	2	2	2	2	3	4	3	3	3	3	3	3	3	3	3	3
Nonlife insurance	1	1	1	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0
Oil and gas producers	1	2	3	3	3	4	5	5	5	2	5	5	5	4	4	3	2	4	5	3
Oil equipment and services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Personal goods	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	1	0
Pharmaceuticals and biotechnology	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Real estate investment and services	5	8	11	9	7	5	4	6	8	3	5	4	6	4	4	5	4	3	2	2
Software and computer services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Support services	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1
Technology hardware and equipment	4	4	2	1	2	2	1	1	1	3	1	1	1	2	3	3	1	2	1	2
Travel and leisure	3	4	2	4	2	3	4	3	2	3	3	3	2	4	5	6	6	5	4	5
Unclassified	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

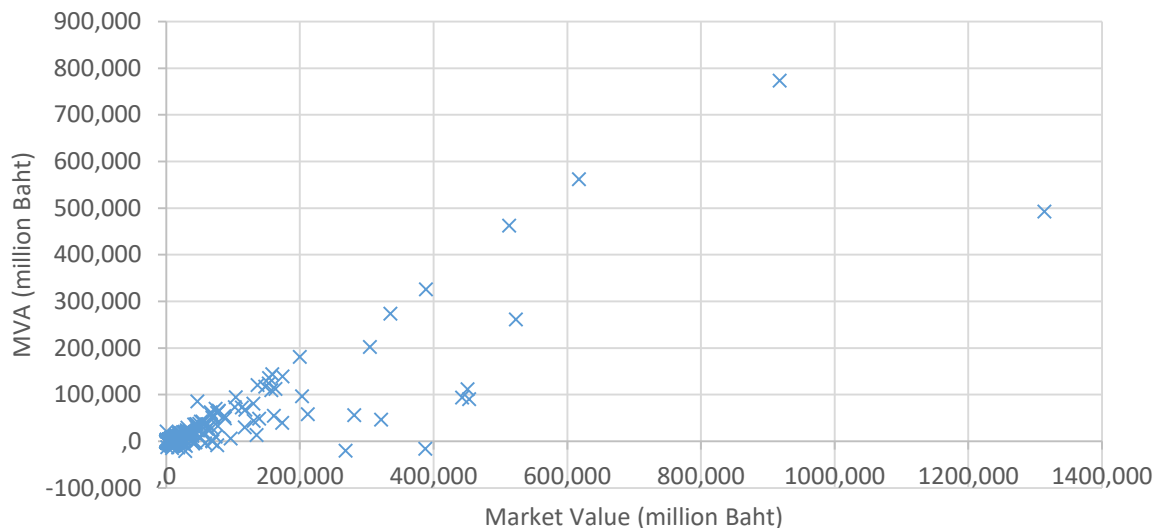


Figure 1. The scatter plot of 2018 MVA and market value (million Baht)

Table 3. The cross-sectional regression of 2018 MVA and market value

Statistics	Intercept	MV
Coefficients	-1078.960	0.526***
<i>t</i> -statistic	-1.139	47.990
Adjusted R-square	0.755497	-

Notes: We run regressions of market value added MVA_i on the market capitalization MV_i of Thai listed companies at the end of 2018. The table reports the estimated coefficients, *t*-statistic, and adjusted R-squared. Equation: $MVA_i = \gamma_0 + \gamma_1 MV_i + \varepsilon_i$, * significant at 10% level, ** significant at 5% level, *** significant at 1% level.

3.2. Change in market value added ranking

The change of MVA method diminishes the effect of market capitalization and past achievement. Tables 4 and 5 show the rank of the listed companies by using this technique. As the ranking result from this approach significantly changes, the number of big corporations are reduced. As presented, more stocks from various industrial sectors are ranked in the top-tier. Also, a number of small firms with high growth potential is also increased. Additionally, the number of delisted stocks within the top rank also increases during the first decade. These outcomes may be driven by temporary performance, short-term strategy, and immediate change of business situations. Food producers, construction and materials, and real estate investment and services are the leading sectors. Finally, the large and longstanding companies

are interesting. To be repetitively counted in the top decile, they not only deliver an exceptional wealth creation capability, but also show growth prospects.

The bottom rank is mixed between large and small firms. Together with Figure 2 and Table 6, the results confirm that the approach is not affected by size differences. In addition, it is normal for delisted companies to appear more during their earlier periods, as they encounter more economic difficulties with underdeveloped regulations and lack of experiences. Therefore, the risk of failure is higher for them. The survivors must be versatile and truly strong. It is important to note that small and young firms with low change in MVA are likely to be the real losers since such companies are in the expansion phase of the business cycle. Only the short-term growth can be expected.

This methodology is suitable for short-term analysis. Although the annually change in MVA reduces size and past accomplishment effect, the ranking is still influenced by other temporary factors, especially the market condition. Even though the observation is small, Table 7 demonstrates preliminary evidence that suggests a positive association between average change of MVA and the change of market index. Consequently, the variation of MVA is affected by economic conditions. In order to minimize the influence, addition remedy is required.

Table 4. The average MVA of the MVA's change portfolios (million Baht)

Decile	10 th	9 th	8 th	7 th	6 th	5 th	4 th	3 rd	2 nd	1 st
2000	6.631	0.385	0.063	-0.075	-0.197	-0.368	-0.631	-0.952	-1.660	-16.135
2001	11.777	1.057	0.556	0.349	0.202	0.083	-0.040	-0.203	-0.586	-7.515
2002	14.139	1.644	0.860	0.512	0.315	0.141	-0.020	-0.172	-0.678	-4.576
2003	66.503	8.800	3.959	2.431	1.638	1.056	0.548	0.248	0.015	-0.656
2004	6.190	0.171	-0.075	-0.273	-0.427	-0.584	-0.757	-0.947	-1.401	-8.152
2005	2.770	0.597	0.177	0.011	-0.166	-0.373	-0.636	-0.934	-1.543	-6.010
2006	17.038	1.800	0.762	0.268	0.071	-0.072	-0.281	-0.551	-1.138	-5.806
2007	12.178	1.379	0.573	0.227	0.040	-0.093	-0.210	-0.406	-0.804	-3.545
2008	2.237	-0.048	-0.240	-0.443	-0.648	-0.893	-1.113	-1.534	-2.357	-11.058
2009	15.674	2.921	1.467	0.856	0.572	0.395	0.239	0.095	-0.061	-4.762
2010	20.508	2.812	1.626	1.046	0.645	0.348	0.168	0.001	-0.202	-1.320
2011	8.552	0.932	0.433	0.151	-0.010	-0.138	-0.296	-0.522	-0.854	-5.461
2012	28.644	4.489	2.291	1.406	0.848	0.498	0.259	0.031	-0.087	-3.258
2013	6.284	0.701	0.199	0.017	-0.081	-0.243	-0.415	-0.583	-0.900	-2.766
2014	19.928	2.392	1.281	0.731	0.415	0.209	0.049	-0.025	-0.187	-1.225
2015	5.177	0.424	0.071	-0.020	-0.173	-0.341	-0.493	-0.695	-0.984	-3.949
2016	10.279	1.639	0.826	0.448	0.198	0.027	-0.031	-0.169	-0.371	-1.035
2017	6.027	0.948	0.387	0.117	0.007	-0.072	-0.244	-0.378	-0.586	-2.567
2018	5.323	0.039	-0.019	-0.169	-0.339	-0.501	-0.664	-0.893	-1.298	-4.491

Note: * Decile portfolio is based on annual change of MVA ranking.

Table 5. The industrial sector of top 50 MVA's change stocks during 1999–2018

Sector	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Alternative energy	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Automobiles and parts	3	1	0	2	1	0	0	1	3	0	4	1	3	0	0	4	1	3	1
Banks	2	1	3	2	0	2	0	3	3	2	0	0	0	0	1	0	2	1	2
Beverages	1	0	0	2	0	1	0	0	0	0	0	2	1	0	0	0	2	0	1
Chemicals	3	0	1	2	1	2	3	2	1	1	1	3	1	4	4	2	1	2	2
Construction and materials	1	8	4	7	1	1	4	6	4	6	5	3	5	6	5	6	4	4	4
Electricity	0	0	0	1	0	1	1	0	0	1	1	1	0	0	1	0	1	1	1
Electronic and electrical equipment	0	1	1	0	1	1	2	2	1	2	2	2	2	4	3	0	2	0	1
Financial services (sector)	0	2	0	2	2	3	6	2	8	3	3	7	4	3	4	2	1	4	2
Fixed line telecommunications	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Food and drug retailers	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
Food producers	13	7	9	5	10	8	2	3	3	9	3	3	4	2	1	4	8	3	2
Forestry and paper	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
Gas, water and multi-utilities	0	2	0	0	1	1	0	1	0	0	1	0	0	0	0	1	0	0	0
General industrials	2	0	2	2	1	0	1	1	0	1	1	1	1	0	2	1	1	0	3

Table 5 (cont.). The industrial sector of top 50 MVA's change stocks during 1999–2018

Sector	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
General retailers	1	2	2	0	0	3	2	0	1	3	2	1	1	4	3	3	2	2	1
Health care equipment and services	1	2	0	1	3	2	4	0	1	2	1	1	1	2	1	0	0	0	0
Household goods and home construction	3	4	1	0	2	1	1	1	1	1	0	2	2	2	2	2	4	2	1
Industrial engineering	0	0	2	0	1	2	2	1	3	1	2	2	3	1	2	2	0	4	5
Industrial metals and mining	0	2	1	1	0	5	2	2	5	2	3	2	2	3	2	5	3	1	3
Industrial transportation	1	1	0	3	0	0	2	1	0	0	0	2	1	2	0	3	0	1	2
Leisure goods	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	1	0	1	0
Life insurance	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Media	2	2	4	3	2	1	4	8	1	4	1	1	7	4	2	1	3	1	2
Mining	1	0	1	0	1	0	0	2	0	2	1	0	0	0	1	1	1	0	1
Mobile telecommunications	1	0	0	0	0	2	1	1	0	0	1	1	0	0	0	0	0	0	0
Nonlife insurance	1	2	0	2	4	0	1	0	0	1	1	3	1	0	0	1	1	3	1
Oil and gas producers	0	0	0	2	0	2	0	2	0	1	4	2	0	0	0	2	3	3	1
Oil equipment and services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Personal goods	3	2	7	2	8	2	1	1	1	0	6	5	2	3	4	2	1	0	3
Pharmaceuticals and biotechnology	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Real estate investment and services	4	5	7	6	5	4	4	4	3	2	2	1	2	5	5	3	1	6	3
Software and computer services	0	0	0	0	0	0	1	1	1	1	1	0	1	1	1	0	0	1	1
Support services	0	2	1	1	1	1	1	2	5	0	1	0	4	2	1	1	2	2	3
Technology hardware and equipment	0	0	2	3	1	2	3	0	1	1	1	0	1	1	1	1	2	4	1
Travel and leisure	6	2	1	1	3	1	2	3	3	4	2	3	1	0	0	2	2	1	3
Unclassified	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

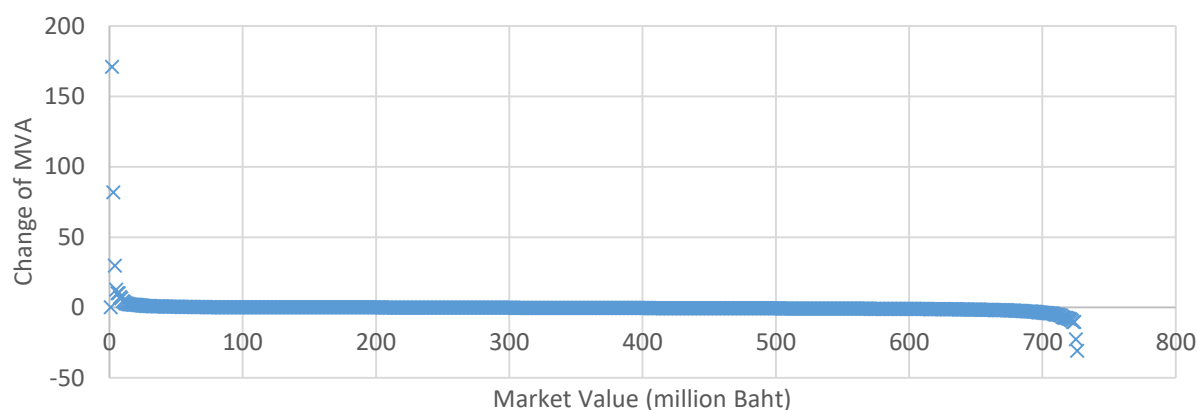
**Figure 2.** The scatter plot of 2018 MVA's change and market value

Table 6. The cross-sectional regression of 2018 MVA's change and market value

Statistics	Intercept	MV
Coefficients	-0.290	0.001
t-statistic	-1.012	0.243
Adjusted R-squared	0.001	-

Notes: We run regressions of the change of market value added ΔMVA_i on the market capitalization MV_i of Thai listed companies at the end of 2018. The table reports the estimated coefficients, *t*-statistic, and adjusted R-squared. Equation: $\Delta MVA_i = \gamma_0 + \gamma_1 MV_i + \varepsilon_i$, * significant at 10% level, ** significant at 5% level, *** significant at 1% level.

Table 7. The correlation between average MVA's change and market return

Statistics	Intercept	R_m
Coefficients	0.430*	5.462***
t-statistic	1.887	9.066
Adjusted R-squared	0.819	-

Notes: We run regressions of the average change of market value added ΔMVA_i on the market return $R_{m,t}$ of Thai listed companies. The table reports the estimated coefficients, *t*-statistic, and adjusted R-squared. Equation: $\Delta MVA_i = \gamma_0 + \gamma_1 R_{m,t} + \varepsilon_i$, * significant at 10% level, ** significant at 5% level, *** significant at 1% level.

3.3. Market return adjusted three-year growth rate of market value added

Since good firms should continuously create shareholder value, the stability of MVA change is examined. Table 8 illustrates the three-year geo-

metric average of MVA change to demonstrate the consistency of wealth creation. Moreover, the market movement effect is minimized by subtracting market index return from the change of MVA. Interestingly, the rankings are different from the previous techniques. For the top-tier, the result encompasses more small than large ones, as it is easier for them to continuously maintain high percentage change in value. However, it will become harder to do so as they get bigger. In fact, most firms cannot keep the outstanding performance constantly. Also, as from 1999 to 2018 is a long period, it is unavoidable to come across a lot of business variations, such as changing economic conditions, regulation changes, and changes in customer behavior. Table 9 suggests that food producers, construction and materials, and real estate investment and services are the top-tier industries, which are the same as the result from the prior approach. However, this method offers smaller variation meaning that less dominant industries.

In terms of underperform companies, most of them are small stocks with the negative MVA growth. Since big firms are responsible for higher fixed costs, their performances are harmed by transitory business trends, especially during recession period. Moreover, they have invested in many large projects, which require a longer period of time based on potential profitability. As a

Table 8. The average market return adjusted three-year growth rate of MVA

Decile	10 th	9 th	8 th	7 th	6 th	5 th	4 th	3 rd	2 nd	1 st
2002	4.706	0.129	-0.348	-0.544	-0.650	-0.786	-0.945	-1.124	-1.882	-67.522
2003	20.337	3.344	0.706	-0.449	-0.776	-0.932	-0.996	-1.060	-1.558	-126.739
2004	34.220	1.420	-0.066	-0.609	-0.875	-0.985	-1.017	-1.105	-1.626	-12.045
2005	14.393	0.663	-0.341	-0.739	-0.943	-0.992	-1.028	-1.115	-1.522	-4.200
2006	6.123	-0.370	-0.636	-0.754	-0.853	-0.937	-1.001	-1.082	-1.345	-6.790
2007	4.672	-0.231	-0.581	-0.749	-0.830	-0.910	-0.997	-1.084	-1.435	-5.287
2008	12.862	-0.005	-0.484	-0.660	-0.760	-0.849	-0.930	-1.027	-1.212	-5.171
2009	8.782	-0.126	-0.585	-0.744	-0.848	-0.901	-0.964	-1.050	-1.312	-5.805
2010	7.734	0.315	-0.416	-0.677	-0.821	-0.894	-0.963	-1.080	-1.433	-14.913
2011	15.198	2.202	0.329	-0.422	-0.729	-0.841	-0.909	-0.965	-1.070	-9.590
2012	21.357	2.341	0.415	-0.196	-0.528	-0.734	-0.828	-0.914	-1.071	-8.971
2013	14.060	0.949	-0.138	-0.445	-0.620	-0.741	-0.820	-0.910	-1.084	-4.276
2014	53.063	2.114	0.268	-0.276	-0.533	-0.686	-0.791	-0.870	-1.032	-5.730
2015	12.560	0.353	-0.346	-0.580	-0.662	-0.728	-0.820	-0.904	-1.006	-6.423
2016	12.361	0.142	-0.334	-0.578	-0.701	-0.751	-0.813	-0.893	-1.032	-4.933
2017	3.666	-0.253	-0.552	-0.705	-0.750	-0.812	-0.881	-0.951	-1.054	-4.785
2018	2.832	-0.346	-0.634	-0.736	-0.782	-0.855	-0.917	-0.974	-1.053	-3.093

Note: * Decile portfolio is based on annual three-year growth rate of market adjusted change of MVA ranking.

result, big companies underperform occasionally. However, they can later become market leaders. To sum up, healthy stocks should not regularly stay in the bottom-tier, as they not only represent the deterioration of shareholder value, but also an indication of permanent failure.

As Table 10 demonstrates that this approach reduces market movement effect, the three-year growth rate technique offers a new perspective of MVA analysis. In terms of size and past achieve-

ment effects, Figure 3 shows an unclear connection between the last MVA version and market value. Unfortunately, Table 10 reveals that the procedure cannot completely eliminate the influence of market capitalization. Therefore, it should be utilized together with the traditional MVA and the change of MVA approaches, which will offer more complete assessment. Furthermore, annually data delivers a small sample size. It requires superior dataset in order to improve statistically significance of the inference.

Table 9. The industrial sector of top 50 three-year growth rate of market adjusted change of MVA stocks

Sector	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Alternative energy	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Automobiles and parts	2	0	0	1	0	0	1	1	2	1	2	0	1	2	2	3	1
Banks	1	3	2	3	0	2	3	3	2	2	0	0	0	0	1	1	2
Beverages	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0
Chemicals	4	3	3	2	1	1	1	3	2	1	0	2	3	5	1	4	2
Construction and materials	4	5	3	3	1	0	2	4	7	6	7	7	8	6	6	2	4
Electricity	0	1	2	1	0	1	0	0	1	1	1	1	0	0	1	0	1
Electronic and electrical equipment	0	1	0	0	2	3	1	1	0	0	0	2	2	1	4	1	2
Financial services (sector)	0	1	4	2	0	3	7	2	3	1	3	4	3	1	3	7	4
Fixed line telecommunications	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Food and drug retailers	0	0	0	1	1	1	0	1	1	2	2	1	0	0	0	0	0
Food producers	8	6	7	4	7	4	4	6	5	7	4	1	1	1	2	3	2
Forestry and paper	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Gas, water and multiutilities	1	1	1	1	0	1	0	1	0	0	1	0	0	0	0	0	0
General industrials	2	1	2	1	1	0	1	1	1	1	0	1	1	0	2	2	1
General retailers	1	1	1	2	4	2	2	0	3	4	4	2	3	3	4	0	2
Health care equipment and services	0	1	1	3	7	3	2	0	1	5	5	4	2	4	3	0	0
Household goods and home construction	1	2	1	0	1	1	1	2	1	0	0	3	0	1	2	2	1
Industrial engineering	2	2	1	1	1	1	2	3	1	0	1	2	3	2	1	1	5
Industrial metals and mining	1	1	1	1	2	5	1	2	6	1	3	0	1	4	2	3	1
Industrial transportation	1	2	2	2	0	0	1	1	0	0	0	1	1	2	0	0	0
Leisure goods	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0
Life insurance	1	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0
Media	3	3	2	0	1	3	3	6	2	5	4	4	6	3	2	1	2

Table 9 (cont.). The industrial sector of top 50 three-year growth rate of market adjusted change of MVA stocks

Sector	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Mining	1	0	0	0	2	2	0	1	0	1	1	0	0	0	0	0	1
Mobile telecommunications	1	0	0	1	1	2	0	0	0	1	2	1	0	0	1	0	0
Nonlife insurance	2	0	0	2	2	0	1	0	0	1	1	1	0	0	0	1	3
Oil and gas producers	0	2	2	3	0	2	0	0	0	1	0	0	0	0	2	4	1
Oil equipment and services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Personal goods	3	3	5	3	5	2	3	3	0	1	1	2	1	3	3	4	4
Pharmaceuticals and biotechnology	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Real estate investment and services	4	5	5	7	6	8	6	3	5	1	2	3	6	3	5	2	4
Software and computer services	0	0	0	0	0	0	1	1	0	2	0	1	1	1	0	1	1
Support services	2	2	1	1	0	0	2	0	2	0	2	1	4	3	1	1	0
Technology hardware and equipment	0	2	2	2	0	0	2	0	1	1	1	2	1	1	2	3	3
Travel and leisure	5	1	0	2	4	2	2	4	3	4	3	2	1	2	0	3	2
Unclassified	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

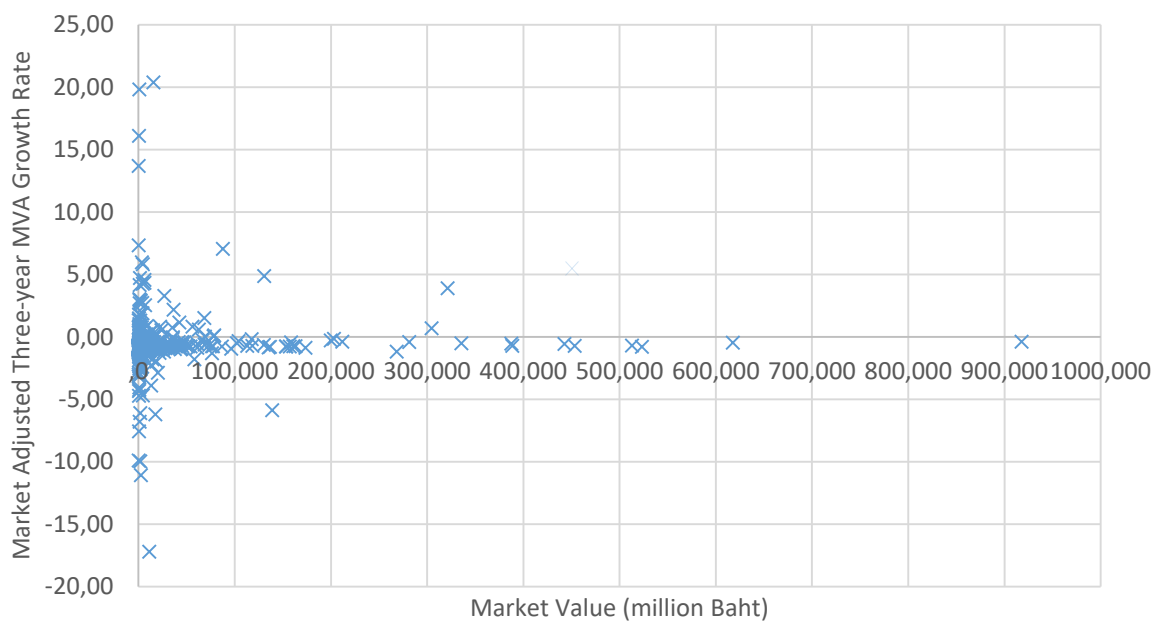


Figure 3. The scatter plot of 2018 three-year growth rate of market adjusted change of MVA and market value

Table 10. The association between three-year growth rate of market adjusted change of MVA with average market value and three-year growth rate of market return

Statistics	Intercept	MV	Growth of R_m
Coefficients	-5.860**	0.001**	-2.461
<i>t</i> -statistic	-2.224	2.185	-0.720
Adjusted R-squared	0.171	–	–

Notes: We run regressions of the average market return adjusted three-year growth rate of MVA $\overline{Adjusted\ Growth}_i$ on the average market capitalization MV_i and three-year growth rate of market return $Growth\ of\ R_{m,t}$ of Thai listed companies. The table reports the estimated coefficients, *t*-statistic, and adjusted R-squared. Equation * significant at 10% level, ** significant at 5% level, *** significant at 1% level.

CONCLUSION

Even though MVA is a simple yet powerful performance indicator for listed companies regarding the owners' wealth, it comes with certain limitations. Adjustments are needed to reduce misinterpretation of MVA obtained from calculation. In addition to the MVA per se, this paper introduces two additional alternatives to analyze MVA of listed companies in Thailand from 1999 to 2018. The analyses include the MVA itself, the change of MVA, and the market return adjusted of the three-year growth rate of MVA. This study finds that during the period studied, all three methods provide useful insight of MVA, while the market return adjusted of the three-year growth rate of MVA appears to be the best of the three methods.

However, it does not imply that the market return adjusted version of MVA used in this study is the best method per se. As the results from each alternative provide different information, thus, they should be considered altogether. As mentioned earlier, illiquidity extends a bid-ask spread, resulting in the biased market value, and the sample size influencing the ranking. It is suggested that further study be conducted using improved technique, a longer period with a larger sample size, and in different markets. Most importantly, MVA is not the best overall performance indicator. There are several other indicators, which deliver different information. Analysts should select the one or groups that serve their objectives.

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