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The Fama-French Three Factor Model Test On Excess Stock Return: Evidence From Hong Kong, Indonesia And Singapore Capital Market

Silfia[1], Zaafri A. Husodo[2]

Faculty of Economic and Business, Department of Management, Universitas Indonesia, Indonesia [1,2]

Corresponding Author: silfia@ui.ac.id

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ABSTRACT

The presence of the capital market has a very important role in the world economy. One of the instruments in the capital market is stock. In stock investment, investors expect a return with a size that is in accordance with the level of risk they can afford. This study aims to test whether the Fama-French Three Factor Model variables, namely market excess returns, book-to-market equity and firm size, can be used to explain excess returns on the stock markets of Hong Kong and Indonesia with the observation period of 2018–2022. This research uses a quantitative method with a sampling technique using probability sampling so that a sample of 132 samples is obtained. The data analysis uses linear regression test, Gibbons, Ross, and Shanken test (GRS test) and spanning test. Based on the results of the GRS-test, in the Hong Kong market the most efficient portfolio is S-M, in the Indonesian market the most efficient portfolio is the Big portfolio, while in the Singapore market all portfolios are efficient and based on the spanning test, in the Hong Kong market the potential redundant factor is SMB, in in the Indonesian market, the potential redundant factor is HML, while in the Singapore market, there is no redundant potential factor.

Keywords: Book-to-market Equity and Firm Size, Excess Return, Fama-French Asset Pricing Models, Fama-French Three Factor Model, GRS F-test, Regression Test, Spanning Regressions.

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INTRODUCTION

The increasing development of the world economy has resulted in significant changes in various fields. People are starting to carry out economic transactions through various means, one of which is investing in the capital market. The capital market is a meeting place for investors to obtain assets and companies that sell assets. Apart from that, the capital market can encourage the creation of efficient allocation of funds, because with the existence of the capital market, parties with excess funds (investors) can choose investment alternatives that provide optimal returns (Rakhmawati & Priyadi, 2015). Capital markets play an important role in the global economy (Tastaftian & Khoiruddin, 2015). Capital markets play an important role in economic and financial activities in various countries. The capital market facilitates the transfer of funds from parties who have a surplus

to parties who need funds, such as corporations or government agencies, by trading long-term instruments such as shares or bonds (Hendra et al., 2021; Husnan, 2018).

Investing in the stock market carries a high level of risk, investors are very careful when choosing which shares or goods to buy. This caution is not without reason, because every investor will consider how to increase the projected return for every rupiah they invest in securities. To optimize investment returns through dividend income (dividend yield) and profit from the difference between the price at which shares were sold and the price at which they were purchased (capital gain) (Astuti et al., 2022). In investing in shares, of course investors will consider two things, namely the risk and level of profit of an issuer, accompanied by external considerations such as economic trends, global reference sector prices and internal factors, namely the issuer's own financial reports. Therefore, it is necessary for investors to have expectations of the returns generated on the shares of the company in which they invest. Apart from calculating the expected return, investors need to calculate the excess value of the actual return from the normal return or what is called excess return. By calculating the actual excess return, investors can find out the actual return that will come (Serepina & Siswantini, 2022).

In estimating excess returns, there are several models that can be used by investors, one of which is the Capital Asset Pricing Model (CAPM). CAPM implies that the risk premium on any single asset or portfolio is the product of the risk premium of the market portfolio and the beta of that asset. The CAPM model is doubted by some researchers because only beta is used as the sole indicator for assessing asset returns. They argue that not only beta can influence returns but there are other variables besides beta (Aprillia et al., 2022).

Previous research conducted by Fama & French, (1992) proves that the market beta variable is not sufficient to explain stock returns, while the company size variable (market capitalization) is a measure of a company's market value, as well as the ratio of book value to market value (book-to - market equity), can better capture variations in stock returns in cross-section data on average stock returns. In further research, Fama & French, (1992) proposed these variables in a three-factor model known as the Fama-French Three Factor Model. This model states that excess market returns, company size, and the ratio of book value to market value are risk proxies that have a significant effect on stock returns. The Fama approach and the French Three Factor Model have been widely used by researchers in testing the relationship between stock returns and market return variables, size and book-to-market equity ratio, through multiple regression tests in capital markets in various countries.

Sehrawat et al., (2020) revealed that the variables in the Fama Model and French Three Factors can describe capital market integration better than the CAPM Model.A similar study was conducted by Wallmeier & Tauscher, (2014), who tested the Fama and French Three Factor Models on 364 companies from 97 industry groups of varying sizes and trading activity from 1989 to 1999. The study results concluded that the Fama Model and French Three Factors can be used to explain excess returns of stocks in the Indian stock market. However, in research by Tauscher & Wallmeier, (2016) and Wallmeier & Tauscher, (2014), it was found that portfolio formation using the Fama Model and French Three Factors using HML (High Minus Low) and SMB (Small Minus Big) methods has the potential to produce overlapping bias in time series data types.

The Fama and French Three Factor Models were originally developed based on research on the capital markets of the United States and other developing countries, however, there have not been many studies that compare the results of research from the Fama and French Three Factor Models between countries with different characteristics (Prabowo & Korsakul, 2020; Roni et al., 2018). Different from previous research, the novelty of this research is the use of the Fama and French Three Factor Models variables, namely excess market return, company size, and the ratio of book value to market value, which can be used to explain excess stock returns in the stock markets in Hong Kong, Indonesia, and Singapore which have different country and capital market

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characteristics from the research period 2018 to 2022 (Tastaftian & Khoiruddin, 2015). Thus, this research aims to compare companies in Hong Kong, Indonesia and Singapore regarding differences and similarities in terms of regulations, liquidity, investment and investor characteristics.

Hypotheses Development

The presence of the Capital Asset Pricing Model (CAPM) in the financial industry provides an important basis for estimating the level of return from a security based on the associated risk. One of the main contributions of the CAPM is its emphasis on the influence of systematic risk on securities, which is consistent with portfolio theory. In CAPM, the beta coefficient (β) is used as a measure of systematic risk, which can be estimated by comparing the historical stock returns of a security with the market returns over a certain period. However, significant debate has emerged regarding the power of the market beta variable in explaining stock returns. Previous research that has tested the CAPM and the efficient market concept shows that the market beta variable cannot fully explain stock returns. On the other hand, there are indications that the issue variables book to equity ratio and size are better able to describe the movement of stock returns (Aksu & Onder, 2003; Chui & Wei, 1998; Fama & French, 1992; Marsono et al., 2022; Sehrawat et al., 2020; Setiawan et al., 2015).

Based on previous studies and phenomena, researchers are interested in testing whether the variables formed in the Fama and French Three Factor Model can explain excess stock returns in the Hong Kong, Indonesian and Singapore stock markets with the following research framework:

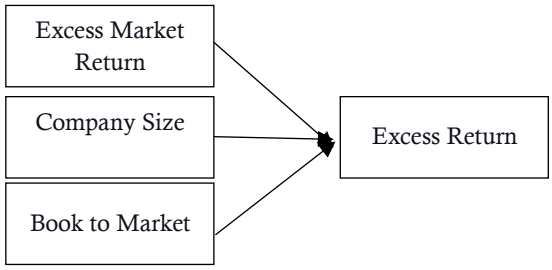

Figure 1. Research Framework
Source: Data author processed

METHODS

This quantitative study uses empirical data to generalize findings to a larger population by testing hypotheses, so that the results obtained can be generalized to a wider population. Using a descriptive approach, this study will analyze the data statistically to examine the effect of excess market return, the ratio of book value to *market* value and company size on the stock return of stocks in Hong Kong, Indonesia, and Singapore. This study used data from the observation period of 2018 to 2022. This study used data from the observation period of 2018 to 2022. The population in this study was all companies in Hong Kong, Indonesia and Singapore. The research technique used was side probability technique and a sample of 136 samples was obtained.

This study uses the analysis model through classical assumption tests, hypothesis tests, Gibbons, Ross, and Shanken tests (GRS test) and spanning regression tests. To test the hypothesis proposed, this study will use multiple regression tests to test the significance of the influence of variables in the Fama Model and French Three Factors on stock excess returns in the stock markets of Hong Kong, Indonesia, and Singapore. The multiple regression models used are as follows (Fama & French, 1992; Harjito, 2020).

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$Rpt - Rft = \alpha p + bp\ (Rmt–Rft) + spSMBt + hpHMLt + \varepsilon$

Information:

Rpt - Rft	=	Excess Return of Shares in Period T
Rmt–Rft	=	Excess market return of shares in period t
SMBt	=	Return on the portfolio of shares of companies that have a large size minus the return on the portfolio of shares of companies that have a small size in the period t
HMLt		Portfolio returns on shares of companies that have a high book-to-market minus the return on a portfolio of stocks that have a low book-to-market in the period t
AP	=	Constant
bp, sp, hp	=	Regression coefficient
E	=	Error

In the Fama and French Three Factor Model approaches, portfolio formation is carried out through the High Minus Low (HML) method by calculating the company's book-to-market equity ratio to *describe whether the value of the company's shares in the market can meet the leverage of assets and debt in a company. In contrast, portfolio formation through the Small Minus Big (SML) method is carried out* based on market capitalization which describes the value of shares in a certain period against the number of shares outstanding. Based on market capitalization during the research period, namely 2018-2022, stocks are divided into two categories, namely Big (B) and Small (S), and based on the *book-to-market equity ratio*, stocks are divided into three categories, High (H) which is the stock with the highest 30% value, Moderate (M) which is a stock with 40% middle value and Low (L) is 30% of the stocks with the lowest value of all shares, So that a portfolio is formed as follows:

a. S-L portfolio: Small Size (S) Low (L) Book to Market;
b. S-M portfolio: Small Size (S) Medium (M) Book to Market;
c. S-H portfolio: Small Size (S) High (H) Book to Market;
d. B-L portfolio: Big Size (B) Low (L) Book to Market;
e. B-M portfolio: Big Size (B) Medium (M) Book to Market;
f. B-H portfolio: Big Size (B) High (H) Book to Market;

RESULTS AND DISCUSSION

The research data is monthly data with a research period of 5 years, namely January 2018-December 2022. The research sample is issuers incorporated in the Hangseng Index, LQ-45 Index, and Straits Times Index which have complete stock prices during the research period.

Table 1. Summary of the sample selection procedure

Information	Hong Kong	Indonesian	Singapore
Shares of companies that are members of the Index specified in each country	76	45	30
Companies with complete monthly share prices during the research period, namely January 2018 to December 2022.	63	41	27

Source: Yahoo Finance, with researchers (2023)

After the selection process, 63 shares of companies that met the criteria and were incorporated in the research sample in Hong Kong, 41 shares of companies that met the criteria and were incorporated in the research sample in Indonesia, and 27 shares of companies that met the criteria

and were incorporated in the research sample in Singapore. Issuer stocks for each country are grouped into 6 portfolios through SMB and HML methods, resulting in Big-High (B-H), Big-Medium (B-M), Big-Low (B-L), Small-High (S-H), Small-Medium (S-M), and Small-Low (S-L) portfolio groups.

Furthermore, classical assumption testing was carried out to ensure that the Fama-French Three Factor Model estimation results in each country portfolio met the Best Linear Unbiased Estimator (BLUE) nature. The basis for making decisions in testing normality and heteroscedasticity is using p-values. If the resulting p-value is less than 0.05, then that assumption is violated. Conversely, if the p-value is more than 0.05, then the assumption is fulfilled. Meanwhile, the basis for decision making in autocorrelation testing is to pay attention to the Durbin-Watson (DW) value around 2. The autocorrelation assumption is satisfied if the DW value is close to 2. The basis for decision making in multicollinearity testing is that if the VIF value is less than 10, the multicollinearity assumption is met. In the event of a violation of autocorrelation and heteroscedasticity, it can be overcome by Newey-west regression. Meanwhile, if there is a violation of normality without paying attention to violations of autocorrelation and/or heteroscedasticity, robust regression can overcome it. The assumption of multicholinerity for the whole country is met.

The results of the classical assumption test in the Hong Kong market show that all assumptions of normality, autocorrelation, and multicollinearity have been met. Still, there are some violations of the heterokedasticity assumption in portfolios B-H, S-H and S-M, so that it can be overcome by Newey-west regression. The results of the classical assumption test in the Indonesian market show that all multicollinearity assumptions have been fulfilled. One equation violates the Normal assumption and will be overcome by robust regression, namely in the B-L portfolio. Several equations meet the normal assumption but violate the assumption of autocorrelation and/or heteroscedasticity, namely in the S-H, S-M and S-L portfolios will be overcome by Newey-West regression. The same is true for the Singapore market, where almost all portfolios except for the S-L portfolio have violated Normal assumptions which will be overcome by robust regression. Furthermore, the estimation results from the Fama Model and the French Three Factors in each portfolio group in the countries studied can be seen in the following table :

Table 2. Simultaneous regression test results

Country	Independent	B-H	B-M	B-L	S-H	S-M	S-L
Hong Kong	F-Statistics	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Adj R2	0.8549	0.8928	0.8895	0.9032	0.7583	0.9205
Indonesian	F-Statistics	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Adj R2	0.9071	0.7778	0.6247	0.9263	0.7342	0.8611
Singapore	F-Statistics	0.0000	0.0001	0.0095	0.0001	0.1655	0.3458
	Adj R2	0.4470	0.2768	0.1398	0.2719	0.0372	0.0064

Source: Stata Output

Based on the table above, in the Hong Kong and Indonesia markets, all variables in the *Fama-French Three Factor Model* simultaneously significantly affect the dependent variable, namely *the excess return* of the entire stock portfolio. The Adjusted Rsquare value shows the contribution of all dependent variables to their dependent variables. In the Hong Kong and Indonesia markets, the lowest Adjusted Rsquare value is still in the range above 75 percent, namely in the S-M portfolio to and the highest Adjusted Rsquare value with 92 percent, namely in the S-L portfolio in the Hong Kong Market and the S-H portfolio in the Indonesian Market. While in the Singapore market, not all variables in *the Fama-French Three Factor Model* simultaneously significantly affect the dependent variable, namely *excess return*. The variables in the *Fama-French Three Factor Model* simultaneously do not have a significant effect on the *excess return* of S-M and S-L portfolios. The value of Adjusted Rsquare in the Singapore Market is very low compared to Hong Kong and Indonesia.

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To find out more about the influence of each independent variable on the dependent variable, the results of estimation of each variable in the *Fama-French Three Factor Model* in the portfolio group of each country can be seen in the following table.

Table 3. Regression test results of each variable

Country	Independent	B-H	B-M	B-L	S-H	S-M	S-L
Hong Kong	Rm-Rf	0.790***	0.887***	1.227***	1.281***	0.778***	0.844***
	SMB	-0.267	-0.105	-0.068	1.091***	0.576**	0.893***
	HML	0.347***	0.142***	-0.476***	0.598***	-0.007	-0.578***
	Constant	0.007	0.012***	0.011**	0.014**	0.006	0.009**
	Adj R2	**0.855**	**0.893**	**0.889**	**0.903**	**0.758**	**0.920**
Indonesian	Rm-Rf	-1.227***	1.193***	0.906***	0.365	0.531	-1.613***
	SMB	0.818***	-0.039	.065	0.532***	0.337***	1.196***
	HML	0.607***	0.067	-.168***	0.338***	0.042	-0.854***
	Constant	0.0003	0.005	-.0006	-0.011*	0.016***	-.010*
	Adj R2	**0.907**	**0.778**	.675	**0.926**	**0.734**	**0.861**
Singapore	Rm-Rf	-0.072	-.248*	-0.212	-.167	-.400***	.226
	SMB	-0.699***	-.688***	-0.528**	.400*	.454*	.311
	HML	0.842***	.353*	0.048	1.084***	.200	-.094
	Constant	0.003	.003	0.000	.0006	.001	.003
	Adj R2	**0.485**	**.286**	**0.136**	**.391**	**.226**	**.007**

significant at the level of <0.01; **significant at level 0.01; *Significant at 5% level
Source: Stata Output

Based on the table above, in the Hong Kong market excess market return *(Rm-Rf) has a positive and significant effect on the* excess return of all portfolio groups. SMB does not significantly affect the excess return of the *entire Big portfolio, but it does positively affect* the excess return of the Small portfolio. While HML significantly affects all portfolio groups, it has different influence characteristics. The effect of HML on groups B-H, B-M and S-H had a positive effect, while in groups B-L, S-M, and S-L had a negative effect.

The influence of market return (Rm-Rf), SMB, and HML in the Indonesian market also varies on each portfolio group. In groups B-H and S-L, excess market return (Rm-Rf) has a negative and significant effect on excess return, *while in other groups* market return *(Rm-Rf) has a positive effect on* excess return. SMB positively and significantly affects the *excess return* of groups B-H, S-H, S-M, and S-L. HML in groups B-L and S-L has a negative and significant effect, while in other groups the effect is positive.

In the Singapore *market, excess market return (Rm-Rf) negatively and significantly affects* the excess return *of* B-M and S-M portfolios. In contrast, in other groups the effect is not significant. SMB negatively affects the *excess return* of Big portfolios, while Small portfolios have a positive effect. HML has a positive and significant effect on portfolio groups B-H, B-M, and S-H, while it is not significant in other groups. The Fama-French Three Factor Model variable GRS test results in each country's portfolio group can be seen in the following table.

Table 4. GRS test results

Country	Portfolio	Mean Alpha	GRS	p-value
Hong Kong	**B-H**	.00663017	.29458397	.04319709
	B-M	.01199182	.60721208	.00007784
	B-L	.01115965	.39233757	.00789795

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Country	Portfolio	Mean Alpha	GRS	p-value
	S-H	.01368263	.41991763	.00464515
	S-M	.00694586	.21798131	.13144754
	S-L	.00915315	.40837469	.00581557
Indonesian	**B-H**	.00026011	.00723479	.96209949
	B-M	.00474973	.18830903	.21927132
	B-L	-.00009111	.00293701	.98460907
	S-H	-.01088312	.36641918	.0189084
	S-M	.01649629	.42445595	.00699219
	S-L	-.0105319	.30531654	.0487847
Singapore	**B-H**	.00013398	.00342575	.97994573
	B-M	.00049381	.01119527	.93453158
	B-L	-.00164941	.03019155	.82471331
	S-H	-.00096618	.01840208	89259809
	S-M	-.00087265	.01808355	.89444588
	S-L	.00081721	.02040345	.88100228

Source: Stata Output

GRS test is a statistical method used to test the efficiency of a portfolio to compare portfolio performance with different investment strategies. In the context of the GRS-test, portfolio efficiency refers to the ability of a portfolio to generate high returns relative to the risks it faces. The GRS test tests whether an investment portfolio is significantly more efficient than an alternative portfolio or market index. In testing portfolio performance, portfolio efficiency becomes important because investors want to maximize the return generated from the level of risk taken. Portfolio efficiency reflects the portfolio's ability to optimize risk and *return* comparisons. However, it is important to remember that the efficiency of a portfolio in the context of the GRS-test depends on the data used and the period analyzed. Portfolio efficiency can also be affected by factors such as transaction costs, liquidity, and market factors that cannot be fully predicted. Therefore, the GRS-test results must be implicated carefully and in the context of broader investment analysis.

The GRS test tests whether the constant (alpha) equals zero. If alpha=0, then the portfolio is efficient. Conversely, if alpha≠0, then the portfolio is inefficient. The results of GRS Tetst can be seen in the following table. Based on the results of the GRS test, it can be seen that there is only one efficient portfolio in the Hong Kong market, namely the S-M portfolio. While in the Indonesian market, the entire Big portfolio shows that the portfolio is efficient. In the Singapore market, the GRS test shows that the entire portfolio group is efficient.

Furthermore, a spanning regression test was carried out to see which of the three factors most dominantly influenced one another and variables that had redundant potential factors. The results of spanning regression can be seen in the following table.

Table 5. Spanning Hong Kong State regression

	a	Rm-Rf	SMB	HML	Adj R2
Rm-Rf	-.0034009		.4710953	.1360586	0.0238
SMB	-.002923	.1156509		-.1728331**	0.0979
HML	-.0193149**	.098739	-.5109159*		0.0587

Source: Stata Output

Based on the spanning regression test in the Hong Kong market, it can be seen that SMB and HML variables are variables that significantly influence each other. Of the three variables in the Fama-French Three Factor Model, namely *excess market return*, SMB, and HML, the first *potential redundant* factor is SMB. This is because it has an insignificant *intercept* so it can be interpreted that SMB is only affected by HML and *excess market return*. The Adjusted Rsquare on the SMB equation in Hong Kong's spanning regression test is the highest, which means SMB can be explained

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by *market excess return* and HML of 9.79%. Furthermore, the second redundant potential factor is HML. While *excess market returns* in the Hong Kong state market do not affect each other on any variable, both SMB and HML.

Table 6. Spanning regression Indonesia

	a	Rm-Rf	SMB	HML	Adj R2
Rm-Rf	-.008959***		.2856488***	-.0095655	0.7763
SMB	.0296271***	2.471849***		.2395759***	0.8049
HML	-.0206789	-.1868862	.540908***		0.3375

Source: Stata Output

Based on the spanning regression test in the Indonesian market, it can be seen that SMB and HML variables are variables that significantly influence each other. In addition, *market excess return* (Rm-Rf) and SMB variables are also variables that significantly influence each other. Of the three variables in the Fama-French Three Factor Model, namely *excess market return*, SMB, and HML, the one with the first *potential redundant* factor is HML. This is because it has an insignificant intercept so it can be interpreted that HML is only affected by SMB and *excess market return*. Furthermore, the second *potential redundant* factor is SMB, because the Adjusted Rsquare in the SMB equation in the Indonesian state spanning regression test is the highest, which means SMB can be explained by *market excess return* and HML of 80.49%.

Table 8. Spanning regression Singapore

	a	Rm-Rf	SMB	HML	Adj R2
Rm-Rf	-.0007481		.1451908	.0459205	-0.0277
SMB	-.0025725	.0479339		-.1669664	0.0092
HML	-.0050451	.0199946	-.2202066		0.0032

Source: Stata Output

Based on spanning tests on the Singapore market, it can be seen that all of them show insignificant, and between factors do not influence each other, with a low Adjusted Rsquare value. So there is no redundant potential factor in the Singapore market.

Discussion

The purpose of examining the Fama and French Three Factor Models in different countries is to understand whether the models are widely applicable and whether the factors considered in these models have a similar influence in various global stock markets namely Hong Kong, Indonesia, and Singapore which are capital markets with different characteristics (Amanda & Husodo, 2015). The three countries have different economies in different sectors. Indonesia has a strong commodity sector, while Singapore and Hong Kong are more focused on financial services, business, and technology (Suharnas et al., 2023; Wulandari, 2020). Researching capital markets in this diverse economic environment can lead to a better understanding of the factors that affect the functioning of capital markets. Investor characteristics can also differ from country to country. For example, Indonesia has an increasingly active retail investor base, while Singapore and Hong Kong are more likely to attract institutional investors and individuals with an international profile. Understanding investor preferences, strategies, and behavior across different capital markets can provide insight into overall market dynamics. Examining the characteristics of these three countries' capital markets can help diversify investment portfolios.

Through the test results on the Hong Kong market, investors can invest in a portfolio of stocks with small sizes to get the potential for higher stock returns, this is evidenced by the results of the t-test on the regression analysis of each variable showing a significant alpha that shows investors achieve higher stock returns that exceed expected based on the factors considered in the Fama Model and the French Three Factors these as well as the results of the GRS-test (Aksu & Onder, 2003; Sochib, 2016). The findings in this study are consistent with the findings of Chui & Wei (1998) which also

revealed an anomaly related to the issue of firm size in the Hong Kong market, where companies with smaller sizes show higher returns compared to companies with larger sizes.

The Indonesian capital market has a mix of institutional and individual investors, with retail investors increasingly active recently, based on the results of research on the Indonesian market, through test results on the Indonesian market, investors are recommended to be able to invest in small company size stock portfolios with high book value to market value ratios (S-H) to get higher potential stock returns, This is evidenced by the results of the T-test in the regression analysis of each variable showing significant alpha in the entire portfolio with a small size (Zheng et al., 2020). Companies with a high book value to market value ratio and a small company size indicate that the company is still in the growth stage because the company's book value is still higher compared to market value, where investors tend to be interested in investing in shares of companies with a high book value to market value ratio and small company size. After all, these stocks can provide higher stock returns.

The findings of this study support the hypothesis of Fama & French, (1992), that companies with a high ratio of book value to market value tend to generate higher stock returns than companies with a low ratio of book value to market value. In addition, they also found that companies with small sizes tend to experience higher stock returns than companies with large sizes (Hudzafidah et al., 2023; Irdiana, 2018).

Singapore is a developed country and industrial pioneer in the Southeast Asian region. Singapore's capital market attracts institutional and individual investors both locally and internationally. Singapore is a regional financial center with strong infrastructure and strict regulation. It is a major investment destination for many global companies and is known for its internationally oriented and long-term investors. Based on the results of the study, compared to Hong Kong and Indonesia, Singapore has the highest excess market return, this proves that the Singapore market tends to be more stable than Hong Kong and Indonesia.

Based on the test results on the Singapore market, the Fama Model and French Three Factors variables cannot effectively explain excess returns compared to Hong Kong and Indonesia. The low Adjusted Rsquare value and insignificant alpha value evidence this (Ekaputra & Sutrisno, 2020). Each stock market has unique characteristics, including differences in industry structure, regulatory policies, and macroeconomic factors that affect stock returns. Suppose the Fama and French Three Factor Models are developed based on the characteristics of the United States market. In that case, there may be significant differences in the factors affecting stock returns in the Singapore market.

The Fama and French Three Factor models consider the ratio of book value to market value and company size as factors that affect stock excess return (Benali et al., 2023). In contrast, in the Singapore market, other factors may also play an important role in explaining stock returns in a particular country. For example, political, economic, regulatory, or market sentiment factors specific to the country may have a significant influence on excess returns of stocks in Singapore, so alternative models or further development of the Fama Model and the French Three Factors may be more suitable to explain stock returns in Singapore.

These results are supported by research conducted by Aprillia et al (2022) which states that the Fama French three factor model is an asset valuation model that is able to explain stock returns well and this model is suitable for long-term investment. Of the six portfolios formed, it shows that the S/H portfolio has the highest value, meaning that this model for the S/H portfolio is very suitable for estimating excess stock returns. The S/H portfolio is a portfolio that has a small company size and a high book to market ratio, so it can be said that companies with a small company size can provide high returns and companies with a high book to market ratio can provide high returns too.

Thus, the purpose of testing the Fama and French Three Factor Model in several countries is to understand its broad applicability and the influence of these factors in global stock markets such as Hong Kong, Indonesia and Singapore which have different characteristics. The research results show that in the Hong Kong market, investment in a small stock portfolio can provide higher returns, while in Indonesia, investment in shares of small companies with a high book value to market value ratio shows the potential for higher returns. Singapore has higher market returns, but the Fama and French Three-Factor Models do not fully explain returns there. This suggests that other factors, such as political, economic, regulatory or market sentiment factors, may have an important role in explaining stock returns in Singapore. Therefore, the development of alternative models may be necessary to explain the unique stock market dynamics in Singapore.

CONCLUSION

Based on the research results, it shows that the variables in the Fama and French Three Factor Model, such as excess market returns, the ratio of book value to market value, and company size, are proven to be influential in explaining excess returns in both the Hong Kong and Indonesian stock markets, as shown by Adjusted Rsquare values range from 73% to 93%. However, in the Singapore market, these variables only effectively explain the excess returns on the Big and S-H portfolios. The impact of each variable varies across portfolio groups in each country, as shown by the GRS test results. Although small stock portfolios have proven efficient in Hong Kong, and stock portfolios with small company sizes and high book value to market value (S-H) ratios are recommended in Indonesia, no single model can perfectly predict market behavior due to the diverse nature of investments and inherent risks. It is important to contextualize these findings within the unique dynamics of each country's industry or sector. Although the Fama and French Three Factor Models provide valuable insights, they must be complemented by a nuanced understanding of each country's market characteristics. Additionally, although this model was developed based on historical analysis, it is important to recognize that market conditions may change over time, potentially impacting the validity of this model in predicting future market behavior.

For further research, it is recommended to explore additional factors that influence stock returns in the Singapore market, as well as conducting a comparative study between the Fama and French Three Factor Models with alternative models adapted to the characteristics of the Singapore market. Additionally, research could expand to analyze changes in the relationship between model factors and stock returns over time in each stock market, as well as investigate market efficiency in Hong Kong, Indonesia, and Singapore to provide deeper insight into the behavior of capital markets in each country.

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