



Examining the Firm-Specific Factors Influencing Systematic Risk of Transportation Firms in Malaysia and Singapore

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Abstract

The objective of this study is to examine the effect of firm-specific variables on systematic risk in the transportation industry in Malaysia and Singapore for 20 years from 1997 to 2016. To determine the systematic risk, this study employs panel data analysis of Fixed Effect Model (FEM), Pooled Ordinary Least Square (POLS), and Random Effect Model (REM). Overall findings of both countries showed that financial leverage, profitability, and firm growth are insignificant to systematic risk. However, Malaysia shows liquidity significantly and positively associated with systematic risk. Meanwhile, Singapore indicates a positive relationship with firm size. Moreover, by examining the impact of the financial crisis (2008) on systematic risk, this study found that the presence of the financial crisis does not influence the behaviour of systematic risk in the transportation industry in Malaysia and Singapore. The findings of this study contribute to the finance literature which may help to increase the current understanding about the nature of systematic risk of the firms, including the Shariah-compliant transportation firms in Malaysia. A good perception of the sources of risk may assist policymakers as well as firm managers to obtain new ideas against external issues such as systematic risk, and this may help firms to increase profitability and prevent them from a loss or bankruptcy cost. Moreover, the additional information about the financial crisis and systematic risk may help firm managers to be more prepared to handle systematic risk in a normal as well as during crisis periods.

Keywords: systematic risk, transportation, firm-specific factors, Shariah-compliant

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1. Introduction

Total risk is a combination of diversifiable and non-diversifiable risk. The diversifiable risk is the specific risk to firms which can be eliminated through efficient diversification, also known as unsystematic risk. The non-diversifiable risk or systematic risk is the market related risk which cannot be avoided or reduced through efficient diversification, and this type of risk affects the market as a whole (Pham and Vo, 2019). It can be said that unsystematic risk results from internal factors within the organization itself that affects the only particular organization, whereas systematic risk results from the external factors which are known as macro variables or market forces for example, inflation, unemployment, exchange rate volatility, interest rate risk and the current pandemic crisis of Covid-19. Therefore, the external factors which cannot be avoided such as systematic risk are the most concerned for firm managers and investors (Charles, 2007, Nizam et al., 2020).

Due to the nature of systematic risk which cannot be avoided or minimized through diversification, it plays important role in determining the rate of return of firms. Therefore, investors and managers are more concerned about systematic risk rather than unsystematic risk (Pham and Vo, 2019). Previously, some studies have been focusing on developing models to estimate the systematic risk (Bollerslev and Zhang, 2003; Chen, 1991; Milionis, 2011; Chhapra et al., 2020). These models however can only demonstrate a relationship

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between systematic risk and expected return on investment hence cannot identify the main factors that influence the behaviour of systematic risk.

Meanwhile, several studies examined the effect of firm-specific variables on systematic risk in various industries and countries (e.g. Borde, 1998; Eldomiaty, 2009; Gu and Kim, 2002; Rowe and Kim, 2010; Alaghi, 2013; Ibrahim and Haron, 2016; Nizam et al., 2020; Frutig and Das, 2020). The findings of these studies provided a better understanding of systematic risk by examining the main factors affecting systematic risk. For example, Iqbal and Shah (2012) found that liquidity and operating efficiency are significantly and negatively related to systematic risk while profitability and firm size are positively related. However, they found leverage and firm growth are not significant in the non-financial firms listed in the Karachi stock exchange.

Similarly, Borde (1998) revealed three main factors such as liquidity, growth, and profitability influence the behaviour of systematic risk in different food businesses whereas leverage is reported as insignificant. Furthermore, Rowe and Kim (2010) showed at least two variables that can determine systematic risk in the non-Shariah compliant industry which are leverage and firm size but profitability, liquidity, and growth are not insignificant. Aruna and Warokka (2013) also used some firm-specific variables to determine systematic risk in an emerging market and their results indicated an insignificant influence between accounting variables and systematic risk. That means, not all accounting variables can influence systematic risk. Based on the past studies of systematic risk, it can be concluded that the previous studies provided mixed results on the main factors affecting systematic risk. This may be due to the isolation of industries and countries. Meantime, there is a lack of studies examining the source of systematic risk in a particular industry in different countries and performing a comparison especially in the transportation industry.

Transportation industry is a very important sector for the economic development of any country because the transportation firms provide many services to the population. All imported and exported goods are in need of transportation whether through the land, airline, or marine services. Moreover, many people are traveling by using public transportation as well as traveling to other countries by air and ships. Therefore, the profit of transportation firms are relatively high especially when the management of firms is good (Lu and Chen, 2015). This study examines the effect of firm-specific variables on systematic risk in the transportation industry in Malaysia and Singapore for a period of 20 years from 1997 until 2016. Malaysia is the neighbouring country of Singapore separated only by the Tebrau Strait. Both are members of the ASEAN-5 with a significant economic contribution in the Southeast Asian region. The overview of the economic outlook for Southeast Asia (OECD, 2019) illustrates the real GDP growth of Malaysia and Singapore is 4.8 % and 2.9%, respectively, and the expectation of GDP growth from 2019 to 2023 is about 4.6 % and 2.6 % respectively. Malaysia however is a developing country while Singapore is a developed country, therefore the factors influencing the systematic risk of firms in each country may differ following the different economic structure between the two countries (Wongbangpo and Sharma, 2002; Alaghi, 2013; Ibrahim and Haron, 2016; Nizam et al., 2020). Based on this backdrop, the objective of this study is to make a comparison of firm-specific factors influencing the behaviour of systematic risk between the transportation firms of these two countries.

2. Data and Methodology

This study employed secondary data sourced from Thomson DataStream on firms classified as transportation firms listed in the Bursa Malaysia and Singapore Stock Exchange. Based on this classification, the panel data set consists of 63 transportation listed firms in both Malaysia and Singapore, for 20 years from 1997 to 2016. Out of the 63 firms, 31 firms are from Malaysia and 32 firms are from Singapore. Following Haron (2014), only firms that have been listed in the stock exchange for the past three years (from 2016) are included in the sample. Most of the transportation firms in Malaysia are Shariah compliant firms based on the Securities Commission of Malaysia Shariah compliant listing (Securities Commission, 2016) while the Singapore firms are not ascertained due to the absence of Shariah compliant list for Singapore listed firms. This study examines systematic risk with a set of firm-specific variables in the transportation industry, which are financial leverage, liquidity, profitability, operating efficiency, firm growth, and firm size, together with the global financial crisis of 2008. The variables' measurements are provided in Table 1.

The panel regression model of this study is depicted below.

$$\text{Systematic Risk}_{i,t} = a_0 + a_1 \text{Financial leverage}_{i,t} + a_2 \text{Liquidity}_{i,t} + a_3 \text{Profitability}_{i,t} + a_4 \text{Firm size}_{i,t} + a_5 \text{Firm growth}_{i,t} + a_6 \text{Operating efficiency}_{i,t} + a_7 \text{Financial crisis 2008}_t + \varepsilon_{i,t}$$

Table 1: The Measurement of Independent Variables

Variable	Measurement	References
Systematic Risk	Beta	Nizam et al. (2020)
Liquidity	current asset/current liabilities	Haron (2018)
Profitability	Net income /Total asset	Alaghi. (2013)
Operating Efficiency	Total revenue/Total asset	Alaghi. (2013)
Firm Growth	Annual Percentage Change in earnings	Nizam et al. (2020)
Firm Size	Natural logarithm of total asset	Nizam et al. (2020)
Financial Crisis 2008	Dummy 1 for crisis, 0 otherwise	Haron et al. (2020)

This study performed the panel data analysis using Stata 12 to explore the main factors influencing systematic risk of the firms. Three panel data models are employed, the Fixed Effect Model (FEM), Pooled Ordinary Least Square (POSL) and Random effect model (REM). The procedure of selecting the most appropriate model for this study is based on the three statistical tests, which are the Chow Test, Breusch and Pagan Lagrangian Multiplier Test (BP-LM), and Hausman Test (see, for e.g., Haron, 2018). Moreover, this study performed the test on multicollinearity, auto-correlated, and heteroskedastic after obtaining the most appropriate model and solve the related problems by employing the robust standard error. There is no issue with multicollinearity since the correlations between independent variables are less than 0.85 (Aslam and Haron, 2020) (refer Table 2 and 3 for details). This study utilized the unbalanced panel data due to the different listing years of the transportation firms in the sample. The summary of the three tests of this study is provided in Table 5 and 6.

Table 2: Correlations between Independent Variables of Malaysian Transportation

Variable	X1	X2	X3	X4	X5	X6
X1	1					
X2	-0.3194	1				
X3	-0.3622	0.2529	1			
X4	0.1155	0.0276	0.145	1		
X5	0.0421	0.0271	0.0319	-0.0071	1	
X6	-0.3269	-0.0346	0.0039	-0.5998	0.0071	1

Notes: X1 (Financial leverage), X2 (Profitability), X3 (Liquidity), X4 (Firm size), X5 (Firm growth), X6 (Operating efficiency)

Table 3: Correlations between Independent Variables of Singaporean Transportation

Variable	X1	X2	X3	X4	X5	X6
X1	1					
X2	-0.0987	1				
X3	-0.2972	-0.0001	1			
X4	0.2423	-0.2128	0.0498	1		
X5	0.0171	0.0083	0.2001	-0.0045	1	
X6	-0.2528	-0.1384	0.1069	-0.2095	-0.0214	1

Notes: X1 (Financial leverage), X2 (Profitability), X3 (Liquidity), X4 (Firm size), X5 (Firm growth), X6 (Operating efficiency)

Table 4 and 5 show the descriptive information of Beta and six independent variables, the mean value of Beta in non-financial firms of Malaysian and Singaporean transportation are 0.895 and 0.967, respectively. These values are less than one which means Malaysian and Singaporean transportation firms are less risky than the market because the mean value of market beta is always equal to one. Interestingly, the systematic risk of transportation firms in Malaysia (Shariah compliant classified) is relatively lower compared to its Singapore

counterpart (non-Shariah compliant classified) supporting Farooq and Alahkam (2016) who reported a different risk level between Shariah and non-Shariah compliant based on firms from the MENA region.

Table 4: Descriptive of Malaysian Transportation

Variable	mean	sd	Skewness	kurtosis	max	min
Beta	0.895	0.408	-3.616	16.127	2.076	-0.992
Financial leverage	30.459	26.976	4.964	58.729	367.080	0.030
Profitability	2.412	2.319	3.241	18.975	21.170	0.020
Liquidity	3.849	10.775	-3.648	28.427	42.880	-91.740
Firm size	13.075	1.480	0.363	3.243	17.842	8.899
Firm growth	0.116	7.925	-5.801	145.569	73.841	-120.015
Operating efficiency	0.575	0.450	1.268	5.343	3.130	0.010

Table 5: Descriptive of Singaporean Transportation

Variable	mean	sd	Skewness	kurtosis	max	min
Beta	0.967	0.156	-5.162	30.505	1.323	-0.039
Financial leverage	27.013	17.677	0.332	2.430	85.140	0.010
Profitability	2.524	4.392	6.035	45.687	45.430	0.070
Liquidity	4.791	13.107	0.371	13.673	89.180	-68.170
Firm size	12.738	1.561	0.106	2.971	16.958	8.329
Firm growth	-0.018	6.702	-2.462	94.291	54.801	-88.367
Operating efficiency	0.681	0.552	1.665	7.608	3.490	0.010

Table 6: Results for Three Tests of Panel Data Analysis in Malaysian Transportation Firms

Chow Test	Hausman Test	BP-LM test
Do not reject H_0	Do not Reject H_0	Do not reject H_0
FEM better than Pooled OLS	REM better than FEM	REM better than Pooled OLS
F-state = 0.38**	Chi2 = 10.01	chibar2 = 5.17**

Table 7: Results for Three Tests of Panel Data Analysis in Singaporean Transportation Firms

Chow Test	Hausman Test	BP-LM test
Reject H_0	Do not reject H_0	Reject H_0
Pooled OLS better than FEM	REM better than FEM	Pooled OLS better than REM
F-state = 1.40	Chi2 = 4.86	chibar2 = 0

Based on Table 6 and Table 7, the results of the tests shown that REM is the most appropriate model to estimate the parameters of interest in the Malaysian transportation firms while the POLS is the best estimator for Singaporean transportation firms. These two models are used to explore the sources of systematic risk of the firms in the respective countries. The detailed findings and discussion are discussed in the following section.

3. Findings and Discussion

Table 8: Regression Results for Malaysian Transportation Firms

Variable	Coefficient	Std. Error	Z-statistics	Prob
Financial leverage	0.0010	0.0007	1.20	0.23
Liquidity	0.0150	0.0071	2.11	0.035
Profitability	0.0003	0.0014	0.21	0.837
Firm size	0.0140	0.0211	0.65	0.518
Firm growth	0.0006	0.0012	0.55	0.585
Operating efficiency	0.0522	0.0569	0.92	0.359
Financial crisis 2008	0.0259	0.0721	0.36	0.719

Table 9: Regression Results for Singaporean Transportation Firms

Variable	Coefficient	Std. Error	T-statistics	Prob
Financial leverage	-0.0006	0.0005	-1.22	0.224
Liquidity	0.0019	0.00080	2.38	0.018
Profitability	0.0006	0.0009	0.64	0.521
Firm size	0.0063	0.0037	1.67	0.095
Firm growth	-0.0009	0.0008	-1.13	0.260
Operating efficiency	0.01260	0.0094	1.34	0.181
Financial crisis 2008	-0.0765	0.0551	-1.39	0.166

Based on Table 8 and Table 9, the analysis showed that liquidity is significantly and positively related to systematic risk of Malaysian transportation firms ($p < 0.05$) while the other variables such as financial leverage, profitability, operating efficiency, firm size, and firm growth are not significant. The positive relationship between liquidity and systematic risk supported the second hypothesis of this study and this is in line with previous studies such as Borde (1998), Kim et al. (2007) and Frutig and Das (2020). Frutig and Das stated that the high liquidity of firms will affect the agency cost, that is, the availability of the free cash flow will influence the behaviour of firms' managers to undertake many projects base on their own interest. This may lead to higher agency cost to the firm, hence increasing the level of systematic risk of the firm. Specifically managers of the transportation firms may incline towards taking many possible projects including the negative NPV projects due to the free cash flow position of the firms. This eventually may increase the systematic risk of the firms had the projects are not properly evaluated. Dogru et al. (2020) in their studies concluded that firms with high-free cash flows gain lower returns compared to firms with low-free cash flows, suggesting that acquisitions reduce underinvestment problems but also increase over investment problems. They concluded further that acquisition seems to be an important tool for firms with limited free cash flows, supporting the underinvestment theory, in which a firm with underinvestment problems gains from acquisitions while firm value decreases when the firm encounters overinvestment problems.

Besides Malaysia, firm size ($p < 0.10$) and liquidity ($p < 0.05$) are reported as significantly and positively influence the behaviour of systematic risk in Singaporean transportation firms. These two variables are considered as the main factors while other variables are not significantly related to systematic risk. The findings supported the second and fourth hypotheses of this study, a positive relationship between firm size and systematic risk is expected, in the line with the previous studies such as Rowe and Kim (2010) and Nguyen et al. (2019). They stated that a rapid expansion of firm size among firms may lead firms to higher competition and eventually market saturation which may cause firms to face loss or bankruptcy cost, thus experience a higher level of systematic risk.

Apart from the firm-specific variables, both firms in Malaysia and Singapore showed insignificant impact of the financial crisis in 2008 on systematic risk. This may due to the nature of the industry itself. Transportation industry is considered as an important industry that provides many services through land, marine and airline. People who are trading, traveling and delivering things need these types of services irrespective of crisis or non-crisis periods. It can be said that generating profit in this industry is quite high than others especially when the management of firms is good (Lu and Chen, 2015). Therefore, the presence of financial crisis in 2008 may not influence the behaviour of systematic risk since firms still remain

profitable. Previously, Chee-Wooi and Chyn-Hwa (2010) also found that there is no any significant relationship between financial crisis (2008) and systematic risk in airline industry in East Asia.

Table 10: Summary of the Impact of Firm-Specific Factors on Systematic Risk of Transportation Firms (Malaysia and Singapore)

Hypotheses	Full sample	
	Malaysia	Singapore
H1 Financial leverage is positively related to systematic risk.	Not supported	Not supported
H2 Liquidity is positively related to systematic risk.	<i>Supported</i>	<i>Supported</i>
H3 Profitability is negatively related to systematic risk.	Not supported	Not supported
H4 Firm size is positively related to systematic risk	Not supported	<i>Supported</i>
H5 Growth is positively related to systematic risk	Not supported	Not supported
H6 Operating efficiency is negatively related to systematic risk.	Not supported	Not supported
H7 The financial crisis in 2008 has a significant influence on systematic risk.	Not supported	Not supported

4. Conclusion

The main purpose of doing investment is to generate as much profit as possible and to be prudent in risk management. To obtain such purpose there is a need for firm managers and investors to recognize the factors which may cause risk on firms. Risk is uncertainty which may involve in any investment, so firm managers and investors should pay more attention and find out the way to deal with risk especially the systematic risk which is undiversified.

Barring its importance, this study focuses on the systematic risk of transportation firms in Malaysia and Singapore by examining the firm-specific factors that may influence such risk and the global financial crisis of 2008. This study provides evidence that, firm size and liquidity played an important role in influencing the systematic risk of the firms. The findings of this study therefore contribute to the finance literature by enlightening the sources of systematic risk among the firms. The study also highlights the difference in systematic risk level of transportation firms between the two countries which are partly contributed by the Shariah compliant status of the firms.

Furthermore, this study also contributed to policymakers as well as firm managers on the important of liquidity policy related to systematic risk of firms in transportation industry, that is, highly liquid firms may face with the agency cost issue which in turn affects systematic risk. Hence, generating an approach to deal with systematic risk, policymakers should be concerned about the level of firms' liquidity.

Besides policymakers, firm managers should ensure that the main specific factors such as liquidity and firm size are managed efficiently to determine systematic risk. Profitability of firms can be maximized if systematic risk is reduced. A good understanding about the sources of systematic risk related to financial crisis not only assist policy makers and firm managers but it also helps investors on the decision making. Investors may have a sound decision on their investment by looking both at technical analysis (price movement) and fundamental information (relationship between specific variables and systematic risk).

This study highlighted the research gap based on previous studies on systematic risk. However, the number of sample firms is limited to 63 as the study focuses only on the transportation firms in Malaysia and Singapore. Future research may expand this study to include other industries across the ASEAN-5 countries and to compare the difference in systematic risk between the Shariah and non-Shariah compliant firms as well. These comparisons of various industries and Shariah listing status may provide a more comprehensive understanding of the risk of the firms. This therefore may facilitate firm managers to implement the appropriate strategies against the external factors brought by the systematic risk.

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