Asian Business Research; Vol. 2, No. 1, 2017
ISSN 2424-8479 E-ISSN 2424-8983
Published by July Press

Equity Risk Premium in ASEAN: Empirical Analysis on Its Puzzle and Impact of 2008 Financial Crisis

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Received: February 13, 2017 Accepted: February 27, 2017 Online Published: March 14, 2017

doi:10.20849/abr.v2i1.124 URL: https://doi.org/10.20849/abr.v2i1.124

Abstract

This paper aims to mainly investigate equity risk premium of the six major members of ASEAN countries such as Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam which have been chosen based on their stock market development and data availability. It has focused on the two main issues of the equity risk premium such as the intriguing issue on the existence of equity premium puzzle and the analysis on the impact of the 2008 financial crisis on the trend of the equity risk premium and their potential contribution on the risk aversion's attitude of the ASEAN investors. Three methods are utilized to test this phenomenon (1) basic model consumption of Mehra and Prescott (1985) and simplified model by Ni (2006); (2) calibration (Campbell, 2003) and (3) GMM estimation (Hansen, 1982). The calibration method results suggest that the puzzle exists in Indonesia.It has determined that the puzzle seems lying on the negative covariance between the consumption growth rate and the average real stock return. After applying GMM as method of the three sub-sample analyses for before, after and excluding 2008, it shows that financial crisis didn't affect much the value of risk aversion, but it cannot deny the fact that it has profound effect on the behavior of the equity risk premium. It can also be inferred that after crisis, ASEAN investors are likely tend to become more decreasing relative risk averse and prefer to have happiness tomorrow than today.

Keywords: equity risk premium puzzle, risk aversion, subjective discount factor, basic model, calibration, GMM model, 2008 financial crisis

1. Introduction

1.1 Background of the Study

Equity risk premium (ERP) which refers to the difference between returns on stocks and bonds plays an important role in the financial market. This is the main component of every risk and return in finance models. It can be also considered as the central input in projecting the costs of both equity and capital in the corporate finance and valuation.

Most of the studies related on equity risk premiums mainly focused on the developed countries such as US, UK, Germany, France etc. In this case, it implies that there are very few studies mainly focusing in developing countries data. The growing economy of Association of South East Asian Nations or simply called ASEAN is one of the known international associations aiming to have integration on accelerating economic growth among countries members. The potential contribution of this community as one of the efficient markets in the world should be also given an attention. In this present study, it focuses on the six major members of the organization such as Indonesia, Malaysia, Singapore, Thailand, Philippines and Vietnam which have been selected based on their stocks development and data availability, these six countries already comprise almost 95% of the ASEAN GDP (2012 World Bank Data).

And as a given importance of the equity risk premiums in financial market, this paper aims to focus in two different issues involved with it in the six major ASEAN countries. First is the intriguing issue on the existence of equity premium puzzle which is a phenomenon that there is an observed higher return in the stock market in comparison with yield in the bond market. Mehra and Prescott (1985) had argued that observed equity risk premiums are not consistent with the financial conventional theories and have estimated historical premiums

about 6% were too high and eventually termed this phenomenon as equity risk premium puzzle (ERPP).They suggest investors would have implausibly high risk-aversion to justify these premiums. Many studies attempt to give explanations both based on risk or non-risk reasons on this puzzle. This study firstly aims to find out if the puzzle also exists in ASEAN six main members. Second issue is the common analysis on the behavior of the equity risk premiums among the countries, then eventually employing the sub-sample analyses to also determine the possible impact of the 2008 financial crisis.

For the first part, three methods are used to test the existence of the puzzle, the basic model and simplified model of Mehra and Presscot (1985) and Ni (2006); the calbration model (Campbell, 2003); and the GMM estimation (Hansen, 1982) using the E-views. Other studies simply use only until two methods such as the basic model and the calibration method. However, this paper also includes execution of the GMM method.

Second part is regarding on the behavior of equity risk premiums of ASEAN countries showing a dramatically drop in year 1999 and 2008 which led to analyze the possible impact of financial crises on risk aversion and might solved the puzzle. However due to lack of data availability, only the 2008 financial crisis has been the focus of study in the second part.

1.2 Objectives of the Study

Issue on the existence of equity premium puzzle has been one of the most interesting topics on financial studies when Mehra and Prescott (1985) had coined this term after observing equity risk premiums are not consistent with the financial conventional theories and have estimated historical premiums about 6% were too high. They suggest investors would have implausibly high risk-aversion to validate these premiums. Many researches exerted efforts to find out possible rational reasons on its occurrence based on both risk or non-risk reasons. But in this study, to determine whether the puzzle exists in the six major countries, the criteria of Mehra and Prescott of having risk aversion more than 10 was applied. This means if the risk aversion among the countries turn to have higher than 10, that country will be considered to have equity premium puzzle. Thus, following is the first main objective of this paper.

1. *To determine the existence of equity premium puzzle in six major members of Association of South East Asian Nations (ASEAN)*

Many researchers have exerted efforts to seek explanations of the existence of equity premium puzzle. In the past studies, many explanations have been suggested for the reason of this puzzle. Potential explanations involved consumption based generalized expected utility models, as suggested by Epstein & Zin (1991), Constantinides (1990), Abel (1990) and Campbell (1999),considering the additional risk provided by rare and disastrous events (Rietz 1988;Barro 2006) or idiosyncratic income shocks (Constantinides & Duffie 1996, Krebs 2000). Other possible factors are the liquidity limitations (Bansal & Coleman 1996), borrowing constraints (Constantinides, Donaldson & Mehra 2002) and tax reasons (McGrattan & Prescott 2003, McGrattan & Prescott 2003). Also, it has been shown that an industry group's higher risk ought to higher equity risk premiums (Athanassakos, 1998). The variables on behavioral finance have also been proposed, most remarkably aversions to ambiguity (Chen & Epstein 2002, Barillas, Hansen & Sargent 2009, Gollier 2011, Rieger & Wang 2012) and myopic loss (Benartzi & Thaler 1995, Barberis & Huang 2008). Furthermore, through international evidence, it has been revealed that there is a relevant relation between the historical equity premiums and the discount factors. It is supporting the explanation of the presence of the puzzle in myopic loss aversion. This can be interpreted that greater historical equity risk premiums are noticeable in countries where participants prefer to be more short-term oriented than long term oriented (Marc Oliver Rieger, Mei Wang and Thorsten Hens, 2013).

However, among these studies, still no factor alone can clarify the puzzle. It is still a puzzle. In Cochrane (2011) study, he specifies that the variation in the discount rates might be the reason on why this puzzle occurs since even the traditional finance theories can't confirm on why the discount rate varies so much than we expected. The theories are in their infancy. As Cochrane states that the variation of the discount rate seems to be a cause on why there are a lot of small puzzles in finance. One of these puzzles is the equity premium puzzle. As he mentioned that the models and traditional theories of Finance failed to explain this phenomenon, this research study about the ASEAN countries tried to find the possible and potential factor of the discount rate on existence of the equity premium puzzle. This paper has shown the integration of the consumption wealth model and the discount factor. The latter represents the marginal utility. This means that this factor is about the willingness of the ASEAN investors to accept the risk for the sake of additional satisfaction for the future returns of their portfolio. As many studies tried to describe different explanations on the occurrence of this puzzle, it is also

important to find out the possible reason on why this phenomenon could occur in ASEAN countries.

1.1 To find out a possible explanation of the puzzle in ASEAN countries

Based on the neoclassical theory of interest by Irving Fisher, the interest rate decides the relative price of both present and future consumption. In association with relative levels of present and future consumption, it is important to define the marginal rate of substitution between the consumption with two different time preferences. These two rates must essentially be equal, and this equilibrium is conveyed approximately by the relative prices of these two consumptions. Subjective discount factor is the determinant whether investors prefer to have satisfaction today or in the future. If it is greater than one, this denotes the utility preferences of the investors for tomorrow rather than today. Otherwise if this beta is less than 1 but greater than zero, it is consistent with the conventional financial theory that most of the investors prefer to have utility now. Recent studies of Biwesh Neupane (2013), found out Nepalese to have preference for the present time rather than in the future as its accounted subjective discount factor is less than 1 but higher than zero. On the other hand, study of Ni, Z. (2006) in Chinese stock market suggests that Chinese people tend to invest more on the future than in the present, as its beta appeared to be greater than one. In this study, since it is important to determining what kind of investors ASEAN countries have, the following sub-objective has been drawn.

1.2 To determine if ASEAN investors prefer happiness today or tomorrow

Equity risk premiums are relevant part of every risk and return in model in finance. They are the key in measuring the costs of equity and capital in valuation and corporate finance. Most of the previous studies claim that equity risk premiums in emerging countries are higher in developed countries (Roelof Salomons and Henk Grootveld). In time series analysis, it is necessary to perform the stationary of the data and if it is not, the results may give spurious regression. This can be firstly done by finding out the trend or behavior of the data. Most of the recent studies claim that equity risk premium varies over time. In the seminar of Northfield Asia Research in Hongkong presented by Katsunari Yamaguchi (2013), it was discussed that equity risk premiums of Japan is varying slowly over time when employing the stock market data from 1980 to 2012. The trend of equity risk premium tends to persist over some years to one decade. ERP may have a characteristic of mean-reverting in the long-run, or investment horizon over a few years. Thus, the second main objective of this paper is below relating on finding out the trend of equity risk premium among the ASEAN countries:

2. To analyze the behavior or trend of equity risk premium of sample countries

After finding the trend analysis of the equity risk premiums in the second main objective, if the outlier or sudden drop of the data occurs, subsample analysis is necessary to perform. Sub-sampling analysis can be different depending on the field but in statistics and business, it denotes with the range of a subset of individuals from within a statistical population to estimate features of the whole population. In the analysis of this paper, it is mainly referring on the examination of the existing data of the ASEAN countries, and doing structural break to perform the sub-sample analyses. This is to define whether there would be some differences or affect after removing the part of making the series unstationary, and may lead to spurious regression and irrational results. Thus the sub-objective is the following:

2.1 To figure out if sub-sample analysis is necessary

Another issue is the potential impact of the financial crises on the equity risk premium. After doing sub-sample analyses, which would have been done probably due to the impact of the financial crises on the equity risk premium, same procedures of conducting Generalized Method of Moments (GMM) was executed to determine if there's a variation in the value of risk aversion and subjective discount factor. If the big change occurs, this would suggest the impact of financial crises both on the risk aversion and the beta, otherwise no influence on them. Hence, the second sub-objective of this part is the following phrase:

2.2 To investigate if financial crises can affect the risk aversion and subjective discount factor

2. Method

2.1 Research Data

The research data used in this study is the data of six major ASEAN members. Table 1 presents the summary of data collection of the stock index code per each sample country, period from 1995-2015 and the source is mostly from PSALM which stands for Power Sector Assets and Liabilities Management Corporation.

Table 1. Summary of ASEAN stock index data collection

Country	Stock Code	Period	Source
Indonesia	*JCI*	1995-2015	PSALM
Malaysia	*FBMKLCI*	1995-2015	PSALM
Philippines	*PSEi*	1995-2015	PSE Library
Thailand	*SET*	1999-2015	PSALM
Singapore	*STI*	1999-2015	PSALM
Vietnam	*VININDEX*	2000-2015	PSALM

Stock index per each country is the index of aggregate value produced by combining several stocks or other investment vehicles together and expressing their total values against a base value from a specific date in the respective country. Having the said value, stock market return is calculated. This is the market index from t to t+1 but these returns are not the real returns, these are the nominal returns. For this case, these returns have been adjusted through the inflation factor. Theoretically, the dividend should be incorporated in calculating the market return, but in here it is not considered. The statistical lag is used and dividend return over the same period of time has not been included. Thus, it is assumed that the dividend was not paid within the sample period. It is believed that the overall impact of the dividend payments would be ignorable since it would have been very small. The equation below shows the calculation of the real return on equity.

$$R_{t+1} = Ln(\frac{I_{t+1}/CPI_{t+1}}{I_t})$$

Where:

R_{t+1}= *real rate on equity in the period t+1*

I_{t+1} *and* I_t= *index value at time t+1 and t*

CPI_{t+1}= *inflation deflator in the period t+1*

Moreover, the *risk free rate* which is a nominal risk free rate. For this case, it has also needed to be a Real Annual Risk Free Rate of Return. So, the equation below shows on how to obtain it:

$$RF_{t+1} = rf_{t+1} - (CPI_{t+1} - CPI_t)/CPI_t$$

Where:

rf_{t+1}= *nominal rate of return*

CPI_{t+1} *and* CPI_t= *Consumer price index at time t+1 and t*

RF_{t+1}= *real risk free rate of return*

For the data of *household consumption expenditure*, it refers to the market value of all goods and services such as durable products bought by the households. In the expected data of the consumption, it focused on the consumption per capita indices. The series of this is be adjusted into real terms through dividing with consumer price index *(consumption deflator series).*

$$CI_{t+1} = \frac{V_{t+1}}{V_t} / CPI_{t+1}$$

Where:

CI_{t+1}= *consumption index of period t+1*

V_{t+1} *and* V_t= *consumption value in the period of t+1 and t in absolute terms*

CPI_{t+1}= *inflation deflator for period t+1*

Moreover, another set of data is gathered to employ the GMM estimation as the third methodology. The stock returns data from 1995-2015 of the top companies in each of the countries are collected (see Appendix A). To calculate the real stock returns of these firms, the last traded price of each companies and the dividends are collected. The formula used is the following:

$$\frac{P_{t+1} + D_t - P_t}{P_t}$$

This is employed to get the real stock returns from the top companies of each country.

2.2 Basic Model

The methodology used in this study is referred to the studies of Mehra and Presscot (1985) and in Biwesh Neupane (2013). The basic model is derived from the consumption based model of the first reference paper while the simplification of the model is from the latter study.

It has been assumed that all investors in the market have an identical in their endowment process and not focusing much attention on the risk management. The equation below presents the maximization of the expected utility having an infinite time horizon.

$$\max W = \max E_o \sum_{t=0}^{\infty} \beta^t [U(C_t)] | I_t$$

Where:

C_t = *consumption per capita in the sample t*

β_t *(0 <β < 1)= subjective discount factor*

I_t = *information available at time t*

$E_0\{./I_t\}$ = *expectation operator in the flow of consumption*

$I_tU(.)$ = *concave utility function*

In here, it denotes that the higher the beta means investors prefer to have the satisfaction in the future.

The utility function can be presented as the usual relative risk aversion utility function.

$$U(c,\alpha) = \frac{c^{1-\alpha} - 1}{1-\alpha}, 0 < \alpha < \infty$$

In here, it presents the parameter measuring the risk aversion of the investors, and as the theory suggests, alpha can be shown as $0 < \alpha < \infty$.

Hansen and Singleton (1983) model of basic capital asset pricing of consumption is also considered in this study wherein it has been calculated by first and second condition of normal logarithmic and getting an additional wealth's contribution.

$$\frac{1}{\beta} = E_t\left\{[1 + E_t(R_{t,t+1})] \cdot \left(\frac{C_t}{C_{t+1}}\right)^{\alpha}\right\}$$

The covariance between the two factors can be presented like the equation below:

$$cov(x,y) = \sigma_{x,y} = E(x \cdot y) - E(x) \cdot E(y)$$

Converting the model into covariance, it turns out to be like this:

$$cov\left[(1 + R_{t,t+1}), \left(\frac{C_t}{C_{t+1}}\right)^{\alpha}\right] = \frac{1}{\beta} - E_t\left\{[1 + E_t(R_{t,t+1})] \cdot \left(\frac{C_t}{C_{t+1}}\right)^{\alpha}\right\}$$

Rearranging the function will be shown like this:

$$E_t(1 + R_{t,t+1}) = \frac{\frac{1}{\beta} - cov\left[(1 + R_{t,t+1}), \left(\frac{C_t}{C_{t+1}}\right)^{\alpha}\right]}{E_t\left(\frac{C_t}{C_{t+1}}\right)^{\alpha}}$$

The basic model is employed to investigate the existence of equity premium puzzle.

Furthermore, the simplified model which is derived by Ni (2006) is also applied in this analysis. It has stated that consumption growth is independent and identically distributed (idd) and the covariance with risk rate is assumed to be zero. This means following a log normal distribution indicating that in $Z \sim N(\mu, \sigma^2)$ and for both sides, getting the normal logarithm, the next equation can be obtained:

$$\ln(1 + R^{f_{t+1}}) = -\ln\beta + \alpha \ln[E_t(C_{t+1}/C_t)] - \frac{1}{2}\alpha^2\sigma^2{}_o$$

And then eventually, other form of equation for the logarithmic return for the risk rate of return equity can be

done.

$$r^{e_{t+1}} = \ln\beta + \alpha c_{t+1} - \frac{1}{2}\alpha^2\sigma_c^2 + \alpha \cdot cov\left(r^{e_{t+1}}, c_{t+1}\right)$$

In which:

$$r^{e_{t+1}} = \ln\left(1 + R^{f_{t+1}}\right)$$
$$C_{t+1} = \ln\left[E_t\left(C_{t+1}/C_t\right)\right]$$

Thus, the following set of equations below show the relations between the risk-free rate of return, return on equity, relative degree of risk aversion and subjective discount factor. In here, all the values can be solved if among these 4 variables, at least two values are known.

$$\ln\left(1 + R^{f_{t+1}}\right) = -\ln\beta + \alpha\ln\left[E_t\left(C_{t+1}/C_t\right)\right] - \frac{1}{2}\alpha^2\sigma^{2_c}$$
$$\ln\left(1 + R^{e_{t+1}}\right) = \ln\left(1 + R^{f_{t+1}}\right) + \alpha \cdot cov\left(r^{e_{t+1}}, c_{t+1}\right)$$

2.3 Calibration

Campbell (2003) has followed the works of Rubinstein (1976), Lucas (1978), Breeden (1979), Grossman and Shiller (1981), Mehra and Prescott (1985) and other classic papers regarding on the equity premium puzzle. All of them assumed about the existence of the representative agent who maximizes a time-separable power utility function specified over aggregate consumption C_t:

$$U(C_t) = \frac{C_t^{1-\alpha} - 1}{1 - \alpha}$$

Where:

α = relative risk aversion

This utility function is stated to have some relevant properties. One of these is stating that risk premia does not vary over time as aggregate wealth and the scale of the economy goes up. Moreover, this power utility function is the elasticity of intertemporal substitution which is simply the reciprocal of the relative risk aversion.

The function also assumes that the aggregate consumption is conditionally lognormal. Then for the expositional convenience, the log discount factor will be the equation below where $C_t = \log(C_t)$.

$$E_t r_{i,t+1} + \log\delta - \alpha E_t \triangle c_{t+1} + \left(\frac{1}{2}\right)\left[\sigma_i^2 + \alpha^2\sigma_c^2 - 2\alpha\sigma_{ic}\right] = 0$$

Where:

σ_c^2 = unconditional variance of log consumption innovations

σ_{ic} = unconditional covariance of innovations

Then the equation below suggests that the riskless real rate is linear in predicted consumption growth. It has the slope coefficient which is equal to the coefficient of the relative risk aversion. The precautionary savings effect is the negative effect on the riskless rate of the conditional variance of consumption growth.

$$r_{f_{t+1}} = -\log\delta + \alpha E_t \triangle c_{t+1} - \frac{\alpha^2\sigma_c^2}{2}$$

Finally, to solve the equity premium puzzle, the log risk premium on any asset is calculated as the product of the relative risk aversion and the covariance between asset return and consumption growth. To compute the covariance, three values are needed, the standard deviation of the log of excess stock returns, standard deviation of the consumption growth and the correlation of these two variables.

$$E_t\left[r_{i,t+1} r_{f,t+1}\right] + \frac{\sigma_i^2}{2} = \alpha\sigma_{ic}$$

The equation above says that an asset having a high consumption variance ought to have low returns when there is low consumption. Thus, a large risk premium is required for the risky asset.

2.4 GMM Estimation

The General Method of Moments (GMM) is first developed by Hansen (1982) which is an extension of the classical method of moments. It has estimated based upon the moment restrictions to be imposed. This aims to estimate the value of α and β. This is a widely used method of the financial economists which the number of

moment conditions is greater than the parameters. This means that this method aims to have an over-identification unlike with the traditional moment of conditions, having exactly identified because of having equal parameters and sample moments.

Then, there are 11 moments of condition or less in total (risk free rate and the real return of the top companies per each sample country). The two parameters are the subjective discount factor and the risk aversion. For this case, we employed the GMM cross-sectional. And to verify if it is over-identified, the J-statistic is used.

To show this, we have parameters b_{Kx1} and *n* moment conditions for *n*>K. N refers to the moment of conditions while K is indication of the number of parameters.

$$E[f(x_t, b)] = 0$$

So let the

$$Z_T(b) \equiv \sum_{t=1}^{T} f(x_t, b)/T$$

to be the function of the moment conditions. In this case, this function is the (*n*x1) vector. Hansen (1982) has suggested the following equation:

$$\underset{K\times n}{a_T} \quad \underset{n\times 1}{Z_T(b)} = 0$$

And to estimate the value of *b*, it has to be minimized the:

$$Z_T(b)' \, W Z_T(b)$$

So, the first conditions are,

$$\frac{dZ_T(\hat{b})}{db} W Z_T(\hat{b}) = 0$$

In the power utility case, we try to find the value of β and α. The next equation is the main equation to estimate the GMM.

$$Z_T(\alpha) \equiv \sum [\beta(C_{t+1}/C_t)]^{\alpha} x_{t+1} - P_t/T$$

Where:

β= Subjective discount factor
α= Risk aversion
C_{t+1}/C_t= Rate of consumption growth
X_{t+1}= real return on stocks, risk free rate
P_t = price

Then the vector matrix will be the following:

$$x_{t+1} = \begin{bmatrix} R^s_{t+1} \\ R^f_{t+1} \end{bmatrix} \text{ and } P_t = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

As mentioned above, the real stock returns of the top companies per each country are used (see Appendix A). In conducting the GMM, Eviews which is the econometric software is used. To estimate it, the 2SLS coefficient estimates with GMM standard errors is utilized. Also this method has been applied to test the impact of 2008 financial crisis on the risk aversion and subjective discount factor.

3. Results

3.1 Basic Model's Empirical Results

Table 2. Basic model's empirical results summary

Country	$R^s_{t,t+1}$	$R^f_{t,t+1}$	$\mathrm{Ln}[E_t(C_{t+1}/C_t)]$	$\mathrm{cov}\{(C_{t+1}/C_t)\ R^s_{t,t+1}\}$
Indonesia	1.18253	-0.72498	2.33862	-2.41990
Malaysia	0.62450	0.55539	6.49155	-14.35658
Philippines	0.48381	0.41238	0.80833	-0.09786
Singapore	0.70909	-0.93243	3.13997	7.56700
Thailand	0.76090	-0.27903	4.51455	-24.38136
Vietnam	1.21274	0.15888	1.31724	0.45382

Table 2 presents the summary of empirical results of the six major ASEAN majors using basic model. It can be inferred in all sample countries that real returns on equity are all positively higher than real risk free rate. The consumption growth rate is all positive and it indicates that MAL has the highest lognormal of consumption growth rate, followed by Thailand, Singapore, Indonesia, Vietnam and Philippines respectively. The covariance of the consumption growth rate and the real return on equity carries different signs among the sample countries. SIN and VIT conveys positive sign while the other countries carry negative sign.

Using the Mehra and Prescott (1985) basic consumption model, it displays that risk aversion of the six members of ASEAN is all less than 10 as shown in Table 3. This proposes that the equity premium puzzle doesn't exist in any of these Asian countries. Indonesia, Malaysia, Philippines, Thailand have a negative aplha with indicates that Indonesians, Malaysians, Filipinos and Thais are risk-lovers. But this value of their risk aversion is inconsistent with the conventional concepts stating that common investors are risk averse. The rational reason behind this result is the accounted negative value of the covariance between real return and consumption growth rate (Indonesia: -2.41990; Malaysia: -14.35658; Philippines: -0.09786 and Thailand: -24.38136).

Table 3. Summary of risk aversion and subjective discount factor

Country	Risk Aversion (α)	Subjective Discount Factor(β)
Indonesia	-0.78719	0.99621
Malaysia	-0.08446	8.49454e-7
Philippines	-14.09074	3.13213e-11
Singapore	0.21693	17.04942
Thailand	-0.04265	1.22025
Vietnam	6.72590	10.69922

In line with the result of the subjective discount factor, values of the IND, MAL and PHIL countries are consistent with the fundamental financial theory. This suggests that these Asian people prefer to have happiness today than tomorrow. However, SIN, THAI and VIET carry values of SDF greater than one indicating investors in these countries choose to have satisfaction more for the future than the present.

3.2 Calibration's Results and Analysis

Table 4. Calibration's empirical results summary

Country	$R^e_{t,t+1}$	$R^f_{t,t+1}$	$\mathrm{Ln}[E_t(C_{t+1}/C_t)]$	σ_c	σer_e	$\rho(\sigma_c, \sigma er_e$
Indonesia	1.18253	-0.72498	2.33862	0.04143	5.26396	1
Malaysia	0.62450	0.55539	6.49155	0.20990	1.22669	1
Philippines	0.48381	0.41238	0.80833	0.31530	3.46960	1
Singapore	0.70909	-0.93243	3.13997	1.08094	2.29804	1
Thailand	0.76090	-0.27903	4.51455	1025.20	1.22961	1
Vietnam	1.21274	0.15888	1.31724	0.47414	3.98247	1

Basically Table 4 displays on the 7th column the calibrated value of the correlation of the variance of consumption growth rate and variance of excess log stock returns into one. This is in fact a counter factual exercise but it is considered as a significant diagnostic test. It points out the extent into which the puzzle arises from the smoothness of consumption rather than having a low correlation with the returns on stocks.

Table 5. Summary of risk aversion values

Country	Risk Aversion (α)
Indonesia	**8.73533**
Malaysia	4.70824
Philippines	1.00531
Singapore	0.6608
Thailand	0.00083
Vietnam	1.61649

After conducting the calibration method, it shows that equity premium puzzle occurs only in Indonesia having value of risk aversion of 8.73533 in Table 5. According to Mehra and Prescot (1985), the value of alpha should be more than 10 to declare the incidence or explain the phenomenon of the puzzle. However, our result is supported by the research of Cecchetti, Lam and Mark (1993) and Kocherlakota (1996) suggesting value of more than 8 is also considered to explain the existence of the puzzle.

3.3 GMM Estimation's Results and Analysis

Table 6. 2SLS coefficient estimates with GMM standard errors

Country	Beta C(1)	Alpha C (2)	J-Statistic
Indonesia	0.011928	-0.010033	0.889710
Malaysia	-0.026761	-5.11E-12	1.63E-13
Philippines	**2.247048**	-0.004513	0.818433
Thailand	0.007818	-0.016353	305.1240
Vietnam	0.275514	-0.004608	5.05E-05

Note: due to the missing data, GMM-cross section for Singapore is not estimated

It can be inferred from Table 6 that only PHIL displays to have subjective discount factor or the beta greater than one. This denotes that under some considerations, using GMM method, Filipinos tend to invest more for the future than for the present. Countries of Indonesia, Thailand and Vietnam carry less than one beta and consistent with the conventional financial theories. Only the country Malaysia accounted to have negative beta (-0.026761) which is suggesting that among the countries in ASEAN, investors in Malaysia likely to have investment that moves in the reverse direction from the stock market.

In line with the risk aversion, it shows that all the five countries are risk lovers which are not congruent with the traditional theories. The outcomes tell that Asian people tend to have higher risks in expecting to have higher return on stocks. And again, the rational reason behind this negative value is the same with the reason explained in basic model's result. And this is due to the fact that covariance between the consumption growth rate and the excess returns on equity is negative.

3.4 Sub-sample Analyses on the Impact of 2008 Financial Crisis

The Figure 1 of the real equity risk premium of the ASEAN countries show sudden drop in the periods of 1999 and 2008. The rational reason behind this drop is the financial crisis during those times. However in this study, only the period of 2008 is the focus of the investigation due to lack of data availability of other countries in the period of 1999. All six major sample countries have data available for the year of 2008.

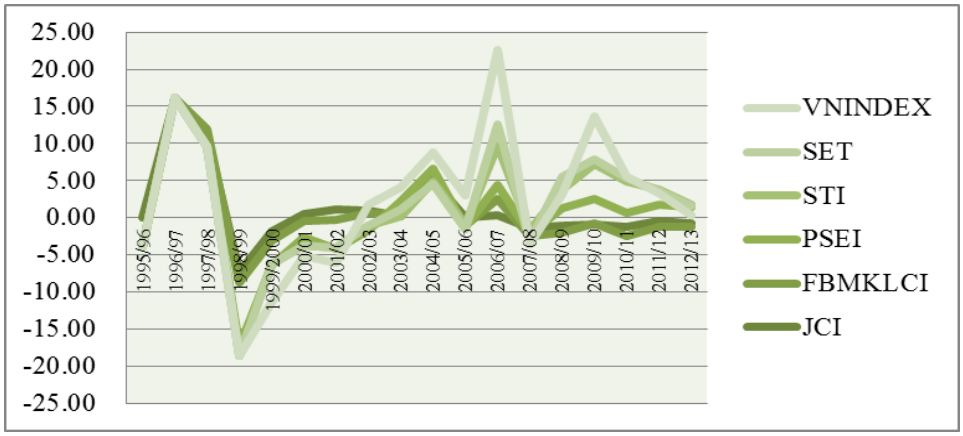

Figure 1. Real equity risk premium of ASEAN

In line with this, to determine whether 2008 financial crisis can affect the value of the risk aversion and the subjective discount factor of each country, the GMM estimation of the sub-sample analysis is performed. The sub-sample analysis is executed in three ways. First is the before crisis data analysis which aims to find out the values of risk aversion and SDF before crisis happens, then after and excluding 2008 accordingly.

Table 7. GMM estimation before 2008 financial crisis

Country	Alpha (Risk Aversion)	Beta (SDF)
Indonesia	-0.006334	0.014813
Malaysia	1.78E-11	-0.017341
Philippines	1.87E-10	-9.836066
Thailand	-0.019088	-0.388911
Vietnam	-0.009928	-5.191110

The Table 7 above shows that all the values of the risk aversion of the ASEAN countries before the crisis are negative indicating decreasing relative risk aversion of the investors. This infers that their negative wealth shocks raise the risk premium needed to hold risky assets.

Subjective discount factor shows all negative to ASEAN major members except Indonesia. It can be noticed that Singapore is not in the list of GMM estimation due to the unavailability of the data of top firms of the said country.

Table 8. GMM estimation after 2008 financial crisis

Country	Alpha (Risk Aversion)	Beta (SDF)
Indonesia	Square root of negative nos.	N/A
Malaysia	-5.18E-11	0.242365
Philippines	Square root of negative nos.	N/A
Thailand	5.40E-11	0.004738
Vietnam	-1.92E-10	0.163452

On the other hand, Table 8 shows the values of risk aversion and beta after the 2008 financial crisis. It can be compared from Table 7 that after the crisis, the values of risk aversion in most countries tend to have more

negative decreasing values. This is indicating that ASEAN investors tend to be less risk averse after the crisis and prefer to invest their negative wealth shocks in a raised risk premium needed to hold risky assets to have happiness tomorrow than today. And under some considerations, Indonesia and Philippines carry square root of negative values which lead not to produce values of subjective discount factor.

Table 9. GMM estimation excluding 2008 financial crisis

Country	Alpha (Risk Aversion)	Beta (SDF)
Indonesia	-0.009344	0.012153
Malaysia	Square root of negative nos.	N/A
Philippines	-0.005091	1.826232
Thailand	-0.015386	0.007724
Vietnam	-0.003539	0.235260

In the third way of executing the GMM estimation, year 2008 in all of data is excluded. It can be noticed that only Malaysia has the square root of negative values presented in Table 9 which make the alpha and beta impossible to calculate. This likely suggests that among the ASEAN countries, this country seems to be much affected by the 2008 financial crisis.

In all of the three ways of analyses, to determine whether the crisis could explain the equity premium puzzle is not supported as all displayed values are smaller than 10. However, it can be notable the impact of after crisis as the value of relative risk aversion shows to be negatively smaller after 2008 than before. While subjective discount factor have to be mostly negative values before 2008 while turned out to be positive after 2008. This implies that ASEAN investors tend to likely become more decreasing relative risk averse and prefer to have utility for the future.

4. Conclusion

4.1 Summary

In the first major part of this research, its objective is to determine if equity premium puzzle exists and based on the empirical results, among the six major countries of ASEAN, the existence of the puzzle is only proven to have in Indonesia using the calibration method after setting the correlation of the standard deviations of excess log stock returns and consumption growth into one. This is to test into what extent the puzzle arises from the smoothness of consumption and not on the low correlation with the real stock return.

Subjective discount factor in basic model of IND, MAL and PHIL countries are consistent with the basic financial theory suggesting that these Asian people prefer to have happiness today than tomorrow. However, SIN, THAI and VIET carry values of SDF greater than one signifying investors in these countries choose to have pleasure more for the future than the present. SDF produced by GMM presents different result which reveals that among the ASEAN countries only PHIL has the preference to have satisfaction tomorrow than today. Rational reason behind this estimation is mainly because of the different utilized data in the third method of the first part, which are the top firms per each sample country.

However using the other methods, to conclude whether the puzzle exists or not in the ASEAN countries is somewhat difficult as implied by the basic model of the Mehra and Presscot and Ni (2006); and the GMM estimation. This is for the reason that the risk aversion turns to be negative for countries IND, MAL, PHL and THAI and even less than ten for SIN and VIET. This indicates that the investors in these countries are risk lovers and relative risk averse respectively. Being risk lovers are inconsistent with the financial conventional theories. This paper found out that the reason behind this negative value is due to the negative covariance between the stock returns and consumption growth. While for being relative risk averse of the last two countries is somewhat supported by the financial theories, however not sufficient enough to prove the existence of the puzzle.

For the second part of this paper, its main objective is to know the behavior or trend of equity risk premium of the sample ASEAN countries. Sub-objectives are to figure out if sub-sample analyses are necessary and investigate if financial crisis can explain the puzzle, impact on the risk aversion and subjective discount factor of the investors.

Based on the graphical stochastic trend of ERP, it can be inferred that implementing sub-sample analyses is needed. Then in relation with the financial crises, after conducting three sub-sample analyses, it suggests that 2008 financial crisis cannot significantly affect the puzzle as it didn't make risk aversion higher than 10 in GMM approach. However, it is worth noting that crisis has potential impact on the trend of the equity risk premium as years 1999 and 2008 with global financial crises showed sudden and dramatic fall down. It can also be concluded that after crisis, ASEAN investors are likely tend to have more decreasing relative risk averse and prefer to have pleasure tomorrow than today.

4.2 Research Contribution

This paper has relevant contribution mainly on the methodology and uniqueness of data. It has also some important contributions for policy making and investment decisions. It can be summarized into four contributions.

First, this study firstly tried to test the existence of equity premium puzzle by employing three methods such as the basic model (Mehra & Prescott, 1985), calibration (Cochrane, 2003) and the Generalized Method of Moments GMM (Hansen, 1981). Most of the other studies typically only use the basic model, and recent study of Xiaojing Jin (2011) used two methods such as basic model and the calibration among Asian countries.

Second, few studies applied the approach of GMM mainly because of its complicated features. Study of Ki Young Park & Kwang Hwan Kim (2009) used GMM to test the equity risk premium of South Korea and simply use the stocks return, its lags and risk free rate as the moments of conditions. Present paper executes the top companies per each country in ASEAN. Up to date, this seems to be the first paper using last traded price of top companies to be moments of conditions to test the occurrence of this puzzle phenomenon.

Third, related to research contribution number 2, this seems to be the first paper to mainly focusing on the data related to ASEAN countries. Most of the previous related literatures are focusing on developed countries or generally on the Asian countries. As the economic growth of ASEAN organization is getting stronger, it is a must to also pay attention on how the equity risk premiums of the member’s countries could contribute on the financial literature.

Lastly, financial crises are indeed having potential impact on the behavior of the equity risk premiums. This paper has a very different and could say simply unique from other studies, as it has tried to do sub-sample analyses by excluding year 2008 financial crisis. Other two sub-sample analyses are the before and after the crisis to determine the potential impact of the crisis on the risk aversion, subjective discount factor and eventually for the possible explanation of equity premium puzzle.

4.3 Limitations and Suggestions for Future Research

It is very common to have limitations on every research paper based on their data usage and methodologies. Followings are the limitations and recommended further research studies of this paper.

The nature of the data itself has its own limitations. Due to difficulty of collecting data, some data are missing and not having the same periods. Gathered data is mainly focusing on ASEAN countries, other things equal, it cannot be generalized that same results could be the same with other countries such as European, Middle-east countries, or other organizations. Also, among ASEAN countries, there are also some limitations as each country has its own individual or heterogeneous characteristics.

Methodologies can be also set as one of the limitations of this paper. As it has been discussed in the chapter 3 of methodologies on this research, different methods showed different results. For the first part of this paper, the basic model and GMM results have shown same implications but still different values. The calibration shows favorable results in relation with the objective of this paper to determine the existence of equity premium puzzle. However, this favorable method is not true to all countries in ASEAN, the calibration method has been only considered useful for Indonesia. Other remaining countries still have a mystery on testing the occurrence of this puzzle. This suggests that there could be a bias on the applied methods which could lead for its one of the limitations to consider.

Furthermore, in relation with the second part of this paper which is doing sub-sample analyses through GMM, could have also drawn to have limitations. The year excluded is only 2008, but it could be noticed on the graph years of 1999 and 2011 show dramatic fall down of the equity risk premium. In this case, this denotes that there can be also limitation on concluding for the generalization of the results of the sub-sample analyzes. These analyzes have been executed only in three ways in this paper. Executing in more sub-sample analyzes could have different results and implications.

For further research studies, since this study has been interested on equity risk premiums of ASEAN countries, expanding this analysis into country members of AIIB or the Asian Infrastructure Investment Bank might lead to have more accurate results of the paper as this organization is widely accepted in financial markets. Moreover, updating the data is one of needed further studies.

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Appendix A

Top Companies in ASEAN countries

COUNTRY	CODE	COMPANY
INDONESIA	*ASII*	Astra International
	HMSP	HM Sampoerna
	BBCA	Bank Central Asia
	BMRI	Bank Mandiri
	TLKM	Telekomunikasi Indonesia
	BBRI	Bank Rakyat Indonesia
	UNVR	Unilever Indonesia
	PGAS	Perusahaan Gas Negara
	GGRM	Gudanggaram
	SMGR	Semen Indonesia
MALAYSIA	*PBBANK*	Public Bank Berhad
	TENAGA	Tenaga National Berhad
	AXIATA	Axiata Group Berhad

	CIMB	CIMB Group
	SIME	Sime Darby Berhad
	PCHEM	Petronas Chemicals Group
	MAXIS	Maxis Berhad
	PETGAS	Petronas Gas Berhad
	GENTING	Genting Group
PHILIPPINES	*TEL*	Philippine Long Distance Telecommunications
	AYL	Ayala Land
	URC	Universal Robina Corp
	BDO	BDO Unibank
	AC	Ayala Corp
	JGS	JG Summit Holdings
	SM	SM Investments
	SMPH	SM Prime Holdings
	AEV	Aboitiz Equity Ventures
	JFC	Jollibee Foods Corp
THAILAND	*AOT*	Airports of Thailand
	BCP	The Bangchak Petroleum
	BKI	Bangkok Insurance
	CPN	Central Pattana
	IRPC	IRPC
	KBANK	Kasikorn Bank
	MCOT	MCOT
	PSL	Precious Shipping
	PTT	PTT
	PTTEP	PTT Exploration & Production
VIETNAM	*PVN*	Petro Vietnam
	VNE	Vietnam Electricity

This table shows the summary of the codes and names of the top companies per each country, the Singapore is eliminated from the list due to the difficulty of collecting data. The first and 2nd methods are only applied for the said country using the stock index. Moreover, among the list of the top firms in Vietnam only two companies are included in the GMM estimation due also to the lack of data's availability. These 2 companies are Petro Vietnam and Vietnam Electricity respectively.

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