
BEHAVIOR OF THE VIETNAMESE EQUITY PREMIUM

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ABSTRACT

The Vietnamese equity premium over the period 2000:07 to 2013:10: (i) followed a stationary trend process with a break date of August 2007, (ii) adjusted around its estimated threshold value symmetrically in the long run. When the short-run dynamic components are introduced to the model: (i) the return on the market portfolio asymmetrically responded to both the widening and the narrowing of the equity premium, (ii) the T-bill rate did not respond to either the widening or the narrowing of the equity premium. Finally, the GARCH (3, 3) effect is present on the Vietnamese monthly equity returns and their variance. **JEL classifications:** C22, F36, and G14

INTRODUCTION

Equity premium, the difference between the return on the market portfolio and the risk-free interest rate has been a topic of considerable debate. From the theoretical perspective, the equity premium is the difference between the expected real return on market portfolio of common stocks and the real risk free interest rate. As initially recognized by Mehra and Prescott (1985), the historic U.S. equity premium, which is in the world's largest economy, appears to be much greater than what can be rationalized in the context of the standard neoclassical paradigm of financial economics. Mehra (2003) articulated that for the 1889-2000 period, the average annual real return on the US equity market has been about 7.9%, as compared to the real return on a relatively riskless security was 1.00%. This irrationally high average, dubbed "the equity premium puzzle" is not unique to U.S. capital market. Internationally, as reported by Dimson et al., (2006) over the 1900-2005 period, the equity premium measure relative to T-bills was 7.08% in Australia, 6.67% in Japan, 6.20% in South Africa, 3.83% in Germany, 5.73% in Sweden, 5.51% in the US, 4.43% in the UK, 6.55% in Italy, 4.54% in Canada, 6.79% in France, 4.55% in Netherlands, 4.09% in Ireland, 2.80% in Belgium, 3.07% in Norway, 3.40% in Spain, 2.87% in Denmark and 3.63% in Switzerland. The average equity premium for these 17 countries over this period of 106 years is 4.81%.

In the late 2011, Dimson et al., (2011) updated the global evidence on the long-term realized equity risk premium, relative to both bills and bonds, in 19 different countries. Their sample was from 1900 to the start of 2011. They found that while there was considerable variation across countries, the realized equity risk premium was substantial everywhere. They reported that for a sample of 19-country World index, over the entire 111 years, geometric mean real returns were an annualized 5.5%; the equity premium relative to Treasury bills was an annualized 4.5%; and the equity premium relative to long-term government bonds was an annualized 3.8%. The expected equity premium is lower, around

3% to 3½% on an annualized basis.

Since its introduction to the literature in 1985, the equity premium puzzle has spawned many efforts by a number of researchers to explain this anomaly away. With the exception of the following investigations, the majority of the studies concentrated on theoretically and empirically explaining the implausible equity premium puzzle. Buranavityawut and Freeman (2006) examined consumption risk and the equity premium. Blanchard (1993) studied the variation of the equity premium for a 50 year period. Fama and French (2002) compared the estimated unconditional equity premium to the realized market gains. Siegel (1999) investigated the variations of the size of the equity premium. Welch (2000) surveyed financial economists on their expectations on the future equity premium.

While the theoretical and empirical debates are still unsettled, equity is the major instrument to channel the financial resources from the capital surplus economic units (the savers) to the financial deficit units (the borrowers) in the direct financing mode of the market economies. In the capital market, the realized equity premium is the premium that corporations have to pay to obtain their financial resources, when they issue new equities or to acquire their treasury stocks, just like the difference between the loan rate and the risk free interest rate that financial institutions charge for loans to corporations. Therefore, the time path on which the equity premium adjusts towards its “normal” or equilibrium level following a shock has a major consequence on the cost of capital to corporations. Thus, policymakers should have accurate knowledge of the adjustment process of the equity premium when being disturbed by economic shocks or countercyclical monetary policy action in the equity market.

The remainder of the study is organized as follows: Section 2 briefly describes the nature of the equity premium; Section 3 summarizes the Vietnamese equity market; Section 4 describes the data set and its descriptive statistics; Section 5 discusses the methodology and model’s specification; Section 6 reports and discusses the empirical results; Section 7 provides some concluding remarks and recommendations.

NATURE OF EQUITY PREMIUM

Brealey and Myers (2003) articulated that an integral part of the economic and financial literature on equity premium is the assumption that “there is a normal, stable, risk premium on the market portfolio.” Therefore, to estimate the ex-ante equity premium, the most popular method is to extrapolate the historically realized equity premium into the future (Welch, 2000). For example, Brealey and Myers (2000), described how to estimate a return for a diversified stock market portfolio. They do this by taking the current interest rate on U.S. Treasury bills plus the average equity premium over some historical time period. In other words, they simply extrapolated past returns forward. Brealey and Myers (2000) noted that their result is consistent with security analysts’ forecasts of earnings growth. This assumption requires that the equity premium time series be mean-reverting. In addition, the capital asset pricing model (CAPM) conceptually postulates that investors set their required real earning yields as some markup relative to real risk free interest rates. In the equity market, this mark-up is the equity premium. If this equity premium becomes too high or low, the marketplace will put pressure on the investors to adjust it back to some “normal” or equilibrium equity premium. Specifically, the above assumption implies that the equity premium returns back to its long run equilibrium position following any shock.

Perhaps the state of the equity premium puzzle today still can be described best by

one of the two researchers who originally recognized the anomaly: “After detailing the research efforts to enhance the model’s ability to replicate the empirical data, I argue that the proposed resolutions fail along crucial dimensions.” Mehra (2003). Also, Damodaran (2014) articulated that Equity risk premiums are a central component of every risk and return model in finance and are a key input into estimating costs of equity and capital in both corporate finance and valuation. Given their importance, it is surprising how haphazard the estimation of equity risk premiums remains in practice.

VIETNAMESE EQUITY MARKET

To this end, the recent inaugural equity market of the transitional economy of Vietnam is of particular interest. To describe what has transpired in the Vietnamese economy, as cited by Currie (2008), Klaus Rohland, the World Bank’s Vietnam country director from 2002 to 2007 stated “There is probably no other country in the world that, over the last 15 years, has moved its development so far and so fast.” This characterization is in diametric contrast with Vietnam in the 1990s, which was mostly mentioned in policy circles for having some of the most inappropriate reforms among the transitional economies, Kim (2008). The equity market is the supposed poster child of the Vietnamese financial sector, which has benefitted greatly from market liberalization and demonstrated impressive economic growth in spite of the considerable international, political, and social turmoil of the 2000s.

Historically, Vietnam’s first stock exchange, known as the Ho Chi Minh City Securities Trading Center, was established in July 2000. In early 2005, the exchange had 28 stocks listed and a total market capitalization of only U.S. \$270 million. In March 2005, Vietnam opened an over-the-counter exchange known as the Hanoi Securities Trading Center to expedite the privatization of state-owned enterprises. Additionally, Vietnamese officials set the goal of expanding their combined market capitalization to 10 percent of gross domestic product by 2010 and gradually phased out restrictions on foreign ownership of shares. In September 2005, Vietnam’s Prime Minister announced that the limit on foreign share ownership would rise from 30 percent to 49 percent. Actually, by the end of 2012, the number of companies listed was 183 and, as indicated by Table 1, the total market capitalization accounted for only 23.2 percent of gross domestic product. The Vietnam Stock Index or VN-Index is a capitalization-weighted index of all the companies listed on the Ho Chi Minh City Stock Exchange. The index was created with a base index value of 100 as of July 28, 2000. Prior to March 1, 2002, the market only traded on alternate days.

Additionally, equity market regulations, issued in 2006, and the attendant consequences of becoming the WTO membership have changed the landscape of the Vietnamese equity market significantly. On May 03, 2006 the Vietnam Securities Depository officially went into operation under Decision No. 189/2005/QĐ-TTg signed on July 27, 2005 to increase the market performance in general, and the clearing and settlement system in particular. Moreover, on June 01, 2006 the Hanoi Securities Trading Center increased the number of trading days from 3 to 5 days a week, in order to increase the market liquidity. Starting on June 14, 2006, the Ho Chi Minh City Securities Trading Center increased the number of order matching phases from 2 to 3 phases a day (1st phase from 8h40 to 9h10, 2nd phase from 9h20 to 9h50, 3rd phase from 10h to 10h30) in order to meet investors’ trading demand. Finally, on November 07, 2006 Vietnam gained membership to become 150th member of the World Trade Organization, and would

officially join on January 11, 2007. That event created new opportunities and challenges for the course of the country's cultural and economic integration into the globe, especially with respect to the financial aspects of the economy. As Table 1 indicates, the Vietnamese equity market is still relatively undeveloped.

DATA

This study utilizes monthly stock price indices in Vietnam and the T-bill rate as the proxy measure for risk-free rate. The data set, used in this investigation, covers the period from its inaugural month of July 28, 2000 to October 2013 where the data on risk-free rate is available. The time-series data is obtained from the Vietnamese equity market: <http://www.cophieu68.vn/historyprice.php?id=^vnindex>, (retrieved on April 18, 2014.) The data on the T-bill rate, used as the proxy for the risk free rate, is obtained from the International Financial statistics, published by the International Monetary Fund. In this analysis, let ER and RF denote the annualized monthly return on the Vietnamese monthly equity market portfolio and the risk free rate, respectively. The monthly return on the market portfolio is annualized to be comparable to the risk-free rate which is stated in the annual basis. The difference between ER and RF is defined as equity premium and is denoted by EP. Figure 1 illustrates the behaviors of ER, RF and EP over the sample period.

As to the descriptive statistics of the time series of the Vietnamese equity annualized monthly return, its mean is 20.31 percent, ranging from -452.63 percent to 417.99 percent with standard error being 139.46 percent. The corresponding figures for the T-bill rate were 7.38 percent, 3.34 percent, 15.60 percent and 2.76 percent, respectively. The average Vietnamese equity premium since its inauguration is 12.93 percent. Additionally, in their 2014 survey of market premium used in 2014 in 88 countries, Pablo (2014) reported, in Table 2, the average premium of the following selected countries which show that Vietnamese equity premium is the among the highest premia in its neighboring Asian countries and much higher than the corresponding figures in the advanced economies.

METHODOLOGICAL ISSUES AND ANALYTICAL FRAMEWORK

Structural Break

Historically, every economy would experience many business cycles caused by internal and external shocks; therefore, countercyclical monetary policy measures would be used to bring the economy back to its long-run path. Vietnam is no exception! Consequently, the spread between return on market equity index and the risk free rate, the equity premium, is most likely to suffer some structure breaks. To search endogenously for the possibility of any structural break in the basis, this investigation utilized Perron's (1997) endogenous unit root test function with the intercept, slope, and the trend dummy, as specified by equation (1), to test the hypothesis that the spread between stock price index and the money supply has a unit root.

$$EP_t = \mu + \theta DU + \varsigma t + \xi DT + \delta D(T_b) + \zeta EP_{t-1} + \sum_{i=1}^k \psi_i \Delta EP_{t-i} + v_t \quad (1)$$

where $DU = 1(t > T_b)$ is a post-break constant dummy variable; t is a linear time trend; $DT = 1(t > T_b)$ is a post-break slope dummy variable; $D(T_b) = 1(t = T_b + 1)$ is the break dummy variable; and ε_t are white-noise error terms. The null hypothesis of a unit root is stated as $\xi = 1$. The break date, T_b , is selected based on the minimum t-statistic for testing $\xi = 1$ (see Perron, 1997).

Threshold Autoregressive (TAR) model

To further investigate the nature of the Granger causality between the equity premium and the risk-free rate, this study uses the threshold autoregressive (TAR) model, developed by Enders-Siklos (2001) that allows the degree of autoregressive decay to depend on the state of the equity premium, i.e. the “deepness” of cycles. The estimated TAR model would empirically reveal if the premium tends to revert back to the long-run position faster when the premium is above or below the threshold. Therefore, the TAR model indicates whether troughs or peaks persist more when shocks or countercyclical monetary policy actions push the equity premium out of its long-run equilibrium path. In this model’s specification, the null hypothesis that the basis contains a unit root can be expressed as $\rho_1 = \rho_2 = 0$, while the hypothesis that the basis is stationary with symmetric adjustments can be stated as $\rho_1 = \rho_2$.

The first step in the Enders-Siklos’ (2001) procedure is to regress the equity premium, EP_t , on a constant and an intercept dummy (with values of zero prior to the structural break date and values of one for the structural break date and thereafter), as specified by equation (2).

$$EP_t = \pi_0 + \pi_1 Dummy_t + \varepsilon_t \quad (2)$$

The saved residuals, ε_t from the estimation of equation (2), denoted by $\hat{\varepsilon}_t$, are then used to estimate the following TAR model:

$$\Delta \hat{\varepsilon}_t = I_t \rho_1 \hat{\varepsilon}_{t-1} + (1 - I_t) \rho_2 \hat{\varepsilon}_{t-1} + \sum_{i=1}^p \alpha_i \Delta \hat{\varepsilon}_{t-p} + \hat{u}_t \quad (3)$$

where $\hat{u}_t \sim i.i.d.(0, \sigma^2)$, and the lagged values of $\Delta \hat{\varepsilon}_t$ are meant to yield uncorrelated residuals. As defined by Enders and Granger (1998), the Heaviside indicator function for the TAR specification is given as:

$$I_t = \begin{cases} 1 & \text{if } \hat{\varepsilon}_{t-1} \geq \tau \\ 0 & \text{if } \hat{\varepsilon}_{t-1} < \tau \end{cases} \quad (4)$$

The threshold value, τ , is endogenously determined using the Chan (1993) procedure which obtains τ by minimizing the sum of squared residuals after sorting the estimated residuals in an ascending order, and eliminating 15 percent of the largest and smallest values. The elimination of the largest and the smallest values is to assure that the $\hat{\varepsilon}_t$ series

crosses through the threshold in the sample period. Throughout this study, the included lags are selected by the statistical significances of their estimated coefficients as determined by the *t*-statistics.

The Asymmetric Error-Correction Models

Moreover, to investigate the short-run asymmetric dynamic behavior between the return on the market equity portfolio and the risk-free interest rate, this study specifies and estimates the following asymmetric error-correction model. The estimation results of this model can be used to discern the nature of the Granger causality between the return on the market stock portfolio and the risk-free rate. Additionally, the following TAR-VEC model differs from the conventional error-correction models by allowing asymmetric adjustments toward the long-run equilibrium.

$$\Delta ER_t = \alpha_0 + \rho_1 I_t \hat{\epsilon}_{t-1} + \rho_2 (1 - I_t) \hat{\epsilon}_{t-1} + \sum_{i=1}^n \alpha_i \Delta ER_{t-i} + \sum_{i=1}^q \gamma_i \Delta RF_{t-i} + u_{1t} \quad (5)$$

$$\Delta RF_t = \tilde{\alpha}_0 + \tilde{\rho}_1 I_t \hat{\epsilon}_{t-1} + \tilde{\rho}_2 (1 - I_t) \hat{\epsilon}_{t-1} + \sum_{i=1}^n \tilde{\alpha}_i \Delta ER_{t-i} + \sum_{i=1}^q \tilde{\gamma}_i \Delta RF_{t-i} + u_{2t} \quad (6)$$

where $u_{1,2t} \sim i.i.d(0, \sigma^2)$ and the Heaviside indicator function is set in accord with (4). This model specification recognizes the fact that the stock price index responds differently depending on whether the equity premium is widening or narrowing, due to the nature of economic shock or countercyclical policy.

GARCH(s, r)-M MODEL

As to the equity premium in relation to market volatility and economic condition, Graham and Harvey (2009) analyzed the history of the equity premium from surveys of U.S. Chief Financial Officers conducted every quarter from June 2000 to March 2009. They defined equity premium as the expected 10-year S&P 500 return relative to a 10-year U.S. Treasury bond yield. They noted that these surveys were conducted during the darkest parts of a global financial crisis. They further indicated that the equity premium sharply increased during the crisis. The authors also found that the level of the equity premium closely tracks the market volatility as measured by the VIX. Additionally, from June 2000 to March 2012 surveys, Graham and Harvey (2012) found that while the equity premium sharply increased during the financial crisis peaking in February 2009, and then steadily fell until the second quarter 2010. These aforementioned results indicated that the equity premium is affected by market volatility and economic condition of the economy.

The Vietnamese economy has become more and more internationalized and the international economic landscape over the existence of the Vietnamese stock market has been dotted with international political and social turmoil. These developments exacerbate the variance of equity premium and cause the variance to be different from some sub-periods to others over the sample period. Additionally, the graph of the Vietnamese equity premium in Figure 1 strongly supports the different variances in the Vietnamese equity premium from one sub-period to another period. Therefore, another important question

for investors, policy makers, and corporate executives is whether the fluctuations in the equity premia of the market portfolio and hence their variances from the one month affect the premia and the variances in the next month. To this end, this investigation specifies and estimates the following GARCH(s, r)-in-Mean (GARCH-M) model to discern this possibility. GARCH-M models have been very popular and effective for modeling the volatility dynamics in many asset markets.

$$EP_t = c + \lambda \omega_t^2 + \varepsilon_t \quad (7)$$

$$\omega_t^2 = \alpha + \sum_{l=1}^r \beta_l \varepsilon_{t-l}^2 + \sum_{m=1}^s \eta_m \omega_{t-m}^2 \quad (8)$$

where EP is the equity premium, \ln is the natural Logarithm, and ω_t^2 is the variance of the Vietnamese equity index at time t ; ε_t is a disturbance; c is a constant; λ , α , β_l , and η_m are the parameters to be estimated of the model. The retentions of these estimated coefficients are determined by the calculated z-statistics at the 5 percent level of significance. The r and s indices are the highest subscripts l and m of retained β_l and η_m .

EMPIRICAL RESULTS

Results of the Test for Structural Break

The estimation results of Perron's endogenous unit root tests are summarized in Exhibit 1. An analysis of the empirical results reveals that the post-break intercept dummy variable, DU , and the post-break slope dummy variable, DT , are negative and insignificant at any conventional level. The time trend is positive and is significant at a 1 percent level. The empirical results of these tests suggest that the Vietnamese equity premium followed a stationary trend process with a break date of August 2007, which may be attributable to Vietnam officially becoming the 150th member of the World Trade Organization, and its attendant consequences.

Results of Cointegration Test with Asymmetric Adjustment

To examine whether or not the Vietnamese equity premium, EP, and the risk-free rate, RF, are co-integrated when allowing for possible asymmetric adjustments, the equity premium is regressed on a constant and an intercept dummy with values of zero prior to August 2007 and values of one for August 2007 and thereafter. The estimation results are reported in Exhibit 2.

The residuals from them above estimation are used to estimate the TAR model specified by equations (3) and (4). The estimation results for the TAR model are reported in Exhibit 3. Over all, the empirical results reveal that the null hypothesis of symmetry, $r_1 = r_2$, cannot be rejected at any significant level, based on the partial $F = 0.1010$, indicating statistically that adjustments around the threshold value of Vietnamese equity premium are symmetric.

Additionally, the calculated statistic 21.5811 indicates that the null hypothesis of

no co-integration, $\mathbf{r}_1 = \mathbf{r}_2 = \mathbf{0}$, should also be rejected at the 1 percent significance level, confirming that the equity premium is stationary. With regard to the stationarity of the premium, Ewing et al., (2007) pointed out that this simple finding of stationarity is consistent with the two underlying series comprising the premium (the monthly return on the Vietnamese market portfolio and the risk-free rate) being co-integrated in the conventional, linear combination sense.

More specifically, the estimation results reveal that both \mathbf{r}_1 and \mathbf{r}_2 are statistically significant at any conventional level. In fact, the point estimates suggest that the premium tends to decay at the rate of $|\mathbf{r}_1| = 0.7664$ for $\hat{\mathbf{e}}_{t|\square}$ above the threshold $t = -2.8391$ and at the rate of $|\mathbf{r}_2| = 0.8391$ for $\hat{\mathbf{e}}_{t|\square}$ below the threshold.

$\hat{\mathbf{e}}_{t|\square} > -2.8391$ is indicative that an economic shock or a countercyclical monetary policy action causing a decline in the risk-free rate, such as an expansionary monetary policy, has widened equity premium. This widening of the premium initiates a downward adjustment in the equity premium. Similarly, $\hat{\mathbf{e}}_{t|\square} < -2.8391$ is indicative that an economic shock or a countercyclical monetary policy action causing an increase in the risk-free rate, such as a contractionary monetary policy, has narrowed equity premium. This narrowing of the premium initiates an upward adjustment in the premium. Numerically, the estimation results reveal $|\mathbf{r}_2| > |\mathbf{r}_1|$ which seems to indicate a slower convergence for positive disequilibrium than for negative disequilibrium, i.e., an asymmetric adjustment process. However, the aforementioned failure to reject the null hypothesis that $\mathbf{r}_1 = \mathbf{r}_2$ at any significant level, based on the partial $F = 0.1010$, indicates a symmetric adjustments of the equity premium about its threshold to negative and positive shocks in the long run.

Results of the Asymmetric Error-Correction Models

Exhibit 4 summarizes the estimation results for the TAR-VEC model specified by equations (4), (5) and (6) using the Vietnamese return on the market equity portfolio and the risk-free rate. In the summary of the estimation results, the partial F_{ij} represents the calculated partial F-statistic with the p-value in square brackets testing the null hypothesis that all coefficients α_{ij} are equal to zero. “*” indicates the 1 percent significant level of the t-statistic. $Q_{LB(12)}$ is the Ljung-Box statistic and its significance is in square brackets, testing for the first twelve of the residual autocorrelations to be jointly equal to zero. $\ln L$ is the log likelihood. The overall F-statistic with the p-value in square brackets tests the overall

fitness of the model. The retained estimated coefficients \mathbf{a}_i , \mathbf{g}_i , $\tilde{\mathbf{a}}_i$, and $\tilde{\mathbf{g}}_i$ are based on the 5 percent level of significance of the calculated t-statistics.

An analysis of the overall empirical results indicates that the estimated equations (5) and (6) are absent of serial correlation and have good predicting power as evident by the Ljung-Box statistics and the overall F-statistics, respectively.

With regard to the short-run dynamic Granger causality between equity premium and the risk-free rate, the partial F-statistics in equation (5) reveal a bi-directional Granger-causality between the risk-free rate to the equity premium; i.e., the equity premium responds

to both its own lagged changes and the lagged changes of risk-free rate as well. Similarly, the empirical results for equation (6), the partial F-statistics suggest that the risk-free rate responds not only to its own lagged changes but also to lagged changes of the equity premium in the short run. Over all, the TAR-VEC estimation results seem to suggest that the Vietnamese equity market responds to monetary, fiscal policy and economic shocks which change the T-bill rates. This finding indicates that the Vietnamese economic policies matter in the short run.

As to the long-run adjustments, the statistical significances of the error correction terms and $|r_2| > |r_1|$ in equation (5) indicates that the equity premium asymmetrically responds to negative and positive shocks when short-run dynamic components are introduced to the model. Since r_1 and r_2 are significant at any conventional level, the estimation results of the TAR-VEC reveal that equity premium reverses to the long-run equilibrium faster when the equity premium is below the threshold than when it is above the threshold. With regard to the risk-free rate, the estimation results of equation (6) show $|\tilde{r}_2| > |\tilde{r}_1|$. However, both $|\tilde{r}_1|$ and $|\tilde{r}_2|$ are not statistically significant at any conventional level, indicating that the risk-free rate does not respond to either the widening or the narrowing of the equity premium in the long run.

GARCH(s, r)-M Model

As aforementioned, the retentions of the estimated coefficients of equations (7) and (8) are determined by the calculated z-statistics at the 5 percent level of significance. The

r and s indices are the highest subscripts l and m of retained b_l and h_m which are $l=3$ and $m=3$, respectively. The values of l and m , in turn, suggest GARCH (3, 3) be the best model for this investigation. The estimation results of the GARCH (3, 3)-M model are reported in Exhibit 5.

An analysis of the estimation results of the GARCH(r, s)-M model suggests the presence of GARCH (3, 3) effect on the Vietnamese monthly equity returns and their variance. Financially, the empirical results indicate that the fluctuations in the equity premia on the market portfolio and their variances from the one month affect the premia and the variances in the next month.

CONCLUDING REMARKS

While the theoretical debate on the anomalous equity premium is unsettled, equity has been an important instrument channeling the financial resources from the capital surplus economic units (the savers) to the financial deficit units (the borrowers) in the direct financing mode of the market economy. This study uses the well known TAR and the GARCH (3, 3)-M models to analyze the behavior of the Vietnamese equity premium. This study utilizes monthly stock price indices in Vietnam and the T-bill rate as the proxy measure for the risk-free rate. The equity premium is defined as the difference between the monthly change in the Vietnamese equity index and the T-bill rate. The data set used in this investigation, covers the period from its inaugural month of July 28, 2000 to October 2013 where the

data on risk-free rate is available. The descriptive statistics reveal that the equity premium over the sample period is 12.93 indicating that the Vietnamese equity premium is among the highest premia in its neighboring Asian countries and much higher than the corresponding figures in the advanced economies.

Perron's endogenous unit root test revealed that the equity premium is a stationary process with a structural break date of August 2007, which may be attributable to Vietnam officially becoming the 150th member of the World Trade Organization, and its attendant consequences. The threshold autoregressive TAR model reveals that the Vietnamese equity market symmetrically responds to monetary and fiscal policy, which is indicative that the policy makers use these instruments to effectively manage the equity market in the long run.

With regard to the short-run dynamic Granger causality between the equity premium and the risk-free rate, the estimation of equation (5) revealed a bi-directional Granger-causality between the risk-free rate to the equity premium. Similarly, the empirical results for equation (6), suggest that the risk-free rate responds not only to its own lagged changes but also to lagged changes of the equity premium in the short run. Taken together, the empirical results of the TAR-VEC suggest that the Vietnamese equity market responds to monetary, fiscal policy and economic shocks which change the T-bill rates. This finding indicates that the Vietnamese economic policies matter in the short run.

As to the long-run and when short-run dynamic components are introduced to the model, the TAR-VEC reveal that the equity premium reverses to the long-run equilibrium faster when the equity premium is below the threshold than when it is above the threshold. However, the risk-free rate does not respond to either the widening or the narrowing of the equity premium.

Finally, the empirical investigations suggest GARCH (3, 3)-M be the best model for this investigation. The significance of the GARCH (3, 3)-M indicates the presence of GARCH (3, 3) effect on the Vietnamese monthly equity returns and their variance.

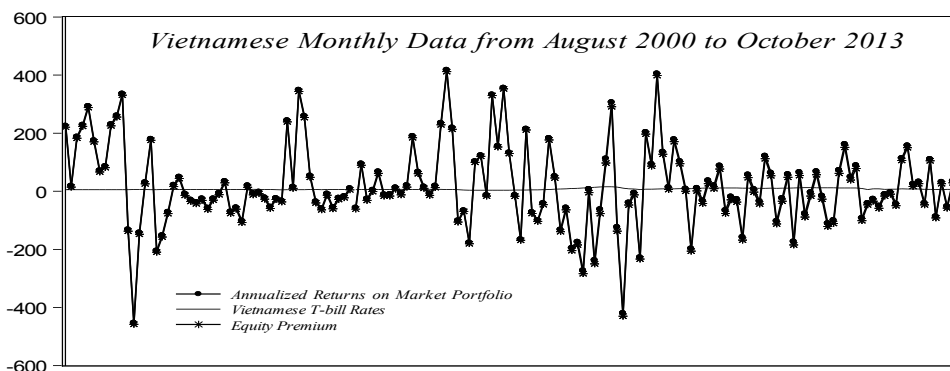
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Figure 1



Sources: International Financial Statistics, IMF; and <http://www.cophieu68.vn/historyprice.php?id=^vnindex>.

Table 1- MARKET CAPITALIZATION OF LISTED COMPANIES AS PERCENTAGE OF GDP

<i>Advanced Markets</i>	2009	2010	2011	2012	<i>Asian Emerging Markets</i>	2009	2010	2011	2012
Canada	125.7	137.0	107.2	110.7	People's Republic of China	100.3	80.1	46.3	44.2
France	75.3	75.6	56.4	69.8	India	86.4	94.4	54.2	68.6
Germany	39.3	43.5	32.9	43.7	Malaysia	126.6	166.3	137.2	156.9
Japan	67.1	74.6	60.0	61.8	Pakistan	20.5	21.6	15.5	18.9
Rep. of Korea	100.3	107.3	89.2	104.5	Philippines	47.6	78.8	73.8	105.6
New Zealand	57.6	51.4	45.1	47.7	Sri Lanka	19.3	40.2	32.8	28.7
Singapore	160.1	170.4	125.8	150.8	Thailand	52.4	87.1	77.7	104.7
United States	108.5	118.9	104.3	119.0	Vietnam	21.8	19.2	14.8	23.2
<i>Average</i>	<i>91.7</i>	<i>97.3</i>	<i>77.6</i>	<i>77.1</i>	<i>Average</i>	<i>59.4</i>	<i>73.5</i>	<i>56.6</i>	<i>68.9</i>

Source: World Bank, World Development Indicators. Market capitalization is the share price times the number of shares outstanding. Listed domestic companies are domestically incorporated companies listed on the country's stock exchange at the end of the year (2012). Listed companies do not include investment companies, mutual funds, or collective investment vehicles.

Table 2- MARKET RISK PREMIUM USED IN 2014 IN SELECTED ADVANCED AND ASIAN EMERGING MAKETS

<i>Advanced Markets</i>	Mean	St. Div.	Min.	Max	<i>Asian Emerging Markets</i>	Mean	St. Div.	Min.	Max
Canada	5.3	1.2	3.0	10.0	People's Republic of China	8.1	3.5	3.9	20.0
France	5.8	1.5	2.0	11.4	India	8.0	2.4	2.3	16.0
Germany	5.4	1.7	1.0	12.4	Malaysia	6.4	6.8	3.4	8.8
Japan	5.3	2.4	2.0	16.7	Pakistan	11.1	5.3	2.5	19.0
Rep. of Korea	6.3	1.8	2.0	11.1	Philippines	8.1	1.4	6.4	11.0
New Zealand	5.6	1.4	2.0	18.0	Sri Lanka	11.3	2.0	9.0	14.0
Singapore	5.7	1.3	3.9	9.6	Thailand	8.0	1.8	6.0	15.1
United States	5.4	1.4	1.5	13.0	Vietnam	10.3	3.3	3.9	16.0
<i>Average</i>	5.6	1.6	2.2	12.8	<i>Average</i>	8.9	3.3	4.7	15.0

Source: Market Risk Premium used in 88 countries in 2014: a survey with 8,228 answers, by Pablo Fernandez, Pablo Linares, and Isabel Fernandez Acin. IESE Business School. Downloadable in: <http://ssrn.com/abstract=2450452>.

Exhibit 1- PERRON'S ENDOGENOUS UNIT ROOT TEST, VIETNAMESE DATA, 2000:8 2103:10

$$EP_t = -12.9429 - 11.9115DU + 0.1836t - 0.0735DT + 30.3960D(T_0) - 0.1321EP_{t-1} + v_t$$

(-3.4262*) (-1.4641) (2.7617*) (-0.8613) (2.5960*) (-0.6469)

No. of augmented lags: $k = 11$ Break Date: August 2007 $t(\alpha = 1) = -5.5420$

Notes: Critical values for t -statistics in parentheses: Critical values based $n = 100$ sample for the break-date (Perron, 1997). "*" indicates significance at 1 percent level.

Exhibit 2- ESTIMATION RESULTS FOR EQUATION (2), VIETNAMESE DATA, 2000:08 TO 2013:10

$$EP_t = -2.1184 - 7.7324Dummy_t + \varepsilon_t$$

(-1.6491) (-4.0917*)

$$\ln L = -613.7181 \quad R^2 = 0.0911 \quad DW \text{ statistic}^{(a)} = 1.2687 \quad F_{(1,156)} = 16.7419^*$$

Notes: "*" indicates significance at 1 percent level.

(a) As articulated by Enders and Siklos (2001, p. 166), in this type of model specification, ε_t may be contemporaneously correlated.

Exhibit 3- UNIT ROOT AND TEST OF ASYMMETRY, VIETNAMESE DATA, 2000:08 TO 2013:10

ρ_1	ρ_2	τ	$H_0 : \rho_1 = \rho_2 = 0$	$H_0 : \rho_1 = \rho_2$	aic	sic
-0.7664*	-0.8391*	-2.8391	$\Phi_\mu = 21.5811^*$	$F = 0.1010$	4.8313	4.9290
$Q_{Q(2)} = 7.5650[0.8181]$		$\ln L = -593.1921$		$F_{(4,151)} = 18.7667^*$	$DW = 1.9897$	

Notes: The null hypothesis of a unit root, $H_0 : \rho_1 = \rho_2 = 0$, uses the critical values from Enders and Siklos, 2001, p. 170, Table 1 for four lagged changes and $n = 500$. "*" and "***" indicate 1 percent and 5 percent levels of significance, respectively. The null hypothesis of symmetry, $H_0 : \rho_1 = \rho_2$, uses the standard F distribution. τ is the threshold value determined via the Chan (1993) method. $Q_{Q(2)}$ denotes the Ljung-Box Q -statistic with 12 lags.

⊕ Exhibit 4- ASYMMETRIC ERROR CORRECTION MODEL, VIETNAMESE DATA, 2000:08 TO 2013:10

Eq. (5)	Independent Variables			
	Overall $F_{(6,131)} = 20.0834[0.0000]$; $\ln L = -501.6739$; $Q_{(12)} = 9.5740[0.6532]$; $\bar{R}^2 = 0.4553$			
ΔEP_t	$\alpha_9 = 0$	$\gamma_4 = \gamma_6 = \gamma_8 = 0$	ρ_1	ρ_2
	Partial $F_{11} = 3.7206[0.0559]$	Partial $F_{12} = 10.7110[0.0000]$	-0.7235*	-0.9901*
Eq. (6)	Independent Variables			
	Overall $F_{(6,144)} = 5.5820[0.0000]$; $\ln L = -146.0594$; $Q_{(12)} = 4.9850[0.9585]$; $\bar{R}^2 = 0.1549$			
ΔRF_t	$\tilde{\alpha}_1 = 0$	$\tilde{\gamma}_1 = \tilde{\gamma}_3 = \tilde{\gamma}_6 = 0$	$\tilde{\rho}_1$	$\tilde{\rho}_2$
	Partial $F_{21} = 5.3492[0.0222]$	Partial $F_{22} = 9.9012[0.0000]$	0.0074	-0.0131

Notes: Partial F-statistics for lagged values of changes in the lending rate and Central Bank discount rate, respectively, are reported under the specified null hypotheses. $Q_{(12)}$ is the Ljung-Box Q-statistic to test for serial correlation up to 12 lags. "*" indicates 1 percent level of significance of the t-statistics. □

Exhibit 5- GARCH (3,3)-M MODEL RESULTS, VIETNAMESE DATA, 2000:08 TO 2013:10

$$EP_t = 1.9972 + 0.0002\omega_t^2 + \varepsilon_t \quad (9)$$

(0.1088) (0.2062)

$$\begin{aligned} \omega_t^2 = & 13,643.2700 + 0.2521\varepsilon_{t-1}^2 + 0.3002\varepsilon_{t-2}^2 + 0.2938\varepsilon_{t-3}^2 \\ & (2.2884**) \quad (2.1265**) \quad (2.7909*) \quad (2.9481*) \\ & - 0.4808\omega_{t-1}^2 - 0.3762\omega_{t-2}^2 + 0.3214\omega_{t-3}^2 \quad (10) \\ & (-1.9297***) \quad (-1.6774***) \quad (2.4263**) \end{aligned}$$

⊕ Notes: Akaike info criterion=12.5990; Schwarz criterion =12.7735; Hannan-Quinn Criterion=12.6699; Log likelihood = -986.3225; Durbin-Watson Statistic = 1.2897. " $**$ ", " $***$ ", and " $****$ " indicate the 1 percent level, 5 percent, and 10 percent level of significances, respectively.
