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Procedia Economics and Finance 7 (2013) 18 – 27

Procedia Economics and Finance

www.elsevier.com/locate/procedia

International Conference on Economics and Business Research 2013 (ICEBR 2013)

Monetary Policy and Stock Market Volatility in the ASEAN5: Asymmetries over Bull and Bear Markets

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Abstract

This paper examines the asymmetric response of stock market volatility to monetary policy over bull and bear market periods in ASEAN5 countries (Malaysia, Indonesia, Singapore, the Philippines and Thailand) using the well-tested pooled mean group (PMG) technique. Bull and bear markets are identified by employing Markov-switching models and the rule-based non-parametric approach. Estimating the models using monthly data from 1991:1 to 2011:12, the results show that a contractionary monetary policy (interest rate increases) has a stronger long-run effect on stock market volatility in bear markets than bulls consistent with the prediction of finance constraints models.

Selection and peer-review under responsibility of ICEBR 2013

***Keywords*: Monetary policy; stock market volatility; asymmetry; bull; bear; Pooled Mean Group; Markov switching**

1. Introduction

Stock market volatility has long been of great interest for both policy makers and market participants. Policy makers are interested in the spillover effects of volatility on real activity while the latter are concerned about the effects of stock market volatility on asset pricing. However, it is generally believed that stock market volatility has a negative effect on the recovery of the real economy. One of the determinants of stock market volatility is central bank policies. Monetary policy decisions influence various short-term interest rates which in turn, affect the discounted present value of expected future cash flows and may thus increase or decrease stock prices. Higher (lower) stock prices and consequently higher (lower) stock returns will lead to

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Selection and peer-review under responsibility of ICEBR 2013
doi:10.1016/S2212-5671(13)00213-X

lower stock market volatility as suggested by the "leverage effect". This effect refers to the asymmetric relation between stock market returns and volatility and has been widely documented in the literature (Gospodinov and Jamali, 2012).

The impact of monetary policy on stock market volatility in the context of developed economies has been widely investigated in the previous literature. See for instance Lobo, 2002; Bomfim, 2003; Chen and Clements, 2007; Farka, 2009; Konrad, 2009 and Vahamaa and Aijo, 2011, among others. The literature has come to a general consensus that stock market volatility is susceptible to monetary policy decisions of the central banks. Several studies have revealed that the response of stock returns and volatilities to monetary policy is asymmetric. In the context of stock returns, Lobo, 2000, Bernanke and Kuttner, 2005 and Chulia et al., 2010 examined asymmetries related to the direction of monetary policy shocks. Guo, 2004, Andersen et al., 2007 and Basistha and Kurov, 2008 studied asymmetries over business cycle. Chen, 2007, Kurov, 2010 and Jansen and Tsai, 2010 looked at asymmetries over bull and bear markets. Bomfim, 2003 investigated the asymmetric response of stock market volatility to positive and negative monetary policy shocks. However, the empirical evidences for the presence of asymmetric response of stock market volatility to monetary policy over bull and bear market periods are limited. To the best of our knowledge the only study is by Konrad, 2009 who discovered that the impact of monetary policy on German stock return volatility is much bigger in bearish periods than bulls.

The studies reviewed so far, examine the impact of monetary policy on stock market returns and volatilities in developed economies especially in the case of US. This research contributes to the existing literature by examining the asymmetric response of stock market volatility to monetary policy over bull and bear markets in the ASEAN5 countries (Malaysia, Indonesia, Thailand, the Philippines and Singapore) as developing and small open economies. The finance constraints models predict that monetary policy is more effective in bear market periods than bulls. According to these models when there is asymmetric information in the financial markets, borrowers may behave as if they are constrained financially. The fact that financial constraints are more likely to bind in bear markets affirms that monetary policy has greater effects in bear markets than bulls (Chen, 2007). Studying this kind of asymmetry is crucially important for central bankers to see in which state of the market does monetary policy decisions have more effects on volatility of the market.

This study examines asymmetries in a panel setting by employing the well-tested pooled mean group (PMG) estimator proposed by Pesaran et al., 1999. Investigating the asymmetries over bull and bear markets requires us to identify these terms. Bull and bear periods are identified by employing two approaches: Markov-switching models and the rule-based non-parametric approach proposed by Pagan and Sossounov, 2003. The empirical results for the period 1991:1 to 2011:12 show that monetary policy is more effective in bear market periods than bulls as predicted by the finance constrain models. The rest of the paper is organized as follows. Section 2 describes the methodology and data description and sources. Empirical results are presented in section 3 and section 4 concludes.

2. Methodology

Investigating asymmetric response of stock market volatility to monetary policy over bull and bear market periods in ASEAN5 countries requires: (1) identifying stock market volatility which is measured with the conditional variance obtained from estimating general autoregressive conditional heteroskedasticity (GARCH) models introduced by Bollerslev, 1986. (2) Identifying bull and bear market periods and (3) estimating the models in a panel setting by employing the PMG estimator of Pesaran et al., 1999.

There are two main approaches for identification of bullish and bearish periods. The first approach is a model-based method and makes use of Markov regime-switching models developed by Hamilton, 1989. The second approach is based on a non-parametric methodology and uses a set of rules to detect bull and bear periods. Pagan and Sossounov, 2003 employed this procedure to identify stock market cycles. In this research, both parametric and non-parametric approaches (denoted by Model 1 and Model 2) are employed to identify the bear and bull stock markets.

2.1. Model 1: A two-state Markov-switching model

Consider the following process of a simple two-state mean/variance Markov-switching model:

$$R_t = \mu_{S_t} + \varepsilon_t, \qquad \varepsilon_t = i.i.d\ N(0, \sigma^2_{S_t}) \tag{1}$$

Where R_t is the stock returns. $S_t = 1,2,\ldots,k$ is the number of states and ϵ_t follows a Normal distribution with zero mean and variance given by $\sigma^2_{S_t}$. The value of $\mu_1(\mu_2)$ is the expected return on a bull (bear) market state, which implies a positive (negative) return for R_t. The different volatilities $\sigma_1^2(\sigma_2^2)$ in each state represent the different uncertainty regarding the predictive power of the model in each state of the world. If we consider $S_t = 1$ indicate the bull market state and $S_t = 2$ the bear market state, the transition probability matrix for a two-state Markov process can be represented as:

$$p = \begin{bmatrix} p^{11} & p^{12} \\ p^{21} & p^{22} \end{bmatrix} \tag{2}$$

Where, p^{ij} controls the probability of a switch from state j to state i.

$$p^{11} = p(S_t = 1 | S_{t-1} = 1) = \frac{\exp\{\theta_1\}}{1 + \exp\{\theta_1\}} \tag{3}$$

$$p^{22} = p(S_t = 2 | S_{t-1} = 2) = \frac{\exp\{\gamma_1\}}{1 + \exp\{\gamma_1\}} \tag{4}$$

The parameters θ_1 *and* γ_1 determine the transition probabilities through the logistic distribution functions in Equations (3) and (4). When the two regimes (the bear and bull markets) have been statistically identified, we can compute the so-called filtered probabilities of each state which are the probabilities of being in each state given the information set available at time t (y^t):

$$Q_{j,t} = p(S_t = j | y^t), \quad j = 1,2 \tag{5}$$

The filtered probabilities provide information about the regime in which the series is most likely to have been at every point in the sample. These probabilities are very useful for dating switches in the series.

2.2. Model 2: the non-parametric dating algorithm approach

In the business cycle literature, Bry and Boschan, 1971 devised a rule-based algorithm for monthly observations to detect local peaks and troughs in the business cycle. Pagan and Sossounov, 2003 adapted this algorithm for use in stock markets by making a number of modifications due to the more volatile nature of financial markets. First, the data are not smoothed at all because of the large movements that are possible in equity markets. Smoothing the data and the process of eliminating the outliers may suppress some of the most important movements in the series. Their second deviation from Bry-Boschan program relates to the size of window used in locating the initial turning points. In the Bry-Boschan program this is six months. Due to the lack of smoothing Pagan and Sossounov, 2003 made this slightly longer and eventually settled on eight months as the proper length for stock prices. Therefore, there is a peak at time t if:

$$[p_{t-8},\ldots,p_{t-1} < p_t > p_{t+1},\ldots,p_{t+8}] \tag{6}$$

and there is a trough at time t if:

$$[p_{t-8},\ldots,p_{t-1} > p_t < p_{t+1},\ldots,p_{t+8}] \tag{7}$$

Where p_t denotes the natural log of the stock price. Pagan and Sossounov, 2003 set the minimal length for stock market phase at four months, whereas a complete cycle is required to last at least 16 months (rather than 15 months in business cycle dating). Finally, due to the sharp movements in stock prices, some quantitative constraints (censoring rules) are appended to the rules above in order to avoid identification of spurious cycles. After detection of the final turning points by applying the censoring operations, the peak-to-trough and the trough-to-peak periods are identified as the bear and the bull market periods, respectively.

2.3. The PMG estimator

To investigate the impact of monetary policy on stock market volatility we employ the robust PMG estimator. In the time series framework, Pesaran et al. 1999 proposed the autoregressive distributed lag models (ARDL) to estimate the long-run co-integrating relationship among variables of interest. In a panel data framework, supposed that the long-run relationship between y_t and X_t is given by:

$$y_{it} = \mu_i + \theta X_{it} + \varepsilon_{it} \tag{8}$$

Where μ_i is the fixed effects, $i = 1,2,\ldots,N, and\, t = 1,2,\ldots,T$. Pesaran et al. (1999) suggest nesting Equation (8) in a general ARDL specification to allow for rich dynamics. For instance, the ARDL $(p,q,q,\ldots,q)$ model can be written as:

$$y_{it} = \mu_i + \sum_{j=1}^{p} \lambda_{ij} y_{i,t-j} + \sum_{j=0}^{q} \delta'_{ij} X_{i,t-j} + \varepsilon_{it} \tag{9}$$

Where $X_{it}(k \times 1)$ is the vector of explanatory variables (regressors) for group i including the variable of interest and other control variables; λ_{ij} represent the coefficients of the lagged dependent variables and are scalars; and δ_{ij} are $(k \times 1)$ coefficient vectors. The ARDL order must be chosen to ensure that the residual of the error correction model is exogenous and serially uncorrelated. By re-parameterization, Equation (9) can be written as an error correction form:

$$\Delta y_{it} = \mu_i + \Phi_i y_{i,t-i} + \beta'_i X_{it} + \sum_{j=1}^{p-1} \lambda^*_{ij} \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \delta^{*'}_{ij} \Delta X_{i,t-j} + \varepsilon_{it} \tag{10}$$

Where $\Phi_i = -(1-\sum_{j=1}^{p}\lambda_{ij}),\ \beta_i = \sum_{j=0}^{q}\delta_{ij},\ \lambda_{ij}^{*} = -\sum_{m=j+1}^{p}\lambda_{im}$ *and* $\delta_{ij}^{*} = -\sum_{m=j+1}^{q}\delta_{im}$

By further grouping the variables in levels, Equation (10) can be rewritten as:

$$\Delta y_{it} = \mu_i + \Phi_i(y_{i,t-1} - \theta_i' X_{it}) + \sum_{j=1}^{p-1}\lambda_{ij}^{*}\Delta y_{i,t-j} + \sum_{j=0}^{q-1}\delta_{ij}^{*'}\Delta X_{i,t-j} + \varepsilon_{it} \qquad (11)$$

Where $\theta_i = -(\beta_i/\Phi_i)$ ensures the long-run or equilibrium relationship among y_{it} and X_{it}. The short-run coefficient relating y_{it} and X_{it} is defined by λ_{ij}^{*} and δ_{ij}^{*}. Moreover, Φ_i measures the speed of adjustment of y_{it} toward its long-run equilibrium following a change in X_{it}. If $\Phi_i < 0$ ensures that such a long-run relationship exists. Accordingly, discovery of a significantly negative Φ_i can be treated as evidence supporting cointegration between y_{it} and X_{it}.

For estimating the above model Pesaran and Smith, 1995 proposed the mean group (MG) estimator which is a fully heterogeneous coefficient model and imposes no cross-country coefficients constraints and can be estimated on a country-by-country basis. Pesaran and Smith (1995) showed that the MG estimator will produce consistent estimates of the average of the parameters. Alternatively, Pesaran et al., 1999 proposed the PMG estimator, which restricts the long-run parameters to be identical over countries, but allows the short-run coefficients to differ across groups in the cross section. If the long-run homogeneity restrictions are valid, the maximum likelihood based PMG estimator is more efficient than MG estimator. The null hypothesis of the long-run homogeneity can be verified with the Hausman test of the form $\theta_i = \theta, i = 1,2,\ldots,N.$

2.4. Data description and sources

In this study we utilize the monthly data of ASEAN5 countries including Malaysia, Indonesia, Thailand, the Philippines and Singapore. The estimation sample is a balanced panel spanning from 1991:1 to 2011:12. Our dataset is taken from DataStream. For the key monetary policy variable to be in line with many empirical studies in the ASEAN-5 economies (see for instance, Ibrahim, 2005; Raghavan et al., 2012 and Siregar and Goo, 2010, among others) the short-term interest rate is used as suitable monetary policy indicator. Monetary authorities in the ASEAN-5 countries have shifted their policy emphasis from money aggregate towards short-term interest rate after the liberalization of interest rates since 1980s. Accordingly, we employ the 3-month Treasury bill rate for the Philippines, Malaysia and Singapore and the money market rates (federal funds) for Indonesia and Thailand due to the availability of the data during the sample period.

To construct stock market volatility and bullish and bearish periods we utilize aggregate stock market indices of the ASEAN5 markets: the Jakarta Stock Exchange composite index (JSE) for Indonesia, the Kuala Lumpur Composite Index (KLCI) for Malaysia, the Stock Exchange Composite Index (PSE) for the Philippines, the Straits Times Stock Price Index (STI) for Singapore and the Bangkok Stock Exchange Price Index (SET) for Thailand. To strengthen our empirical results, we add some relevant control variables in the models including the manufacturing production index (lip), the spot exchange rate $(lexr)$ which is defined as the domestic currency price of one US dollar and inflation rate $(\inf)$. Inflation rate is calculated as the percentage change in the Consumer Price Index.

3. Empirical results

3.1. Identification of the stock market cycles

Table 1 presents the estimation results for a simple mean/variance Markov-switching model. The Markov-switching model identifies the high-return stable and low-return volatile states in stock returns which are conventionally labeled as bull and bear markets, respectively. Obviously, the Markov-switching model has well identified the bull and bear markets in stock returns. Moreover, the transition probabilities show that both bull and bear market states are highly persistent and a bear is supposed to continue for a shorter period than a bull.

Table 1: Markov-switching model of stock returns

	Malaysia	Indonesia	Singapore	Thailand	Philippines
μ_1	0.011 (0.003)	0.0189 (0.0047)	0.0088 (0.003)	0.012 (0.005)	0.006 (0.007)
μ_2	-0.009 (0.013)	-0.026 (0.019)	-0.0032 (0.0096)	-0.019 (0.0149)	0.019 (0.077)
σ_1^2	0.0017 (0.0002)	0.0038 (0.0004)	0.0014 (0.0002)	0.0038 (0.0004)	0.007 (0.0002)
σ_2^2	0.012 (0.0017)	0.018 (0.0032)	0.009 (0.0011)	0.017 (0.0025)	0.25 (0.0301)
p^{11}	0.98	0.98	0.96	0.98	0.88
p^{22}	0.95	0.93	0.93	0.95	0.46
State 1 persistency (months)	46.84	58.55	22.63	40.47	8.52
State 2 persistency (months)	20.50	13.96	15.37	18.59	1.84
LogLik	349.76	286.7388	350.9055	266.4885	125.0164

Notes: the entries in the brackets are the standard errors.

Fig. 1 plots the smoothed probabilities of state 1 (bull markets). When the probabilities are greater (less) than 0.5, the market is more likely to be in a bull (bear) market. As observed in Figures 1 the regime switching models are able to delineate the bear market periods associated with the 1997-98 Asian financial crises and 2007 global financial crisis.

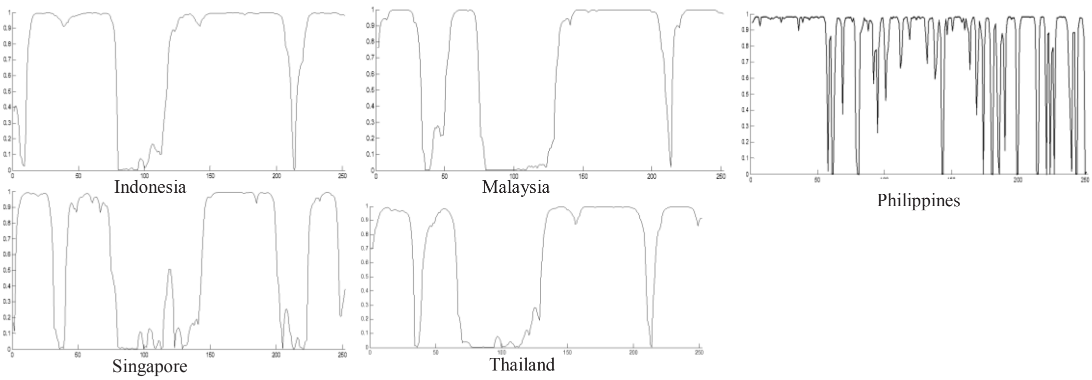

Fig. 1: Smoothed probabilities in state 1 (bull markets)

3.2. Asymmetric effects of monetary policy

To investigate the asymmetric impact of monetary policy on stock market volatility over bull and bear markets, we estimate the following regression:

$$vol_{it} = \alpha_i + \beta_{1i}(r_{it} * bull_{it}) + \beta_{2i} r_{it} * (1 - bull_{it}) + \varepsilon_{it} \tag{12}$$

Here, m_{it} is the policy variable as described before and $bull_{it}$ is a dummy variable for bull market periods constructed using the Markov-switching models and the non-parametric approach. The term $bull_{it}$ takes the value of one when stock market is in bullish periods and zero otherwise. The terms $r_{it} * bull_{it}$ and $r_{it} * (1 - bull_{it})$ are indicator variables for examining the effects of monetary policy in bull and bear periods, respectively. The indicator variables for monetary policy in bull and bear states are constructed following Basistha and Kurov, 2008, Kurov, 2010 and Jansen and Tsai, 2010. The possible asymmetric effects of monetary policy on stock market volatility can be tested by simply comparing the estimated coefficients of constructed monetary policy indicators in bull and bear markets.

Column (1) of Tables 2 and 3 displays the PMG estimates of the impact of monetary policy on stock market volatility in bull and bear market periods. Table 2 reports the results for the case that stock market cycles are identified using non-parametric approach. Table 3 is based on the identification of stock market cycles via Markov-switching models. In both cases, where stock market cycles are identified using non-parametric approach or Markov-switching models, the Hausman test fails to reject the long-run homogeneity restriction at conventional significance level, indicating that the PMG estimate is preferable to the MG estimate. The coefficient on the error correction term is significantly negative and smaller than one, implying that there is a long-run relationship between variables.

Table 2: The PMG estimates of Equation (12) and augmented models. Bull and bear markets are identified using non-parametric approach.

	Equation 12	**Augmented models**						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Long-run coefficients								
rbull	.0089	.0118	.0098	.0092	.0126	.0121	.0097	.0122
	(.0046)***	(.0041)***	(.0044)***	(.0046)**	(.0039)***	(.0041)***	(.0044)**	(.0038)***
rbear	.0223	.0322	.0214	.0225	.0315	.0322	.0213	.0309
	(.0028)***	(.0037)***	(.0027)***	(.0029)***	(.0036)***	(.0038)***	(.0028)***	(.0037)***
inf	–	-.1567	–	–	-.1567	-.1568	–	-.1575
		(.0363)***			(.0351)***	(.0362)***		(.0346)***
lexr	–	–	.0416	–	.0713	–	.0475	.0872
			(.0457)		(.0411)*		(.0514)	(.0460)**
lip	–	–		.0373	–	.0377	-.0364	-.1104
				(.1517)		(.1409)	(.1656)	(.1534)
Error-correction term	-.1137	-.1193	-.1155	-.1134	-.1219	-.1191	-.1165	-.1244
	(.0362)***	(.0394)***	(.0377)***	(.0365)***	(.0412)***	(.0398)***	(.0379)***	(.0422)***
Hausman test	5.67	–	–	–	–	–	–	–
	(0.06)							
Short-run coefficients								
Δ*rbull*	-.0327	-.0336	-.0324	-.0281	-.0332	-.0291	-.0277	-.0288
	(.0264)	(.0260)	(.0262)	(.0205)	(.0257)	(.0201)	(.0203)	(.0199)
Δ*rbear*	-.0506	-.0513	-.0503	-.0469	-.0509	-.0477	-.0466	-.0474
	(.0336)	(.0330)	(.0340)	(.0294)	(.0335)	(.0289)*	(.0210)	(.0295)
Δinf	–	-.0061	–	–	-.0056	-.0066	–	-.0058
		(.0110)			(.0113)	(.0115)		(.0117)
Δ*lexr*	–	–	-.1417	–	-.1684	–	-.1293	-.1606
			(.4107)		(.4039)		(.4108)	(.4028)
Δ*lip*	–	–	–	-.2152	–	-.2344	-.2166	-.2334
				(.1696)		(.1715)	(.1678)	(.1689)
Constant	.0761	.0826	.0551	.0580	.0428	.0633	.0717	.0952
	(.0157)***	(.0193)***	(.0096)***	(.0123)***	(.0163)***	(.0146)***	(.0079)***	(.0099)***

Notes: Dependent variable: stock market volatility and policy variable: short-term interest rate. The numbers in parentheses are standard errors except for Hausman test which is p-value. The asterisks ***, **, and * indicate the rejection of null hypothesis at 1%, 5%, and 10% of significance levels, respectively. Δ denotes difference generator. The coefficients of $rbull$ and $rbear$ measure the response of stock returns to monetary policy in bull and bear markets respectively.

The PMG estimates of monetary policy in bull and bear market periods displayed in column (1) of Tables 2 indicate that the impact of monetary policy in a bull market is smaller in magnitude than the impact in a bear market. The empirical results from Markov-switching identification of cycles depicted in column (1) of Table 3 also indicate that monetary policy is more effective in bear market periods than bulls, thus making the estimates of asymmetry more robust. However, in this case the impact of monetary policy on stock market volatility is negative and statistically insignificant in 1% significance level in bull market periods. These results are in line with findings of Chen, 2007, Kurov, 2010, Jansen and Tsai, 2010 and Konrad, 2009 who provided evidences that monetary policy is more effective in bear market periods than bulls.

Table 3: The PMG estimates of Equation 12and augmented models. Bull and bear markets are identified using Markov-switching models.

	Equation 12	**Augmented models**						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Long-run coefficients								
$rbull$	-.0504 (.0223)**	-.0444 (.0212)**	-.0106 (.0061)*	-.0109 (.0059)**	-.0502 (.0247)**	-.0054 (.0054)	-.0106 (.0061)*	-.0044 (.0055)
$rbear$	.1377 (.0221)***	.1250 (.0196)***	.0159 (.0019)***	.0160 (.0020)***	.1406 (.0214)***	.0206 (.0022)***	.0160 (.0020)***	.0205 (.0022)***
inf	–	-.1646 (.1269)	–	–	-.1612 (.1287)	-.0829 (.0218)***	–	-.0836 (.0218)***
$lexr$	–	–	-.0035 (.0362)	–	.2280 (.3226)	–	.0056 (.0419)	.0213 (.0378)
lip	–	–		.0013 (.1225)	–	.0120 (.1131)	-.0155 (.1419)	-.0254 (.1316)
Error-correction term	-.1046 (.0386)***	-.1071 (.0385)***	-.1363 (.0506)***	-.1369 (.0509)***	-.1067 (.0388)***	-.1440 (.0569)***	-.1360 (.0506)***	-.1448 (.0571)***
Hausman test	1.74 (0.42)	–	–	–	–	–	–	–
Short-run coefficients								
$\Delta rbull$	-.0320 (.0230)	-.0325 (.0234)	-.0322 (.0241)	-.0293 (.0200)	-.0315 (.0234)	-.0296 (.0201)	-.0288 (.0201)	-.0291 (.0202)
$\Delta rbear$	-.0464 (.0339)	-.0459 (.0329)	-.0373 (.0323)	-.0339 (.0276)	-.0456 (.0343)	-.0344 (.0271)	-.0328 (.0287)	-.0333 (.0282)
Δinf	–	-.0069 (.0062)	–	–	-.0065 (.0065)	-.0118 (.0103)	–	-.0115 (.0103)
$\Delta lexr$	–	–	-.2562 (.4377)	–	-.5055 (.4468)	–	-.2557 (.4411)	-.2620 (.4453)
Δlip	–	–	–	-.2575 (.1280)**	–	-.2788 (.1288)	-.2652 (.1276)**	-.2841 (.1281)**
Constant	.0668 (.0185)***	.0747 (.0214)***	.1110 (.0342)***	.1080 (.0326)***	.1208 (.0395)***	.1062 (.0344)***	.1043 (.0320)***	.1154 (.0305)***

Notes: See notes of Table 2.

3.3. Robustness test

To check the sensitivity of our empirical results to model specification, we consider some macroeconomic variables including the natural logarithm of manufacturing production index (lip), natural logarithm of spot exchange rate $(lexr)$ and inflation rate (inf) as relevant control variables augmented in equations (12). These variables play an important role in asset pricing theories and therefore are important in explaining stock market volatility. Macroeconomic variables which affect future cash flows can therefore be expected to influence stock returns and volatilities as described earlier in section 1. The inclusion of these explanatory variables may lessen the potential problem of omitted variable bias.

Tables 2 and 3 report the PMG estimation results of all possible combinations of control variables added to the equations (12). These models are named as augmented models. The estimation outcomes depicted in Columns (2)-(8) are qualitatively similar to that in column (1). The signs and statistical significance of both long and short-run coefficients of monetary policy remain unchanged in augmented models. Consequently, our main findings do not seem to suffer severely from common omitted variable bias.

4. Conclusions

This paper examines the asymmetric response of stock market volatility to monetary policy over bull and bear markets in a panel of ASEAN5 countries including: Malaysia, Singapore, Indonesia, the Philippines and Thailand using monthly data spanned from 1991:1 to 2011:12. Bull and bear market periods are identified by employing the Markov-switching models and the non-parametric approach. To measure the stance of monetary policy we utilize short-term interest rate as suitable monetary policy indicator because interest rate is the key policy variable in the ASEAN5 countries after the liberalization of interest rates since the 1980s. The PMG estimation results indicate that monetary policy has a stronger impact on stock market volatility in bear market periods than bulls in the long-run consistent with the prediction of finance constraint models.

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