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The Asymmetric Impact of Fiscal Policy on an Emerging Stock Market

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This study investigated the asymmetric impact of fiscal policy on Malaysia's stock market. It discovered that fiscal policy has no impact on the stock market performance in the long run. However, budget expansion boosted the stock market return, while budget contraction worsened it in the short run. Therefore, fund managers can adjust their portfolios based on fiscal news in the short run to maximize their returns.

I. Introduction

The effect of fiscal policy on the stock market has been extensively discussed during the last three decades. Sucharita and Sethi (2011) demonstrated the nexus between fiscal policy and private investment (including the stock market). A looser budget balance (increasing government spending, decreasing tax rate, or both) leads to a higher government borrowing. A large outstanding government debt can reduce private investments (and stock prices) by raising the interest rate and vice versa for a tighter budget balance. Duy-Tung et al. (2018) supported this idea by showing that a fiscal consolidation attempt positively affects stock market performance in emerging Asian economies. In contrast, Qureshi et al. (2019) found that a looser budget balance positively influences the stock market in developed and developing economies. There is no consensus in the literature concerning the effect of fiscal policy on the stock market.

Fiscal news (e.g., budget expansion or budget contraction) could create significant fluctuations in an emerging stock market like Malaysia. The effect of fiscal policy on stock prices is ambiguous (Mumtaz & Theodoridis, 2020) from the perspective of economic theory. Blanchard (1981) pointed out that the impact of fiscal expansions on the stock market returns depends on investors' expectations of future real interest rates and profits. However, higher (lower) government demand and companies' sales under budget expansions (contractions) are confirmed. Budget expansions (contractions) are good (bad) news that positively affect stock market returns. According to Bird and Yeung (2012), investors have an asymmetric reaction to good news and bad news. The pessimistic bias of investors leads them to ignore good news in uncertain times. Therefore, the impact of budget expansion (good news) and budget contraction (bad news) on the stock market might have different magnitudes. A large and growing body of literature (Mumtaz & Theodoridis, 2020; Qureshi et al., 2019; Stoian & Iorgulescu, 2020) has investigated the symmetric impact of fiscal policy on financial markets but much less is known about its asymmetric impact on the stock market.

This study argues that the relationship between fiscal news (e.g., budget expansion or budget contraction) and stock market returns are asymmetric. Figure 1 provides a snapshot of the asymmetric reaction of the Kuala Lumpur Composite Index ($KLCI$) to fiscal policy news. The left panel indicates no clear relationship between $KLCI$ and budget balance. The budget balance is also divided into budget expansion and budget contraction in the central and the right panels. In the budget expansion, a positive relationship exists between the budget balance and $KLCI$ performance, while the budget contraction phase is characterized by a negative relationship between the two variables. Overall, this stylized fact suggests that the impact of fiscal news on the stock market is asymmetric. However, most previous studies only focused on testing the symmetric relationship between fiscal news and stock market returns.

This study provides new insights into how fiscal policy affects stock market performance by decomposing the budget into expansions (good news) and contractions (bad news). Understanding how fiscal news affects the stock market asymmetrically will help fund managers and fiscal authorities to design a proactive investment strategy and appropriate fiscal policy respectively. Notably, fund managers can adjust their portfolios according to different types of fiscal news to maximize returns. On the other hand, stabilizing the stock market is as important as stabilizing the economy; the fiscal authorities are able to design a proper

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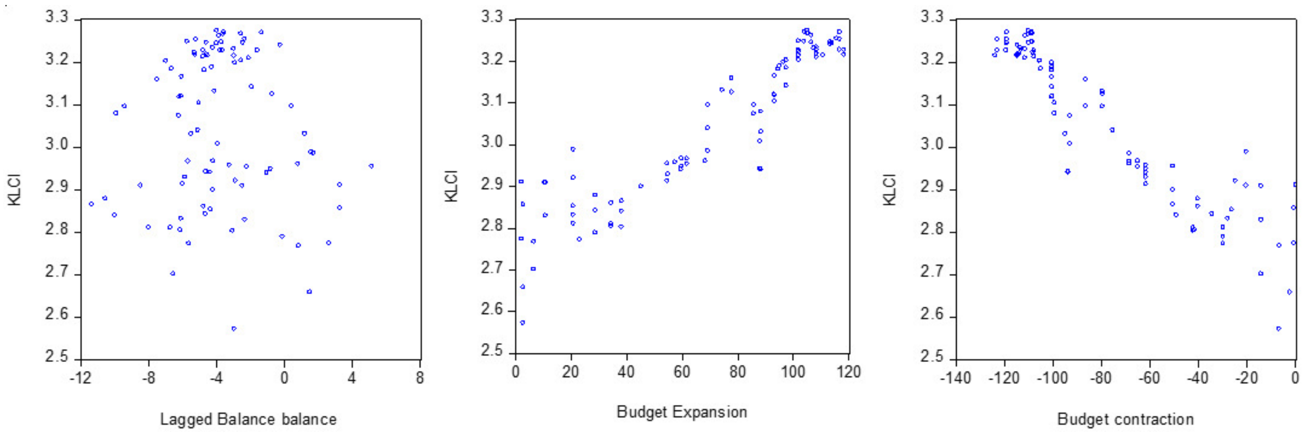

Figure 1. Price-budget correlation (Malaysia, 1997Q1-2018Q4)

This figure plots simple correlation between stock prices (*KLCI*) and lagged overall budget balance-to-GDP, lagged ascending budget balance-to-GDP, lagged descending budget balance-to-GDP in the left, central and right panel, respectively.

fiscal policy by understanding the various effects of budget expansion and budget contraction on the stock market.

II. Methodology

This study focused on the impact of asymmetric fiscal policy on the $KLCI$. Since the $KLCI$ is one of the largest and most active exchanges in Southeast Asia and is fully automated, it is well represented for the emerging stock markets. Furthermore, this study measured the fiscal policy information by the overall budget balance-to-GDP ratio (BB) and the movement of Malaysia's stock market prices by the logarithm of the $KLCI$. Following Al-hajj et al. (2018) and Stoian and Iorgulescu (2020), this study used monetary policy which is proxied using the 3-month interest rate on the money market (IR); inflation rate is measured by using the logarithm growth rate of the consumer price index (CPI); the impact of general economic conditions are proxied using the logarithm of the real gross domestic product ($RGDP$); the external conditions are proxied by the real effective exchange rate ($REER$); and the influence of input costs are measured by logarithm of oil prices (OIL). In addition, this study used government expenditure as an alternative fiscal variable for robustness test. Table 1 describes the data in detail where all data series are quarterly and cover the period between 1997: Q1 and 2018: Q4.

The main model of this study is presented below:

$$\begin{aligned} KLCI_t = \; & C + \propto_1 BB_t^+ + \propto_2 BB_t^- + \propto_3 IR_t^+ \\ & + \propto_4 IR_t^- + \propto_5 CPI_t^+ + \propto_6 CPI_t^- \\ & + \propto_7 RGDP_t^+ + \propto_8 RGDP_t^- \\ & + \propto_9 REER_t^+ + \propto_{10} REER_t^- \\ & + \propto_{11} OIL_t^+ + \propto_{12} OIL_t^- + \varepsilon_t . \end{aligned} \tag{1}$$

$$y_t = \propto^+ z_t^+ + \propto^- z_t^- + \varepsilon_t \tag{2}$$

where $\propto^+$ and $\propto^-$ represent the long run parameter and z_t is the vector regressor which is explained as:

$$z_t = z_0 + z_t^+ + z_t^- \tag{3}$$

where z_t^+ and z_t^- represent the positive and negative partial sums which are computed as follows, respectively:

$$z_t^+ = \sum_{i=1}^{t} \Delta z_i^+ = \sum_{i=1}^{t} \max(\Delta z_i, 0) \tag{4}$$

$$z_t^- = \sum_{i=1}^{t} \Delta z_i^- = \sum_{i=1}^{t} \min(\Delta z_i, 0) \tag{5}$$

Additionally, the asymmetric error correction model (AECM) takes the following form:

$$\begin{aligned} \Delta KLCI_t = \; & \rho KLCI_{t-1} + \theta^+ z_{t-1}^+ + \theta^- z_{t-1}^- \\ & + \sum_{i=1}^{j-1} \varphi \Delta KLCI_{t-i} \\ & + \sum_{i=0}^{p} \left(\pi_i^+ \Delta z_{t-i}^+ + \pi_i^- \Delta z_{t-i}^- \right) + \varepsilon_t \end{aligned} \tag{6}$$

where $\theta^+ = \frac{\propto^+}{\rho y_{t-1}}$ and $\theta^- = \frac{\propto^-}{\rho y_{t-1}}$.

The non-linear autoregressive distributed lag (NARDL) approach includes the following steps: first, this study conducted conventional unit root tests to ascertain that no variable is I (2). The result of the *F*-test would be spurious in the presence of I (2) variables. Nevertheless, the presence of one or more breaks in the time-series data affects the reliability of conventional unit root tests (Sun et al., 2017). Therefore, this study adopted the break-point unit root test to verify stationarity and determine the structural break's presence. Second, this study estimated Equation (6) using the Akaike Information Criterion (AIC) with a maximum lag of four to achieve the final specification.

Third, based on the estimated NARDL model, this study performed a test of co-integration among the variables using the bounds testing approach of Pesaran, Shin, and Smith (2001) and Shin and Greenwood-Nimmon (2014). The bound test in the NARDL framework had very similar procedures to the linear Autoregressive Distributed Lag. Case in point, the estimation of Eq. (6) the null hypothesis is $\rho = \theta^+ = \theta^- = 0$. Finally, in NARDL, the Wald test was employed to find the long-run coefficients by $\theta^+ = \theta^-$ and the short-run coefficients are $\sum_{i=0}^{p} \pi^+ = \sum_{i=0}^{p} \pi^-$.

Table 1. A summary of data

Variable name	Variable description	Source
Stock market prices (*KLCI*)	The logarithm of KLCI index	Bloomberg Terminal
Budget balance (*BB*)	The overall budget balance-to-GDP ratio (%). Seasonally adjusted by Census X-13.	The central bank of Malaysia
Government Expenditure (*GE*)	The total of government operating and development expenditure to GDP ratio. (%)	The central bank of Malaysia
Interest rate (*IR*)	3-month money market interest rate (%)	The central bank of Malaysia
Inflation (*CPI*)	The logarithm of Consumer Price Index	International Monetary Fund
National production (*RGDP*)	The logarithm if real Gross Domestic Product. Seasonally adjusted by Census X-13.	International Monetary Fund
Oil price (*OIL*)	The logarithm of West Texas intermediate oil price	Federal Reserve Bank St. Loius
Exchange rate (*REER*)	The logarithm of real effective exchange rate.	International Monetary Fund

This table provides detail information of data used in this study.

III. Result

The result of the unit root test[1] proved all variables are I (0) or I (1), thus confirming that none of the series is I (2). Table 2 reports the necessary tests and estimated results. The bound test result proves that F-statistic 3.15 and 3.5 is significant in 5%, suggesting a co-integration between these variables. Furthermore, the estimated model passed the standard diagnostic tests (normality, stability, serial correlation, and heteroscedasticity), indicating that the estimated model was free of traditional regression problems. Contrary to Al-hajj et al. (2018), who focused on long-run results, this study ran non-linear tests, both long run and short run, discovering the following impressive results. First, OIL and $REER$ has an asymmetric impact in both the short run and long run. In the long run, only $RGDP$ and CPI had a nonlinear relationship with $KLCI$. Meanwhile, fiscal policy has an asymmetric effect on Malaysia's market return only in the short run, while the impact of fiscal policy on $KLCI$ is symmetric.

Table 3 shown the estimated result by NARDL. In the long run, only $RGDP$ and $REER$ had a significant impact on $KLCI$. Moreover, a booming leading to a bull market and recession would create a bear market. Besides, the appreciation of Ringgit Malaysia has worsened the performance of $KLCI$ while the depreciation of local currency increased Malaysia's stock market return. It could be observed that fiscal policy has no impact on Malaysia's stock market return. In the short run, fiscal expansion has positively affected $KLCI$, and fiscal contraction has reduced Malaysia's market return. This finding supports the asymmetric impact of fiscal policy on $KLCI$, as presented in Figure 1. Additionally, monetary expansion has harmed $KLCI$ with a one-quarter lag.

Notably, ascending oil prices has no impact on $KLCI$, while descending oil prices raised Malaysia's stock market return. The Malaysian government implemented a petrol subsidy to control oil price; therefore, the cost of ascending oil price did not transmit to the stock market while the benefit of descending oil price reflected in stock price hike. In contrast to the long run, the $RGDP$ did not affect $KLCI$ and $REER$ had a reverse impact on Malaysia's stock market performance. In addition, the robustness test that uses *GE* as an alternative fiscal variable displays a similar result – budget balance as a fiscal variable.

IV. Conclusion

The results showed that the emerging stock market (i.e., Malaysia's stock market) is influenced by macroeconomic news. The lessons drawn from the findings are: first, the real gross domestic product and real effective exchange rate are vital information for long-term investment strategy in Malaysia's stock market. In addition, Malaysia's government could create a bull market through a strong economy and the depreciation of Ringgit Malaysia. Second, investors do not need to consider economic growth and inflation in their short-term investment decisions. Despite that, they cannot ignore fiscal policy, monetary policy, oil price, and the exchange rate when making short-term investments in Malaysia's stock market. Furthermore, in Malaysia, fiscal authorities do not need to worry about whether the fiscal policy has a lasting effect on the stock market. Fiscal authorities should focus on cyclical policies that stabilize the economy. On the other hand, fund managers who are sensitive to fiscal news can adjust their portfolios to maximize their returns in the short run.

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1 The table will be provided upon request.

Table 2. Bound, asymmetric, and diagnostic tests

	BB (2,1,2,2,0,0,0,0,1,2,2,2,1)		GE (1,0,2,2,0,0,2,0,0,0,1,1,2)	
	F-statistic	Upper Bound	F-statistic	Upper Bound
Bound test	3.15	3.04	3.5	3.04
Non-linear test	F-statistic	P-value	F-statistic	P-value
Long run				
$BB^+ = BB^-$	0.6271	0.5378	3.7153**	0.0300
$IR^+ = IR^-$	1.0837	0.3452	1.4797	0.2358
$RGDP^+ = RGDP^-$	6.6168***	0.0026	4.7128**	0.0125
$CPI^+ = CPI^-$	3.1672**	0.0496	0.7504	4.7650
$WTI^+ = WTI^-$	2.5092*	0.0903	2.7680*	0.0707
$REER^+ = REER^-$	9.6132***	0.0003	7.7372***	0.0010
Short run				
$\sum_{i=0}^{p} BB^+ = \sum_{i=0}^{p} BB^-$	9.8090***	0.0002	-	-
$\sum_{i=0}^{p} IR3^+ = \sum_{i=0}^{p} IR3^-$	-	-	-	-
$\sum_{i=0}^{p} RGDP^+ = \sum_{i=0}^{p} RGDP^-$	-	-	-	-
$\sum_{i=0}^{p} CPI^+ = \sum_{i=0}^{p} CPI^-$	-	-	-	-
$\sum_{i=0}^{p} OIL^+ = \sum_{i=0}^{p} OIL^-$	2.0449	0.1388	-	-
$\sum_{i=0}^{p} REER^+ = \sum_{i=0}^{p} REER^-$	1.2605	0.2126	1.2583	0.2914
Diagnostic test				
Jarque-Bera	0.2793	0.8697	0.057	0.9717
LM (1)	0.0223	0.8820	1.7374	0.1925
LM (2)	0.7513	0.4765	1.3498	0.2672
ARCH (1)	0.0001	0.9908	0.6132	0.4359
ARCH (2)	0.1802	0.8354	0.5014	0.6076
CUSUM	Stable		Stable	
CUSUMSQ	Stable		Stable	

This table reports bound, asymmetric, and diagnostic test results. Lag length is selected using AIC and is reported in brackets. The model confirmed co-integration if F-statistic > upper bound in Bound test. *, **, *** indicates statistical significance at 10%, 5%, and 1% levels, respectively.

valuable. Furthermore, we also appreciate the two anonymous reviewers, who provided constructive comments to improve this research.

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Table 3. NARDL estimated results

Variable	BB Coefficient	BB t-statistic	GE Coefficient	GE t-statistic
Long Run				
$Fiscal\ variable^{+}$	-0.0108	-0.9342	0.0022	0.4977
$Fiscal\ variable^{-}$	-0.0070	-0.6843	-0.0059	-1.0925
IR^{+}	0.0407	0.4709	0.1307	1.6560
IR^{-}	-0.0407	-0.9884	0.0378	1.0676
$RGDP^{+}$	5.3243*	1.9914	1.2598	0.8059
$RGDP^{-}$	-3.3776*	-1.8115	-5.8369**	-2.2300
CPI^{+}	1.7767	0.9726	1.4701	0.9816
CPI^{-}	7.7914	1.4644	1.2743	0.4272
WTI^{+}	-0.3084	-0.5863	-0.6444	-1.5866
WTI^{-}	-1.0322	-1.4913	-0.6764	-1.4223
$REER^{+}$	-13.1374**	-2.3907	-9.3904***	-2.6665
$REER^{-}$	5.6655**	2.1351	6.2241***	2.7031
Short Run				
Constant	0.0212	1.6375	3.2712***	8.7493
$\Delta KLCI_{-1}$	-0.2116**	-2.6260	-	-
$\Delta Fiscal\ variable^{+}$	0.0065***	3.3113	-	-
$\Delta Fiscal\ variable^{-}$	-0.0092***	-4.6991	-0.0001	-0.0476
$\Delta Fiscal\ variable^{-}_{-1}$	-0.0039**	-2.2918	0.0033***	2.6827
ΔIR^{+}	-0.0196	-1.0472	-0.0085	-0.3804
ΔIR^{+}_{-1}	-0.0462**	-2.5295	-0.0788***	-4.1002
ΔIR^{-}	-	-	-1.1373**	-2.4959
ΔIR^{-}_{-1}	-	-	1.2932**	2.6219
ΔCPI^{-}	-0.8282	-0.7072	-	-
ΔWTI^{+}	-0.0019	-0.0167	-	-
ΔWTI^{+}_{-1}	-0.2014*	-1.7917	-	-
ΔWTI^{-}	0.2151**	2.0448	0.1681**	2.6109
ΔWTI^{-}_{-1}	0.1577*	1.6764	-	-
$\Delta REER^{+}$	-1.2959	-1.2206	-1.1570	-1.1658
$\Delta REER^{+}_{-1}$	3.7593***	4.2034	-	-
$\Delta REER^{-}$	-1.0477**	-2.0891	0.3184	0.5648
$\Delta REER^{-}_{-1}$	-	-	1.7060***	3.0435
ECT_{-1}	-0.3135***	-6.4187	-0.3720***	-7.7127

This table reports estimated coefficients and its corresponding t-statistics obtained from estimating Equation (6). *, **, *** indicates statistical significance at 10%, 5%, and 1% levels, respectively.

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