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ASYMMETRIC ADJUSTMENT OF THE MALAYSIAN STOCK PRICE-INFLATION NEXUS: AN EMPIRICAL ANALYSIS

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Abstract

The stock market-inflation nexus has been the focus of academic and policy research for decades, with perplexing results. Yet the traditional linear time series methods applied in earlier studies ignored the influence of asymmetry adjustment and might have led to an inaccurate assessment. Consequently, this study intends to reduce the gap by examining the asymmetric influence of the consumer price index on the stock index using Malaysian data from December 1993 through June 2022 and the threshold autoregressive and momentum threshold autoregressive models. By using the stock market index and bank sector index, the results of the threshold autoregressive model provide evidence that supports the asymmetric adjustment process of the long-run stock index and consumer price index. We discovered that rising CPI drives up the stock index, but the rates of adjustment back to equilibrium were insignificant. On the other hand, both changes in stock market and bank indices respond to negative deviations from the long-run equilibrium, with 9.24% and 8.42% of a unit negative change from the long-run changes in the consumer price index, respectively. The study's findings indicate that investing in equities does not shield investors from rising inflation. The results suggest that when inflation changes, it is critical for investors to take different policy responses into account.

Keywords: Asymmetric adjustment, stock prices, inflation, consumer price index

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1. Introduction

Inflation is a main macroeconomic factor and an essential source of risk that drives asset values (Fang et al., 2022). The average worldwide inflation rate is predicted to be 5.2 percent in 2023 compared to 7.5 percent in 2022, indicating that inflation has remained high and above many countries' central banks' target levels (UN DESA, 2023). The surge in inflation has spurred renewed questions on the stock returns–inflation nexus, which has been the subject of both academic and policy study for decades. It was traditionally hypothesised that inflation influences stock returns as it contains information about future real activity in determining stock returns (Fama, 1981). According to the Fisher hypothesis, the expected inflation has no effect on real stock returns. Therefore, it can be used as a hedge against expected inflation. Fama (1981) introduces the proxy hypothesis, which explains the negative stock return-inflation relation as a result of the negative relationship between inflation and real activity and the positive relation between real activity and stock return. Geske and Roll (1983) proposed a counter-cyclical monetary policy model to explain the stock return-inflation relationship. The stock return-inflation nexus has been extensively studied in the literature, but with puzzling findings.

The empirical investigation has identified two lines of research that have both positive and negative interactions between stock returns and inflation. The studies that support the Fisher hypothesis and provide evidence of a positive relationship between stock return and inflation were supported, among others, by Athari et al. (2023), Anari and Kolari (2001), Toyoshima and Hamori (2011), and Ryan (2006). Studies that tested the presence of a negative stock-return-inflation relationship were supported by Magweva and Sibanda (2020), Celebi and Hönig (2019), and Campbell and Vuolteenaho (2004). However, many of the past studies examined the relationship of stock return and inflation with standard methods (Kim & Ryoo, 2011), which narrated the symmetric relation between stock return and inflation. According to Madsen (2007), standard models can give biased results. In addition, the traditional linear time series methods applied in earlier studies ignored the influence of asymmetry adjustment and thus might have led to an inaccurate assessment. In light of the unstable market conditions and increasing inflation rate, it is crucial to revise the existing theory (Hoong et al., 2023). Consequently, this study intends to reduce the gap by examining the asymmetric adjustment of the consumer price index on the stock index using Malaysian data from December 1993 through June 2022.

2. Literature Review

Inflation is an economic phenomenon where prices increase over a specific time period. Inflation arises when the prices of goods and services rise or more money is required to buy the same things. Thus, most researchers use the consumer price index (CPI) to measure the inflation rate. Demand pull, cost push, and inflation expectations are the three main forces driving inflation. Demand-pull inflation occurs when the aggregate quantity of goods demanded at a certain price level is rising more quickly than the aggregate quality of goods supplied at that price level. On the other hand, the supply side can also contribute to inflation through factors like higher production costs. The underlying assumption behind inflation expectations is that supply will rise to keep up with demand if everyone anticipates an increase in demand. A sudden rise in demand (or decline in supply) is what causes inflation.

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A healthy and expanding economy is typically characterised by moderate inflation, but high or unstable inflation can have detrimental impacts on consumers, businesses, and the whole economy. Fisher (1930) originally emphasised the significance of this link by arguing that equities represent claims against a company's real assets and act as a hedge against inflation. However, Fama (1981) responded to this claim by arguing that because stock wealth represents a company's future potential revenues, an anticipated economic collapse may prompt businesses to sell off their financial stocks, which would result in a negative correlation between inflation and stock prices. Fama's (1981) argument ultimately contends that stock markets do not serve as a buffer against inflation. Several empirical studies have looked at these ideas based on the claims of Fisher (1930) and Fama (1981), which are completely different from each other. So far, the literature has only come to an unresolved agreement about the exact relationship between inflation and stock prices. For example, empirical attempts by Choudhry (2001), Diaz and Jareno (2009), Alagidede and Panagiotidis (2010), and Alagidede and Panagiotidis (2012) have offered proof that there is a favourable rather than an unfavourable correlation between inflation and stock prices. Alzoubi (2022), Ammer (2002), Merikas and Merika (2006), and Michael (2014), on the other hand, discovered a negative correlation between inflation and stock prices.

The large amount of currently published literature uses the estimation method to arrive at a variety of contradictory empirical results. However, several recent empirical investigations have disputed the idea that there is a linear link between inflation and stock market gains in favour of an asymmetric relationship (Phiri, 2017). Asymmetric relationship or adjustment refers to a situation where the response of a variable to positive and negative shocks is unequal. Therefore, in the context of inflation and stock returns, asymmetries adjustment may refer to the finding that the link between inflation and stock returns may vary depending on whether inflation is growing or dropping. Investors may have a varied perspective on inflation depending on whether it is rising or declining. When inflation is on the rise, investors may become increasingly anxious about the depreciation of their investments, which could result in a decline in stock prices. On the other hand, investors might think that falling inflation is a good sign, which would make stock prices go up. Asymmetric adjustment may also result from variations in how the monetary policy reacts to inflation that is growing and declining. Central banks may tighten monetary policy in reaction to growing inflation, which could cause stock prices to decline. On the other hand, if inflation declines, the central bank might implement a looser monetary policy, which might raise stock values.

Inflation and inflation uncertainty have different impacts on stock returns in different countries (Liu & Serletis, 2022). Kim and Ryoo (2011) used US data from the last 100 years to examine the long-term relationship between stock prices and the prices of goods. The study employed a test for cointegration in a two-regime threshold vector error correction model (TVECM), where the null hypothesis of no linear cointegration is tested against the alternative of threshold cointegration. Their research shows that, starting in the early 1950s, there was a one-to-one long-run link between stock prices and goods prices, with evidence of asymmetric error corrections of market returns and anticipated inflation. As a result, their study concludes that US common stocks have served as a reliable long-term inflation hedge. Similar findings were reported by Hamidi et al. (2018) for the Malaysian equity market, which concludes that the inflation rate is an important factor in predicting Malaysian stock market movement.

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Besides that, Moores-Pitt et al. (2019) used CPI and JSE-ALSI data from 1980 to 2015 to investigate the long-run relationship between inflation and equity returns. The study adopts a threshold cointegration approach to accommodate for non-linear adjustment. The analysis reveals strong evidence that the connection has undergone asymmetric adjustment during the sample period and that threshold cointegration is a better suitable modelling technique for the relationship between equity returns and inflation. Even after accounting for asymmetric adjustment, the study finds that equity returns can shield investors from inflation, making the findings a more reliable barometer of the relationship between equity returns and inflation.

On the other hand, Phiri (2017) investigates the impact of inflation on stock market returns for the Johannesburg Stock Exchange (JSE) in an asymmetric way. A momentum threshold autoregressive (MTAR) model was used to look at monthly data from 2003:01 to 2014:12 for the study. Their results provide evidence of a unidirectional causal chain linking inflation and stock returns in South Africa, which is a negative, nonlinear cointegration relationship. Their empirical findings imply two notions. Firstly, equity companies listed on the JSE do not provide investors with a hedge against rising inflation. Second, monetary policy may establish a stable economic environment for the expansion of South Africa's equity markets by using inflation objectives. In a more recent study, Doho et al. (2023) examined the link between inflation and West African sectoral indices for the period November 2001 to January 2020. The study uses an asymmetric kernel method analysis for seven sectors, including retail, finance, industry, utilities, agriculture, transportation, and other sectors. The results reveal that the connection between inflation and sectoral stock market indices is rather non-linear and that all sectors are sensitive to inflation; however, the utilities and agriculture sectors are more sensitive to changes in inflation.

3. Data and Methodology

3.1. Data

The data used in this analysis are monthly data from December 1993 through June 2022 obtained from the DataStream. Data for stock prices is proxied by the stock market index, i.e., the FBM KLCI (KLCI) and the banking sector index (BANK). Data on inflation is proxied by the consumer price index (CPI).

3.2. Methodology

The basic linear model used to test the long-run cointegration relationship between stock price and inflation is expressed as follows:

$$S_t = \beta_0 + \beta_1 CPI_t + \varepsilon_t \quad (1)$$

where S denotes the stock market index (KLCI and BANK), CPI denotes consumer price index, β_0 and β_1 denote coefficients and ε_t denotes residual.

Our study first examines the stationarity of each variable by using the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) unit root tests. If the null hypothesis of unit root cannot be rejected at level, we will test the variable at first difference. If the variables are integrated at the first difference, the study will examine the residuals to test the cointegration between the variables as proposed by Engle and Granger (1987):

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$$\Delta\varepsilon_t = \rho\varepsilon_{t-1} + u_t \quad (2)$$

According to Enders and Siklos (2001), standard cointegration tests may have low power in the presence of asymmetric adjustment. Enders and Granger (1998) and Enders and Siklos (2001) introduced the asymmetric adjustment that allows the deviation from the long-run equilibrium to perform as a threshold autoregressive (TAR) process. The TAR model is expressed as follows:

$$\Delta\varepsilon_t = I_t\rho_1\varepsilon_{t-1} + (1 - I_t)\rho_2\varepsilon_{t-1} + \sum_{i=1}^{p}\alpha_i\,\Delta\varepsilon_{t-i} + u_t \quad (3)$$

where I_t is the Heaviside indicator function as below:

$$I_t = \{1\ if\ \varepsilon_{t-1} \geq \tau, 0\ if\ \varepsilon_{t-1} < \tau\ \} \quad (4)$$

where τ is the threshold value.

An alternative specification proposed by Enders and Granger (1998) and Caner and Hansen (2001) that defines the Heaviside indicator to depend on the previous period's change in ε_{t-1}, i.e., momentum threshold autoregressive (MTAR) model is employed to capture the adjustment in the series that exhibits more momentum in one direction than the other. The MTAR model is expressed as follows:

$$\Delta\varepsilon_t = M_t\rho_1\varepsilon_{t-1} + (1 - M_t)\rho_2\varepsilon_{t-1} + \sum_{i=1}^{p}\alpha_i\,\Delta\varepsilon_{t-i} + u_t \quad (5)$$

where M_t is the new indicator function as below:

$$M_t = \{1\ if\ \Delta\varepsilon_{t-1} \geq \tau, 0\ if\ \Delta\varepsilon_{t-1} < \tau\ \} \quad (6)$$

The above threshold model allows the adjustment to depend on the deviation from the long-term equilibrium ($\varepsilon_{t-1} \geq \tau$ vs. $\varepsilon_{t-1} < \tau$) for the TAR model and on the change in the deviation from the long-term equilibrium ($\Delta\varepsilon_{t-1} \geq \tau\ vs.\ \Delta\varepsilon_{t-1} < \tau$) for the MTAR model. In both models (TAR and MTAR), the null hypothesis of no cointegration $(\rho_1 = \rho_2 = 0)$ with the F-test while the null hypothesis of symmetric adjustment $(\rho_1 = \rho_2)$ can be tested by applying the standard F-test. The AIC model selection criterion will be used to select the TAR and MTAR models.

The asymmetric error correction model along with two asymmetric error correction terms (equation 7-8) can be estimated in the presence of cointegration relationship and asymmetric adjustment in the MTAR model. If there exists a cointegrating relationship in the form of equation (1), the study will estimate the asymmetric vector error correction model stated as follows:

$$\Delta KLCI_t = \theta_0 + \rho_1 I_t\varepsilon_{t-1} + \rho_2(1 - I_t)\ \varepsilon_{t-1} + \sum_{i=1}^{q}\theta_i\,\Delta KLCI_{t-i} + \sum_{i=1}^{q}\delta_i\,\Delta CPI_{t-i} + u_{1t} \quad (7)$$

$$\Delta CPI_t = \theta_0 + \rho_1 I_t\varepsilon_{t-1} + \rho_2(1 - I_t)\ \varepsilon_{t-1} + \sum_{i=1}^{q}\theta_i\,\Delta KLCI_{t-i} + \sum_{i=1}^{q}\delta_i\,\Delta CPI_{t-i} + u_{2t} \quad (8)$$

where $I_t\varepsilon_{t-1}$ and $(1 - I_t)\ \varepsilon_{t-1}$ are the error correction terms and u_{1t} and u_{2t} are white noise errors.

4. Results and Discussion

Table 1 reported the statistical properties of the time series employed in this study from December 1993 through June 2022, with a total of 343 observations. The stock market indexes, i.e., the KLCI and BANK, have a mean value of 1226 and 539, while the average CPI was 96 during the observation period. The maximum values recorded for the KLCI, BANK, and CPI were 1886, 950, and 127, while the minimum values were 294; 59; and 65, respectively. KLCI has a larger standard deviation compared to BANK.

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Table 1. Descriptive statistics

	KLCI	BANK	CPI
Mean	1226.36	539.30	96.09
Maximum	1886.84	950.00	127.40
Minimum	294.59	59.63	65.50
Std. Dev.	413.85	247.70	17.88
N	343	343	343

The results of the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests are presented in Table 2. The study failed to reject the null hypothesis of nonstationary at level for all variables. However, the null hypothesis was rejected at the 1% significant level after first differencing. This suggests that the observed variables are stationary and are integrated in order *I* (1). The study continues with the analysis of the cointegration test.

Table 2. Unit root tests

	Level							
	ADF				PP			
	Intercept		Trend & Intercept		Intercept		Trend & Intercept	
KLCI	-1.1634		-3.0904		-1.2388		-2.3299	
BANK	-1.2423		-2.5869		-1.1695		-2.6220	
CPI	-0.0040		-3.0245		-0.0786		-2.7520	
	First difference							
	ADF				PP			
	Intercept		Trend & Intercept		Intercept		Trend & Intercept	
KLCI	-17.8959	***	-17.8889	***	-17.9187	***	-17.9111	***
BANK	-15.8856	***	-15.8601	***	-15.9917	***	-15.9666	***
CPI	-12.4600	***	-12.4425	***	-12.7552	***	-12.7289	***

Notes: *** and * denote the significance at 1% and 10% levels. For ADF tests, critical values are from MacKinnon (1996) and the optimal lag length is determined by the AIC. For PP tests, the bandwidth is determined by the Newey-West using Bartlett kernel.

Table 3 presents the results of the ordinary least square (OLS) and Engle Granger (EG) cointegration tests using equations (1) and (2). Panel A of Table 3 shows that there is a positive long-run relationship between the CPI and both stock price indicators, i.e., the KLCI and the BANK. However, inflation has a larger impact on the KLCI compared to the BANK, as indicated by the higher CPI value. Panel B of Table 1 reports the Engle-Granger (EG) cointegration test. The study rejects the null hypothesis of no cointegration between the variables at a 1% significance level. The results provide evidence of a long-run cointegrating equilibrium relationship among both stock price indicators and the CPI. However, the Engle-Granger model assumes that the symmetric adjustment to the long-run equilibrium relationship.

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Table 3. OLS and Engle–Granger (EG) cointegration tests

Panel A: OLS						
	KLCI			BANK		
	Coeff	t-stat		Coeff	t-stat	
Constant	-573.3859	-7.9638	***	-646.5653	-19.4007	***
CPI	18.7295	25.4247	***	12.3410	36.1918	***
Panel B: Engle–Granger (EG) cointegration test						
ADF (tau-stat)	-3.3309	***		-3.5477	***	

Notes: *** denotes the significance at 1% level. Critical values of the EG cointegration tests are from MacKinnon (1996). The optimal lag length is determined by the AIC.

Table 4 reports the results from the TAR, TAR-consistent, MTAR and MTAR-consistent models. The TAR and TAR-consistent models are estimated using equations (3) and (4), while the MTAR and MTAR-consistent models are estimated using equations (5) and (6). Panel A reported the results for KLCI. The null hypothesis of no cointegration is rejected at the 5% and 10% levels for TAR-consistent and MTAR-consistent, respectively. The cointegration of stock prices and inflation allows the study to test the null hypothesis of symmetric adjustment. The null hypothesis of symmetric adjustment is rejected at the 5% level for TAR-consistent only. Panel B of Table 4 documents the results for the BANK. The results show that the null hypothesis of no cointegration is rejected in all models at a 5% significance level for TAR-consistent and 10% for the other three models. This enables the study to proceed to test the symmetric adjustment. With the lowest AIC at an optimal 9 lags, the null hypothesis of symmetric adjustment is rejected at the 5% level for TAR-consistent only. Moreover, the TAR-consistent model for stock price and inflation is the best model given the lowest value of AIC, indicating that both the KLCI and the BANK support that long-run adjustments follow the TAR-consistent adjustment process.

Table 4. TAR and MTAR cointegration results

Panel A: KLCI												
	TAR			TAR-consistent			MTAR			MTAR-consistent		
	Coeff	t-stat		Coeff	t-stat		Coeff	t-stat		Coeff	t-stat	
ρ1	-0.0402	-2.3911	**	-0.0231	-1.5784		-0.0458	-2.7725	***	-0.0475	-3.5479	***
ρ2	-0.0423	-2.4169	**	-0.0795	-3.7946	***	-0.0359	-2.0412	**	-0.0096	-0.3365	
τ	0			-225.6814			0			-48.0488		
ρ1=ρ2=0	5.5341			8.1678	**		5.6213			6.3055	*	
ρ1=ρ2	0.0076			5.1001	**		0.1763			1.4991		
Lags	9			9			9			9		
AIC	10.7003			10.6846			10.6998			10.6957		
Q(4)	0.1913			0.1284			0.2239			0.3101		
Q(8)	1.1471			1.2136			1.1543			1.1671		
Panel B: BANK												
	TAR			TAR-consistent			MTAR			MTAR-consistent		
	Coeff	t-stat		Coeff	t-stat		Coeff	t-stat		Coeff	t-stat	
ρ1	-0.0402	-2.1804	**	-0.0308	-1.8972	*	-0.0438	-2.4092	**	-0.0422	-2.7780	***
ρ2	-0.0608	-3.0958	***	-0.0919	-3.9695	***	-0.0568	-2.8837	***	-0.0827	-2.8484	***
τ	0			-126.0527			0			-19.7041		
ρ1=ρ2=0	6.6077	*		8.9735	**		6.4088	*		7.1459	*	
ρ1=ρ2	0.6433			5.1974	**		0.2604			1.6793		
Lags	9			9			9			9		
AIC	9.3865			9.3725			9.3877			9.3833		
Q(4)	0.0808			0.1216			0.1173			0.1080		
Q(8)	0.1719			0.2016			0.2443			0.1810		

Notes: ***, ** and * denote the significance at 1%, 5% and 10% levels. τ is the threshold value. $\rho_1=\rho_2=0$ is the null hypothesis of no cointegration; the critical values of the φ statistics with eight lags for a sample of 250 in a 2-variable TAR (MTAR) models are 9.01 (9.45), 6.88(7.30), and 5.90 (6.27) at the 1%, 5%, and 10% significance levels (see Wane, 2004). $\rho_1=\rho_2$ refers to the null hypothesis of symmetric adjustment. The optimal lag length is determined by the AIC. Q(4) and Q(8) are the Ljung-Box statistics for serial correlation, with 4 lags and 8 lags, respectively.

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From the findings of the TAR-consistent model in Table 4, our study estimates the asymmetric error correction models for KLCI/BANK and CPI pairings (Table 5). Based on equation (7), only the error correction term (ρ2) carries the expected negative sign and is statistically significant at the 1 percent level. This suggests that KLCI (BANK) responds to deviations below the threshold value only, with the speed of adjustment being 9.24% (8.42%), indicating the existence of asymmetry. Nevertheless, the Wald tests reported in Table 5 reveal a bidirectional causality between the KLCI and the CPI as well as the BANK and the CPI in the short-run.

Table 5. Asymmetric error correction models

Pane1 A (TAR-consistent, τ= -225.6814)							
Dependent variable: ΔKLCI				Dependent variable: ΔCPI			
Variable	Coeff	t-stat		Variable	Coeff	t-stat	
Constant	0.2870	0.0797		Constant	0.1779	5.4990	***
$I_t\varepsilon_{t-1}$	-0.0100	-0.6489		$I_t\varepsilon_{t-1}$	0.0002	1.1841	
$(1-I_t)\varepsilon_{t-1}$	-0.0924	-4.0266	***	$(1-I_t)\varepsilon_{t-1}$	0.0002	1.2450	
Wald#	26.8288	***		Wald#	8.7735	*	
Wald##	10.3202	***		Wald##	42.1894	***	
Adjusted R2	0.0887			Adjusted R2	0.1276		
AIC	10.6858			AIC	1.1378		
LM(2)	0.1237			LM(2)	0.2460		
Pane1 B (TAR-consistent, τ= -126.0527)							
Dependent variable: ΔBANK				Dependent variable: ΔCPI			
Variable	Coeff	t-stat		Variable	Coeff	t-stat	
Constant	2.5391	1.3124		Constant	0.1876	6.0552	***
$I_t\varepsilon_{t-1}$	-0.0213	-1.3049		$I_t\varepsilon_{t-1}$	0.0000	0.1584	
$(1-I_t)\varepsilon_{t-1}$	-0.0842	-3.5643	***	$(1-I_t)\varepsilon_{t-1}$	0.0008	2.1978	**
Wald#	25.5954	***		Wald#	13.3103	***	
Wald##	12.7254	**		Wald##	41.2568	***	
Adjusted R2	0.0941			Adjusted R2	0.1545		
AIC	9.3133			AIC	1.0899		
LM(2)	0.5273			LM(2)	1.8706		

Notes: *** and ** denote the significance at 1% and 5% levels. LM = Breusch–Godfrey Serial Correlation LM test with 2 lags. Optimal lag length is selected using the AIC. Wald# and Wald## are the Wald statistic for short-run causality.

5. Robustness Checks

Using a financial sector index (FIN), the study carried out robustness checking to confirm the findings. Table 6 displays the outcomes of the Engle-Granger (EG) and ordinary least squares (OLS) cointegration tests. The results demonstrate a consistent finding of a long-term cointegrating equilibrium relationship between the two variables.

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Table 6. OLS and Engle–Granger (EG) cointegration tests

Panel A: OLS			
FIN			
	Coeff	t-stat	
Constant	-424.9423	-12.2000	***
CPI	9.8614	27.6708	***
Panel B: Engle–Granger (EG) cointegration test			
ADF (tau-stat)	-3.6099	***	

Notes: *** denotes the significance at 1% level. Critical values of the EG cointegration tests are from MacKinnon (1996). The optimal lag length is determined by the AIC.

Table 7 reports the results for the TAR and MTAR cointegration for the FIN index. The findings in Table 4 were confirmed by the results, which show that the null hypothesis of no cointegration is rejected at the 5% and 10% levels for TAR-consistent and MTAR-consistent, respectively. In line with the findings of the KLCI-BANK and the BANK-CPI, the symmetric adjustment null hypothesis is rejected at the 10% level for only the TAR-consistent model. Again, the TAR-consistent is the best model with the lowest AIC value. The asymmetric error correction model for FIN (Table 8) is found to be consistent with the findings in Table 5. The error correction term indicates that FIN reacts to deviations below the threshold value only. In the short-run, there exists a bidirectional causality between the FIN and the CPI.

Table 7. TAR and MTAR cointegration results (FIN)

	TAR			TAR-consistent			MTAR			MTAR-consistent		
	Coeff	t-stat		Coeff	t-stat		Coeff	t-stat		Coeff	t-stat	
ρ1	-0.0412	-2.2978	**	-0.0334	-2.1333	**	-0.0407	-2.3362	**	-0.0354	-2.1402	**
ρ2	-0.0573	-3.0196	***	-0.0852	-3.6719	***	-0.0589	-3.0455	***	-0.0705	-3.4108	***
τ	0			-129.9340			0			-3.2161		
ρ1=ρ2=0	6.7089	*		8.4284	**		6.7758	*		7.4969	**	
ρ1=ρ2	0.4102			3.7158	*		0.5388			1.9251		
Lags	9			9			9			9		
AIC	9.4063			9.3961			9.4059			9.4016		
Q(4)	0.1741			0.2019			0.2345			0.2211		
Q(8)	0.2614			0.3276			0.4009			0.4514		

Notes: ***, ** and * denote the significance at 1%, 5% and 10% levels. τ is the threshold value. $\rho_1=\rho_2=0$ is the null hypothesis of no cointegration; the critical values of the φ statistics with eight lags for a sample of 250 in a 2-variable TAR (MTAR) models are 9.01 (9.45), 6.88(7.30), and 5.90 (6.27) at the 1%, 5%, and 10% significance levels (see Wane, 2004). $\rho_1=\rho_2$ refers to the null hypothesis of symmetric adjustment. The optimal lag length is determined by the AIC. Q(4) and Q(8) are the Ljung-Box statistics for serial correlation, with 4 lags and 8 lags, respectively.

Table 8. Asymmetric error correction models with TAR-consistent (FIN)

(TAR-consistent, = -129.9340)							
Dependent variable: ΔFIN				Dependent variable: ΔCPI			
Variable	Coeff	t-stat		Variable	Coeff	t-stat	
Constant	1.5277	0.7876		Constant	0.2443	7.7961	***
$I_t\varepsilon_{t-1}$	-0.0247	-1.5599		$I_t\varepsilon_{t-1}$	0.0000	0.0002	
$(1-I_t)\varepsilon_{t-1}$	-0.0820	-3.4315	***	$(1-I_t)\varepsilon_{t-1}$	0.0011	2.8548	***
Wald#	25.1683	***		Wald#	12.9683	***	
Wald##	6.5580	**		Wald##	6.1993	**	
Adjusted R2	0.0846			Adjusted R2	0.0582		
AIC	9.3577			AIC	1.2003		
LM(2)	2.5592			LM(2)	34.9186	***	

Notes: *** and ** denote the significance at 1% and 5% levels. LM = Breusch–Godfrey Serial Correlation LM test with 2 lags. Optimal lag length is selected using the AIC. Wald# and Wald## are the Wald statistic for short-run causality.

6. Conclusion

The study empirically investigates the asymmetric adjustment between stock market index and CPI changes from December 1993 to June 2022 by utilising the threshold autoregressive (TAR) and the momentum threshold autoregressive (MTAR) models. The study suggests that, first, there exists a long-run cointegration between the stock index and the CPI in Malaysia based on the Engle-Granger cointegration tests. Rises in CPI speed up stock prices, and the speeds of adjustment back to equilibrium were not statistically significant. On the other side, a decline in the CPI tends to have a negative and significant impact on the stock market, bringing it back to its normal equilibrium level. This finding implies that equities do not offer investors long-term hedges. Second, this study finds evidence of an asymmetric adjustment process in the stock index-CPI nexus using the threshold autoregressive and momentum threshold autoregressive models. Lastly, the results indicate the presence of bidirectional causality between the stock index and CPI in the short-run. The findings clearly demonstrated the stock market's asymmetric adjustments and responsiveness to fluctuations in the CPI. The study's findings have significant policy ramifications for investors; specifically, it is critical for investors to take into account various policy responses when the CPI changes. Investors may respond by executing a strategy to look for other hedge products when changes in the CPI level occur since a negative CPI shock would cause stock values to momentarily decrease.

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