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Quantifying Shifts in Exchange Rate Risks from Changes in U.S. Financial Conditions

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June 20, 2025

Abstract

With the deepening of global financial integration, policy decisions in major advanced economies – such as the United States (U.S.) – increasingly generate significant cross–border spillover effects. A shift in the monetary policy stance of these economies, or the emergence of financial instability within them, can rapidly transmit through global financial channels, increase systemic risk, and potentially precipitate financial crises with substantial adverse consequences for real economic activity worldwide. In this context, selected global risk factors, particularly those related to financial conditions, play a critical role in driving the comovements of key financial variables, including exchange rates, across countries. These global factors, often amplified through capital flows and investor sentiment, underscore the interdependence of financial markets and the challenges facing policy makers in maintaining macro–financial stability amid heightened external vulnerabilities.

As a small and open economy, Malaysia's financial markets remain highly vulnerable to shifts in global financial conditions. In the aftermath of the COVID–19 pandemic, a series of developments in the U.S. – including adjustments in monetary policy, evolving geopolitical dynamics, and domestic political events such as national elections – have intensified external pressures on emerging market currencies. This study investigates the response of the ringgit's return distribution to changes in U.S. financial conditions, with particular emphasis on downside risks associated with currency depreciations. Using quantile regression, our results reveal that a one–standard deviation tightening in the U.S. Financial Conditions Index significantly shifts the conditional distribution of the ringgit, a non–safe–haven currency, to the left – indicating an increased likelihood of depreciation during a risk–off period. In contrast, the same tightening causes a leftward shift (i.e., an appreciation) in the distribution of safe haven currencies. These findings underscore the asymmetric impact of the tightening of U.S. financial conditions on currency performance, and highlight the elevated external vulnerability faced by Emerging Market Economies like Malaysia during periods of global financial stress.

Keywords: Exchange Rates, Financial Conditions, Foreign Exchange, International Financial Markets, Quantile Regression, Tail Risk

JEL Codes: C21, E44, F31, G15

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1 Introduction

Since the designation of the U.S. dollar as the world's primary reserve currency, it has occupied a central role in shaping global financial conditions. The dollar continues to dominate international transactions, far exceeding the U.S.' share of global GDP when measured by its use in official foreign exchange (FX) reserves, international trade invoicing, and global financial flows. Consequently, significant shifts in U.S. policies – particularly in monetary policy or broader macroeconomic strategies – tend to generate substantial spillovers on global economic and financial activity. These spillovers are especially pronounced in Emerging Market Economies (EMEs), following the adoption of unconventional policies in the U.S. post–Global Financial Crisis, where surges of liquidity were being channelled to other parts of the world including the EMEs. As a result, EMEs exhibit heightened sensitivity to U.S. developments relative to Advanced Economies (AEs), particularly those with large shares of foreign participation in domestic bond markets (Oura et al. (2014) and Gelos et al. (2024)), considerable dollar–denominated external debt (Financial Stability Board (2022)) or less credible monetary policies (Shousha (2019)). The outsized influence of U.S. policy shifts underscores the systemic importance of the dollar and highlights the structural macro–financial vulnerabilities that EMEs face within the current international monetary system.

The aggressive monetary policy tightening undertaken by the U.S. Federal Open Market Committee (FOMC) since 2022, aimed at curbing elevated inflation, has led to a marked tightening in U.S. financial conditions. This, in turn, has exerted substantial depreciation pressures on emerging market currencies, including the ringgit. Against this backdrop, the central objective of this study is to examine how changes in U.S. financial conditions – proxied by the Bloomberg U.S. Financial Conditions Index – affect the distribution of exchange rate returns [1] for the ringgit bilateral pair against the U.S. dollar (known as MYR/USD), and a selected group of other emerging market currencies against the U.S. dollar. Specifically, this paper investigates the full conditional distribution of currency returns, with particular emphasis on the distributional tails to capture the likelihood of extreme currency appreciations or depreciations. By adopting this approach, we aim to provide a nuanced characterisation, and quantitative assessment of the risks these currencies face under varying scenarios of U.S. financial conditions. This analysis offers important insights for policy makers and market participants on the asymmetric vulnerabilities of emerging market currencies in a highly interconnected global financial system.

Our findings further demonstrate that simple quantile regression techniques can significantly enhance the fit of the model in the tail regions of the return distribution, even in cases where conventional statistics R^2 remain low. This methodological advantage enables us to rank currencies based on the sensitivity of their lower (depreciation) and upper (appreciation) tails to tightening in U.S. financial conditions. Through this approach, we are able to validate the prevailing narratives that characterise emerging market currencies as 'risk sensitive' or 'risky' assets. Moreover, this framework provides valuable quantitative insights by allowing us to estimate the probability of extreme exchange rate movements under observed or anticipated U.S. financial conditions. These findings contribute to a more granular understanding of exchange rate dynamics and offer practical implications for risk assessment, portfolio management, and policy formulation in EMEs.

In addition to examining the static impact of U.S. financial conditions on currency return

[1] The exchange rate returns distribution refers to a sample of monthly changes in the ringgit–dollar exchange rate over a specified time period.

distributions, we also explore how this relationship has changed over time. Specifically, we assess how the sensitivity of MYR/USD returns to a tightening in U.S. financial conditions has varied over time by employing a rolling window quantile regression approach. This dynamic analysis allows us to quantify temporal changes in the conditional probability of extreme exchange rate movements. This approach is particularly informative in evaluating whether the ringgit has become more or less responsive to shifts in U.S. financial conditions over time, especially after ringgit's unpegging from the U.S. dollar in July 2005. This time–varying perspective enhances our understanding of the structural evolution of exchange rate risk, and policy exposure in Malaysia's open economy setting.

The remainder of this paper is structured as follows. Section 2 reviews literature on this particular topic while Section 3 introduces the data set and methodology. Section 4 presents the results for quantile regressions of emerging market currency returns against the dollar on U.S. financial conditions. In Section 5, we run a series of robustness checks on the results and introduce caveats. Section 6 discusses the potential policy implications for central banks in small open economies, and Section 7 concludes.

2 Literature Review

The U.S. dollar has maintained a central role in the global financial system since its designation as the world's primary reserve currency, a status solidified in the aftermath of World War II through the Bretton Woods Agreement. This literature review examines the enduring dominance of the U.S. dollar, its widespread use in international reserves, and the significant spillover effects of U.S. monetary policy on EMEs. As of the end of 2024, the U.S. dollar accounted for approximately 58% of disclosed global official foreign exchange reserves, maintaining a dominant lead over other major reserve currencies. In comparison, the euro held around 20%, the Japanese yen 6%, the British pound sterling 5%, and the Chinese renminbi 2%.[2] Although this marks a decline from a peak of 71% in 2000, the dollar remains the preeminent reserve currency globally. The gradual reduction in the dollar's share reflects a broader trend among reserve managers toward portfolio diversification, with increasing allocations to non–traditional reserve currencies such as Australian dollar, Canadian dollar, Chinese renminbi, South Korean won, Singapore dollar and Nordic currencies (Arslanalp et al. (2022) and Arslanalp et al. (2024)). This strategic shift aims to mitigate concentration risks associated with holding a single dominant reserve currency, particularly in light of heightened financial market volatility and evolving geopolitical considerations. Nevertheless, the persistence of the dollar's dominance underscores its continued role as a cornerstone of the international monetary system and a key channel through which U.S. policy decisions influence global economic and financial conditions.

Therefore, major shifts in U.S. policy, particularly changes in the monetary policy stance, have been shown to exert significant spillover effects on EMEs. These spillovers manifest through both financial and trade channels, influencing exchange rates, capital flows, and broader economic activity (Ramos-Francia and García-Verdú (2014) and Federal Open Market Committee Secretariat (2018)). EMEs with high levels of foreign participation in local currency bond markets (Oura et al. (2014) and Gelos et al. (2024)), substantial dollar–denominated debt (Financial Stability Board (2022)) or less credible monetary policies (Shousha (2019)) are especially vulnerable to such external shocks. Monetary policy tightening in the U.S.

[2]Compositions based on The Currency Composition of Official Foreign Exchange Reserves (COFER) dataset published by the IMF as of Q4 2024.

often leads to tighter financial conditions in EMEs, characterised by increased borrowing costs and capital outflows. In this context, Escayola et al. (2023) highlight the role of the U.S. dollar in amplifying trade channel effects, noting that fluctuations in the dollar's value significantly impact the export competitiveness of EMEs. Similarly, Ahmed et al. (2024) find that EMEs are more susceptible to U.S. monetary policy spillovers than their developed market counterparts, owing to structural vulnerabilities such as elevated foreign–currency debt exposures, shallow domestic financial markets, and limited policy space. These findings underscore the systemic influence of U.S. monetary policy and the heightened external sensitivity faced by EMEs within the global financial system.

Since 2022, the FOMC has implemented a series of policy rate hikes in response to the sharp rise in inflation, which reached levels not observed in several decades. These policy actions, notably the increases in the federal funds rate, were intended to restore price stability by tightening monetary conditions and dampening aggregate demand. The resulting tightening of U.S. financial conditions has had broad implications for global markets, influencing asset valuations, interest rate differentials, and cross–border capital flows. Gelos et al. (2024) provided empirical evidence that such tightening had exerted depreciation pressure on several emerging market currencies, including the ringgit. Similarly, Harikrishnan et al. (2023) highlighted that elevated U.S. interest rates and a strengthening U.S. dollar typically trigger capital outflows from EMEs, exerting downward pressure on their exchange rates. This effect is particularly pronounced during periods of heightened global financial stress – such as the 2013 Taper Tantrum – when global liquidity tightened and investor aversion intensified. Their findings underscored the vulnerability of EMEs to shifts in U.S. monetary policy, especially under strained global financial conditions.

The ringgit has historically demonstrated marked sensitivity to shifts in U.S. financial conditions, with episodes of U.S. monetary tightening often coinciding with periods of ringgit depreciation. These movements were often driven by declining investor risk appetite and capital flight toward safe–haven assets, particularly the U.S. dollar. Understanding the full distribution of currency returns, especially the tails, is essential to evaluate the risks faced by emerging market currencies under varying global financial scenarios. In this context, Eguren-Martin and Sokol (2022) employed a quantile regression framework to examine the tail risks of exchange rate returns, offering valuable insights into the likelihood of extreme appreciations or depreciations of various currencies. Their analysis revealed that currencies of countries with higher domestic interest rates, limited international reserves, and elevated fiscal deficits were more vulnerable to sharp depreciations during episodes of tightening global financial conditions. Their results underscored the importance of both macroeconomic fundamentals and external financial conditions in shaping exchange rate vulnerabilities in EMEs, including Malaysia.

3 Data Set and Methodology

3.1 Data Set

This study utilises Bloomberg as the primary data source. Daily bilateral exchange levels against the U.S. dollar, recorded at 6:00 PM, were collected for a selected group of EMEs over the period from August 2005 to December 2024. These daily observations were subsequently averaged to construct monthly bilateral exchange rate series. The averaging method was chosen on the hypothesis to preserve a relatively high level of granularity – sufficient to capture rapidly evolving market dynamics – while simultaneously managing short–term noise. For analytical consistency, the bilateral exchange rates were inverted to express the value of

one unit of local currency in terms of the U.S. dollar. The return series used in the analysis were computed as the monthly differences of the natural logarithms of the transformed series.

In addition, the Bloomberg U.S. Financial Conditions Index (FCI) was obtained on a daily basis and subsequently aggregated into monthly averages to align with the frequency of the exchange rate data. To enhance interpretability, the index was negatively transformed so that higher (positive) values denote a tightening of U.S. financial conditions, while lower (negative) values reflect a loosening. This transformation facilitates a more intuitive understanding of the relationship between financial conditions and the dynamics of exchange rate.

Table 1 describes all data fields and the corresponding transformation.

Table 1: Data Source for the Estimation

Variable	**Description**
USD/AUD	Currency pair representing the exchange rate between the U.S. Dollar (USD) and the Australian Dollar (AUD)
USD/JPY	Currency pair representing the exchange rate between the U.S. Dollar (USD) and the Japanese Yen (JPY)
USD/MYR	Currency pair representing the exchange rate between the U.S. Dollar (USD) and the Malaysian Ringgit (MYR)
USD/NZD	Currency pair representing the exchange rate between the U.S. Dollar (USD) and the New Zealand Dollar (NZD)
USD/PHP	Currency pair representing the exchange rate between the U.S. Dollar (USD) and the Philippine Peso (PHP)
USD/SGD	Currency pair representing the exchange rate between the U.S. Dollar (USD) and the Singapore Dollar (SGD)
USD/THB	Currency pair representing the exchange rate between the U.S. Dollar (USD) and the Thailand Baht (THB)
Bloomberg U.S. Financial Conditions Index	Daily index that tracks the overall level of financial stress in the U.S. money, bond, and equity markets

3.2 Methodology

This paper adopts a methodological framework similar to that proposed by Eguren-Martin and Sokol (2022), and focuses on Malaysia. Specifically, the analysis employs quantile regression to examine the relationship between MYR/USD exchange rate returns, and changes in the U.S. FCI across different points (quantiles) of the return distribution. Unlike conventional ordinary least squares (OLS) regression – which estimates the conditional mean of the dependent variable and may obscure distributional heterogeneity or be overly sensitive to outliers – quantile regression provides a more comprehensive analytical framework by estimating conditional quantiles across the entire distribution. This approach enables the identification of asymmetric effects and tail risks, which are particularly relevant to understanding the dynamics of exchange rate under varying financial conditions. By capturing how relationships differ at the extremes – such as during episodes of sharp currency depreciation or appreciation – quantile regression offers valuable insights that would likely be missed by mean–based estimation methods. A pseudo–R^2 was used as a measure of goodness–of–fit.

I. Estimating Quantile Regression and Goodness–of–Fit

A quantile regression was used to estimate the following specification:

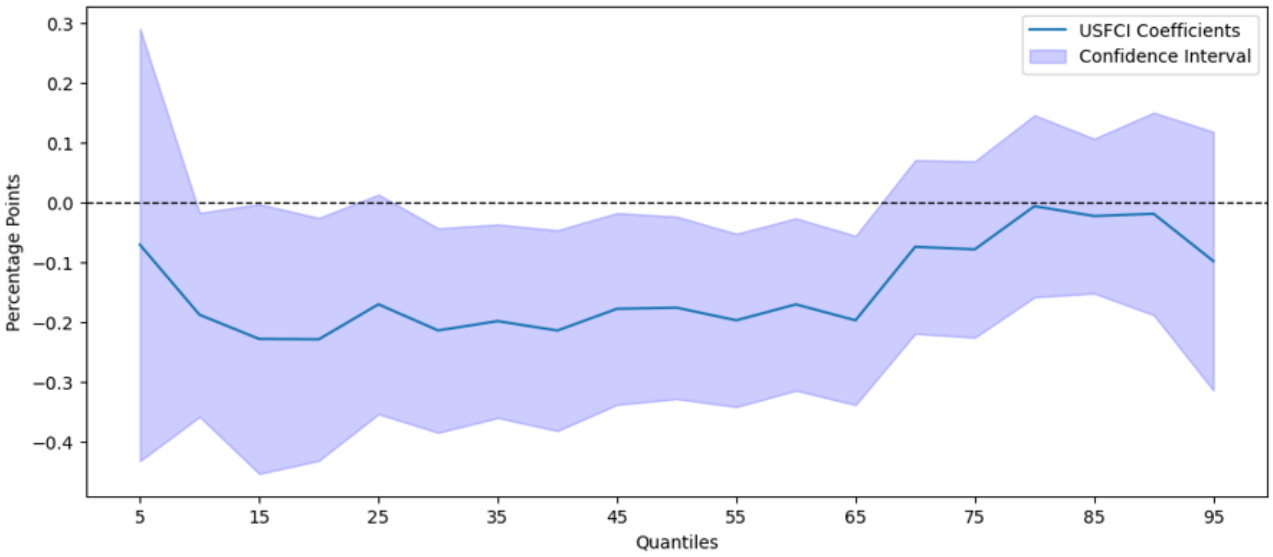
$$Q_{\Delta FX_{t+h}}(\tau|X_t) = \alpha_h(\tau) + \beta_h(\tau) \cdot USFCI_t + \varepsilon(\tau)_t \tag{1}$$

where:

- ΔFX_{t+h} is the monthly log change in MYR/USD h months ahead; and
- $USFCI_t$ is the Bloomberg U.S. Financial Conditions Index.

Figure 1 shows the output from Equation 1. The prevailing narrative in FX markets considers the ringgit to be among risky currencies, which means that it tends to depreciate during periods of increased global risk aversion. The panel shows the impact of one–standard deviation change in U.S. financial conditions on different quantiles of the conditional distribution of exchange rate returns over the same month, i.e., $h = 0$. The ringgit exhibits negative coefficients which are statistically significant at the 5% level from the 10th to 65th percentiles. This means that most of the conditional distribution shifts to the left in the face of a tightening of U.S. financial conditions, indicating an increased risk of a sharp depreciation. Table 2 shows the advantages of our approach with respect to OLS alternatives commonly used in the literature. The higher pseudo–R^2 at the lower quantiles shows that an OLS, which focuses on the mean, misses key information in the left tail.

Figure 1: Impact of U.S. financial conditions on the conditional quantiles of MYR/USD returns (Post–ringgit unpegging: August 2005 – December 2024)



Given the sample size and the focus on tail events, this study adopts a parsimonious specification for Equation 1, using the Bloomberg U.S. FCI as a principal component proxy. This index serves to capture a broad range of global and U.S. financial developments, including shifts in investor risk sentiment, regardless of their underlying source. It offers a comprehensive, market–based measure that summarises the information across a broad spectrum of financial indicators, unlike single–market indicators such as VIX or MOVE (Hatzius et al. (2010)). The focus on the U.S. specifically is further justified by its central role in shaping the global financial cycle (Miranda-Agrippino and Rey (2020)).

Table 2: Goodness of fit measure (Post–ringgit unpegging: August 2005 – December 2024)

Quantiles	Coefficient of U.S. FCI	Significant at 5%	R^1 (Quantile) (%)
5	-0.071	No	1.33
10	-0.188	Yes	3.15
15	-0.228	Yes	2.64
20	-0.229	Yes	2.44
25	-0.170	No	2.42
30	-0.214	Yes	3.05
35	-0.199	Yes	2.75
40	-0.214	Yes	2.37
45	-0.178	Yes	1.87
50	-0.176	Yes	1.40
55	-0.197	Yes	0.86
60	-0.171	Yes	0.90
65	-0.197	Yes	0.94
70	-0.074	No	0.31
75	-0.079	No	0.20
80	-0.006	No	0.02
85	-0.023	No	0.01
90	-0.019	No	0.07
95	-0.098	No	0.51
OLS	-0.160	Yes	2.40

However, it is important to acknowledge that this paper does not attempt to identify the fundamental drivers of exchange rate fluctuations in emerging market currencies. As asset prices, exchange rates are influenced by a complex array of factors – including, but not limited to, U.S. monetary policy, domestic and global macroeconomic conditions, fiscal dynamics, and shifts in global investor sentiment. Disentangling these influences is inherently challenging.[3]

II. Estimating Ringgit Distributions

Two nonparametric distributions were fitted with a normal kernel, ϕ, and a suitably chosen bandwidth, h, with density function given by:

$$\hat{f}_h(x) = \frac{1}{nh} \sum_{t=1}^{T} \phi \left(\frac{x - \hat{q}(t)}{h} \right) \tag{2}$$

such that the first of the two fitted quantiles, $\hat{q}(\tau)$, is conditional on the average value of global financial conditions (which is 0), given by $\alpha_h(\tau)$ in Equation 1. Meanwhile, the second fitted quantile was conditional on a one–standard deviation increase in global financial conditions, given by $\alpha_h(\tau) + \beta_h(\tau)$ in Equation 1. A bandwidth of $h = 0.6$ was chosen for our distribution estimation.

[3]This is well–documented in the literature. See, for example, Meese and Rogoff (1983), Obstfeld and Rogoff (2000), and Itskhoki and Mukhin (2021) on the exchange rate disconnect puzzle.

Accordingly, the use of quantile regression proves valuable in capturing the full distributional effects of exchange rate returns, extending beyond the average impact estimated by mean–based models. This methodology enables a detailed analysis of how shifts in global financial conditions influence the likelihood of extreme movements in the ringgit, encompassing both appreciations and depreciations. By focusing on the tails of the distribution, quantile regression facilitates the quantification of tail risks and allows for the estimation of conditional probabilities associated with large exchange rate fluctuations, conditional on prevailing state U.S. financial conditions. In doing so, it provides empirical support for the prevailing market narratives regarding heightened sensitivity of emerging market currencies to external financial shocks.

III. Measure of Tail Behaviours

Changes in probability over different ranges ΔFX for both distributions were computed via a cumulative distributive function (CDF) given by:

$$\Delta \hat{P}_h(x) = \int_{\Delta FX^1}^{\Delta FX^2} \left[\hat{f}_h(x) – \hat{g}_h(x) \right] dx \tag{3}$$

where:

- $\Delta FX^2 > \Delta FX^1$;
- The first fitted distribution, $\hat{f}_h(x)$, is conditional on a one–standard deviation increase in global financial conditions; and
- The second fitted distribution, $\hat{g}_h(x)$, is conditional on average global financial conditions.

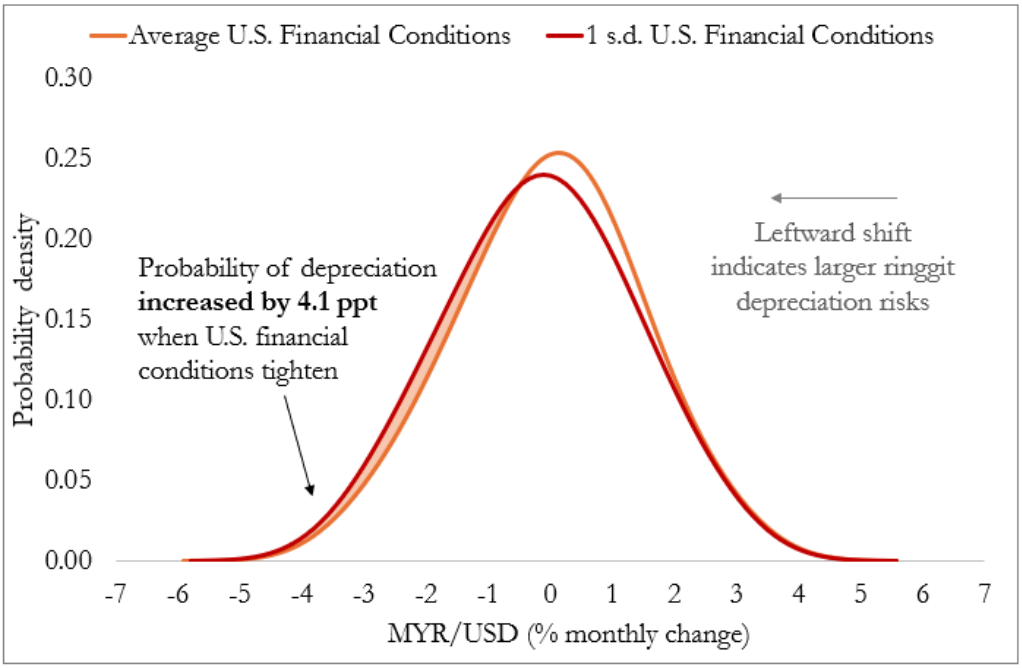
4 Results

The empirical findings indicate that the ringgit does not exhibit safe–haven characteristics, aligning with prevailing market narratives. However, the currency has shown increased vulnerability to depreciation risks, particularly in the period following 2015. Building on the methodological framework proposed by Eguren-Martin and Sokol (2022), this study employs a model that estimates the probability distribution of exchange rate changes as a function of U.S. financial conditions. By focusing on the conditional density of the ringgit returns, the analysis offers insights into how shifts in U.S. financial conditions – especially episodes of monetary tightening – reshape the distribution of exchange rate outcomes. Particular emphasis is placed on the tails of the distribution, where the likelihood of extreme depreciations becomes more pronounced. This approach enhances our understanding of the asymmetric and nonlinear effects of external financial shocks on emerging market currencies.

Finding 1: Increased Susceptibility of the Ringgit, Post–2015

Figure 2 presents the estimated effects of a one–standard deviation tightening in U.S. financial conditions on the conditional distribution of MYR/USD returns. The results empirically show that the ringgit is not a safe haven currency. This is because a tightening of U.S. financial conditions leads to a leftward shift in the conditional distribution of ringgit returns, indicating a heightened probability of depreciation.

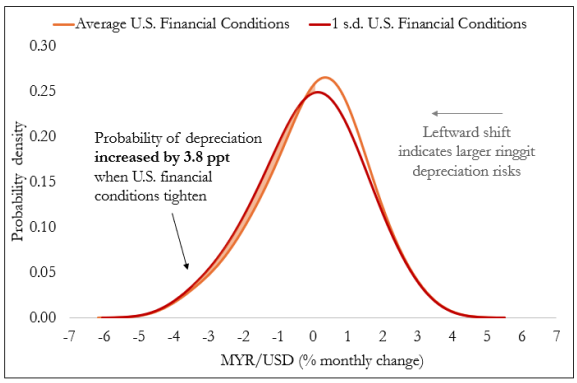
Figure 2: Impact of tightening of U.S. FCI on the conditional distribution of MYR/USD returns (Post–ringgit unpegging: August 2005 – December 2024)



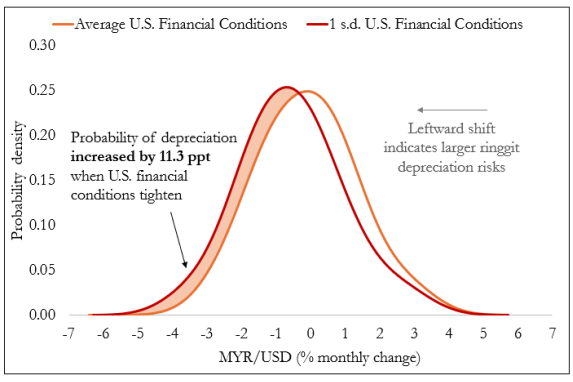
This vulnerability has become particularly pronounced in the post–2015 period. As illustrated in Figure 3, the conditional distribution of MYR/USD returns exhibits a more substantial leftward shift after 2015, indicating an increased sensitivity of the ringgit to external financial shocks. This shift suggests a heightened probability of extreme depreciations under adverse global financial conditions. These findings point to a potential structural change in the behaviour of the ringgit during periods of financial stress, underscoring the growing importance of external factors in shaping Malaysia's currency risk profile.

Figure 3: Impact of tightening of U.S. FCI on the conditional distribution of MYR/USD returns (Pre– and Post–oil price crash)

(a) Pre–oil price crash: Aug 2005 to Sep 2015



(b) Post–oil price crash: Oct 2015 to Dec 2025



Prior to the 2015 oil price collapse, a one–standard deviation tightening in U.S. financial conditions was associated with a relatively modest increase in the probability of ringgit depreciation – rising by 3.8 percentage points, from 46.2% to 50.0%. However, in the period following 2015, the ringgit's sensitivity to external financial shocks intensified markedly. Under comparable conditions, the probability of depreciation increased by 11.3 percentage points,

from 53.2% to 64.5%. This pronounced shift underscored a potential structural change in the ringgit's external vulnerability, likely reflecting evolving macroeconomic fundamentals, and shifts in investor sentiment toward Malaysian assets in the wake of lower commodity prices and heightened global uncertainty.

Table 3: Changes in depreciation probability due to tightening of U.S. financial conditions

Ringgit depreciation ranges	Pre-2015			Post-2015		
	Average U.S. FCI	1 s.d. tightening in U.S. FCI	Change in depreciation probability (ppt)	Average U.S. FCI	1 s.d. tightening in U.S. FCI	Change in depreciation probability (ppt)
	Depreciation probability, %			Depreciation probability, %		
0-2.5%	39.4	42.3	2.9*	47.3	53.8	6.5*
2.5-5%	6.7	7.6	0.9	5.9	10.6	4.7*
5-7.5%	0.1	0.1	0.0	0.0	0.1	0.1
Total	**46.2**	**50.0**	**3.8**	**53.2**	**64.5**	**11.3**

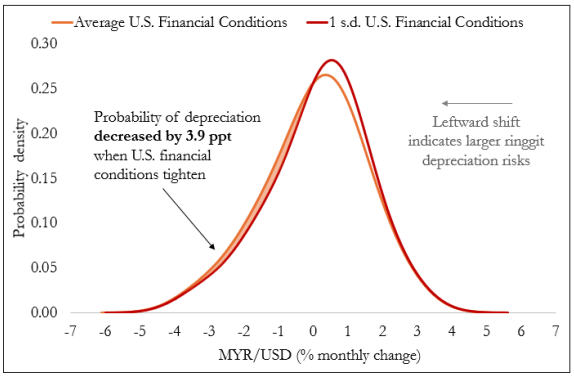
Note: *Statistically significant at 5%.

Finding 2: Greater Influence of the Impact of Easing U.S. Financial Conditions on MYR/USD Returns, Post–2015

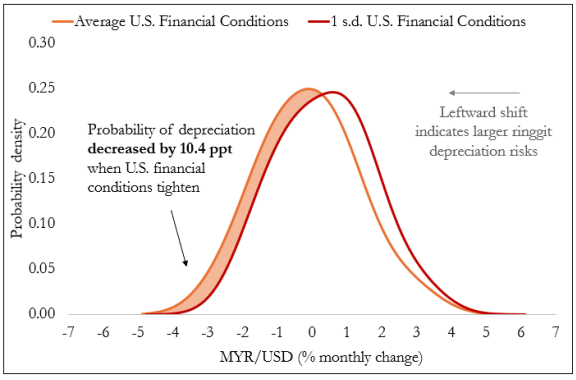
Given the symmetric properties of the model, the estimated coefficients $\beta_h(\tau)$ from Equation 1 can be multiplied by –1 to derive the conditional distribution of MYR/USD returns under easing U.S. financial conditions. This transformation allows for the examination of how looser financial conditions in the U.S. affect the ringgit. The results revealed a rightward shift in the conditional distribution, indicating a lower likelihood of depreciation and, conversely, a greater probability of ringgit appreciation. These findings further underscored the ringgit's sensitivity to global financial cycles, with easing conditions offering some relief from depreciation pressures.

Figure 4: Impact of U.S. FCI easing on the conditional distribution of MYR/USD returns (Pre– and Post–oil price crash)

(a) Pre–oil price crash: Aug 2005 to Sep 2015



(b) Post–oil price crash: Oct 2015 to Dec 2025



U.S. financial conditions exerted a more pronounced influence on ringgit movements in the post–2015 period. This was reflected in the larger decline in the probability of depreciation when financial conditions in the U.S. eased. Specifically, post–2015, the probability of ringgit depreciation decreased by 10.4 percentage points, compared to a smaller decline of 3.9 percentage points observed in the pre–2015 period. The more substantial shift highlighted the heightened responsiveness of the ringgit to global financial conditions in the aftermath of the oil price collapse in 2015, and the accompanying structural adjustments within the Malaysian economy. The findings further emphasised the asymmetry in the ringgit's reaction to external financial shocks over time, with greater volatility, and sensitivity to external spillovers emerging in recent years.

Table 4: Changes in depreciation probability due to easing of U.S. financial conditions

Ringgit depreciation ranges	Pre-2015			Post-2015		
	Average U.S. FCI	1 s.d. easing in U.S. FCI	Change in depreciation probability (ppt)	Average U.S. FCI	1 s.d. easing in U.S. FCI	Change in depreciation probability (ppt)
	Depreciation probability, %			Depreciation probability, %		
0-2.5%	39.4	36.2	-3.2*	47.3	39.5	-7.8*
2.5-5%	6.7	6.0	-0.7	5.9	3.3	-2.6*
5-7.5%	0.1	0.1	0.0	0.0	0.0	0.0
Total	**46.2**	**42.3**	**-3.9**	**53.2**	**42.8**	**-10.4**

Note: *Statistically significant at 5%.

The analysis further revealed that a reduction in the probability of ringgit depreciation, in response to easing U.S. financial conditions, was accompanied by a corresponding increase in the probability of appreciation. However, this increase was not statistically significant at the 5% level, as indicated by the quantile regression coefficients in the upper tail of the MYR/USD return distribution (see Appendix: Table 5 & 6). This suggests that while easing financial conditions may alleviate downward pressure on the ringgit, the extent to which they generate upward momentum remains limited and statistically inconclusive. The asymmetry in statistical significance across the distribution highlighted the ringgit's greater sensitivity to downside risks compared to upside gains under changing global financial conditions.

This finding suggests that the influence of U.S. financial conditions on the ringgit is markedly asymmetric. While the impact was substantial during tightening episodes – captured in the left tail of the MYR/USD return distribution – it was notably weaker during easing episodes, reflected in the right tail. This asymmetric response underscores the ringgit's heightened vulnerability to external financial shocks, particularly those originating from the U.S. The evidence indicates that adverse shifts in U.S. financial conditions exert greater downward pressure on the ringgit than favourable shifts providing upward support, pointing to a downside bias in the currency's sensitivity to global financial cycles.

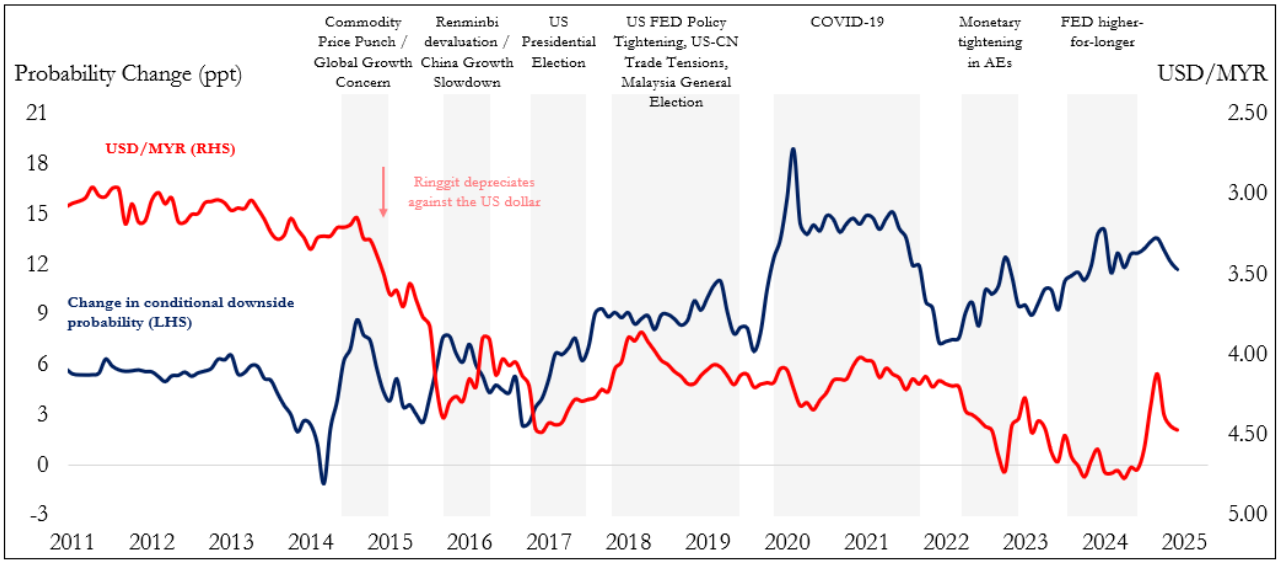
The heightened likelihood of a ringgit depreciation observed in the post–2015 period may be attributed to several key domestic macro–financial risk factors, as highlighted in the literature for most major and emerging market currencies. These include deteriorating external buffers such as a narrowing current account surplus relative to GDP, a decline in both gross and

net international reserves, as well as a significant tightening of U.S. monetary policy (Eguren-Martin and Sokol (2022)). The convergence of these factors may exacerbate Malaysia's external vulnerabilities, particularly during episodes of global financial shocks. However, establishing a definitive causal relationship requires more careful considerations given potential endogeneity problem surrounding the exchange rate and the risk factors, which is proposed as a direction for future research.

Finding 3: The ringgit's time–varying downside risk to tightening of U.S. financial conditions increased post–2015, particularly during global risk–off events

Extending our earlier analysis, we used a rolling–window quantile regression framework with a 60–month window to estimate the time–varying depreciation risk of the ringgit against the U.S. dollar, conditional on shifts in U.S. financial conditions. Our findings revealed an increase in the sensitivity of the ringgit to U.S. financial conditions in the post–2015 period. Specifically, the estimated change in the lower quantiles of the conditional distribution of exchange rate returns (i.e., downside risks) has become more pronounced in response to a one–standard deviation tightening in U.S. financial conditions. This heightened sensitivity is illustrated in Figure 5.

Figure 5: Time–varying change in conditional downside probability of the ringgit against the U.S. dollar

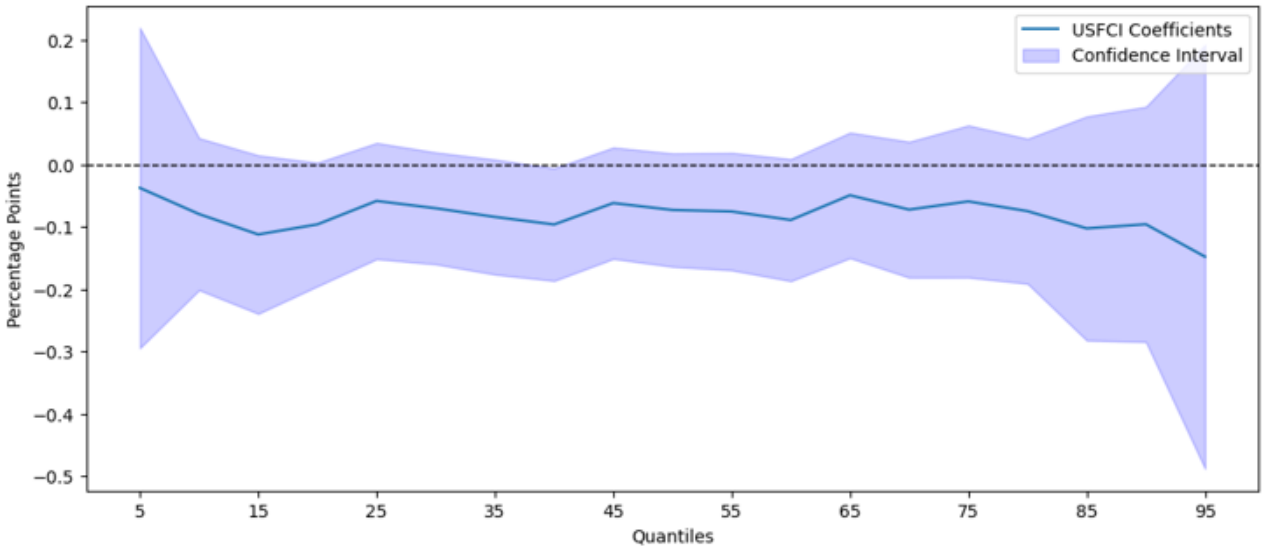


Importantly, the amplification of downside risk aligns temporally with several global risk–off episodes, including the 2013 U.S. Taper Tantrum, the 2015–2016 China growth slowdown, the 2018 U.S.–China trade tensions, the 2020 COVID–19 shock, and the 2022 U.S. monetary policy tightening. These episodes likely exacerbated capital outflows and increased the vulnerability of emerging market currencies like the ringgit to external shocks. The results underscore a structural shift in the ringgit's external risk exposure, suggesting that global financial conditions have become a more relevant driver of exchange rate dynamics in the post–2015 era.

5 Robustness Checks

We replaced MYR/USD with Malaysia's ringgit nominal effective exchange rate (NEER).[4] Our analysis shows that the movements of the ringgit NEER are not as sensitive to changes in U.S. financial conditions. This could be because movements in the ringgit bilateral cross rates (e.g., MYR/SGD, MYR/IDR) are typically influenced by the domestic factors specific to each country. Consequently, when a common global factor such as a shift in U.S. financial conditions affects both currencies in a bilateral pair similarly, the impact tends to cancel out, resulting in a muted effect on the effective exchange rate. This result is consistent across the full sample as well as across the two sub–samples, whereby the estimated coefficients are statistically non–significant.

Figure 6: Impact of U.S. financial conditions on the conditional quantiles of ringgit NEER returns (Post–ringgit Unpegging: August 2005 – December 2024)



[4]The NEER used in this study is based on the internal series compiled by Bank Negara Malaysia.

Figure 7: Impact of U.S. financial conditions on the conditional quantiles of ringgit NEER returns (Pre–oil price crash: August 2005 – September 2015)

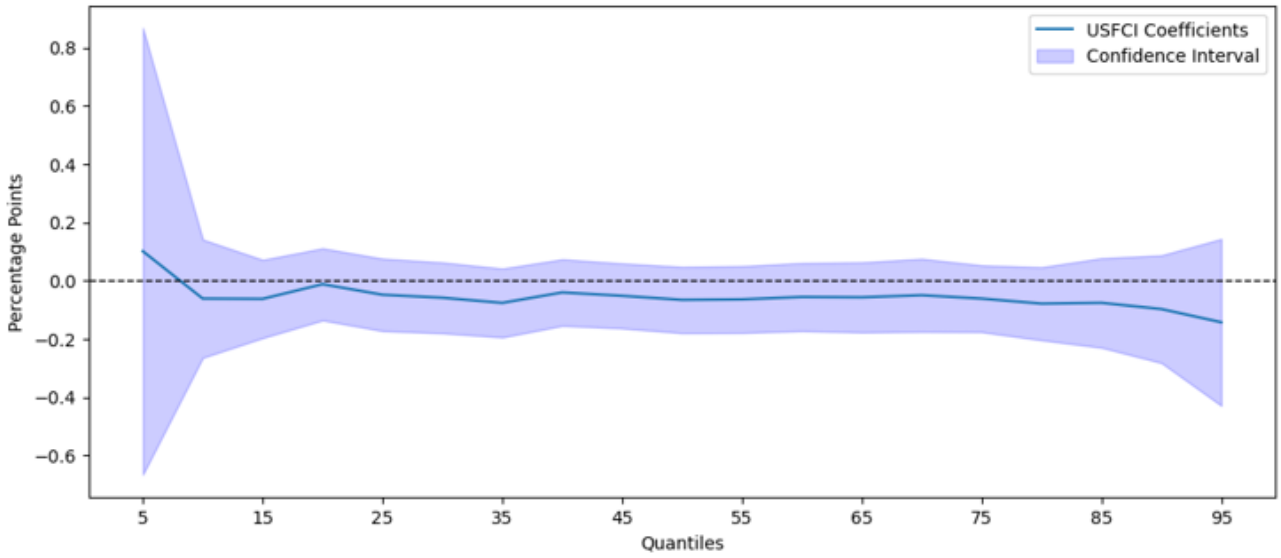
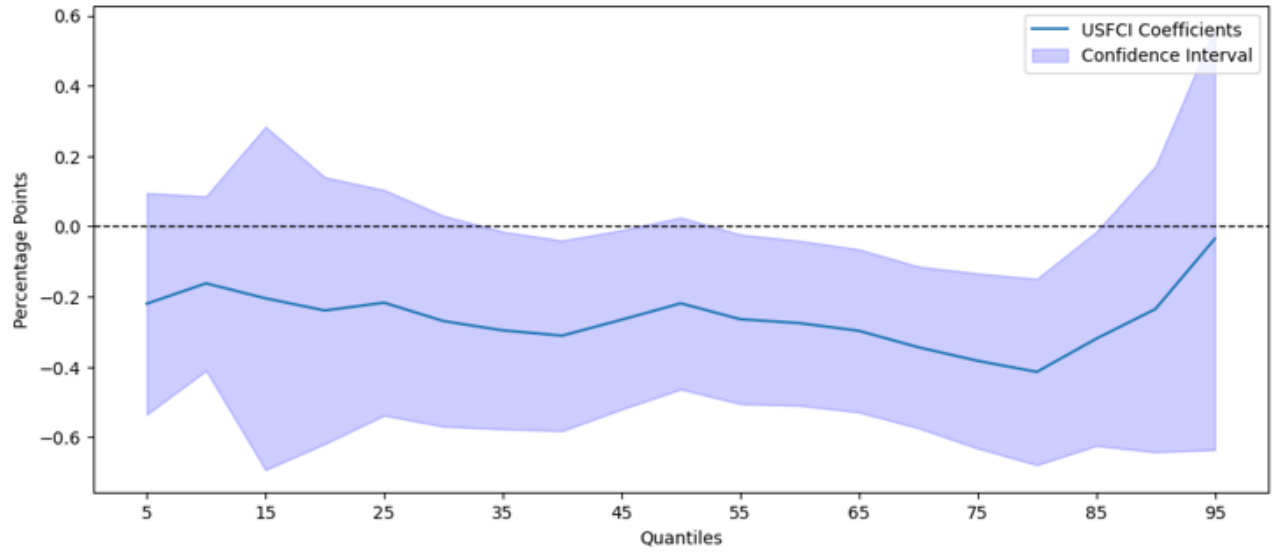


Figure 8: Impact of U.S. financial conditions on the conditional quantiles of ringgit NEER returns (Post–oil price crash: October 2005 – December 2024)



6 Policy Implications

The quantile regression framework employed in this study offers a valuable tool for central banks to enhance their surveillance, and management of exchange rate risks. By capturing the entire distribution of exchange rate outcomes and not just the average effect, this approach allows policymakers to assess the probability and magnitude of extreme depreciation events. Such distribution–sensitive insights are critical for identifying tail risks that may threaten macro–financial stability, especially in small open economies with significant exposure to global financial cycles.

In the Malaysian context, the analysis underscores the growing importance of external financial conditions, particularly tightening in U.S. financial markets, in shaping the risk profile of the ringgit. The post–2015 period has seen an elevated probability of ringgit depreciation associated with adverse shifts in U.S. financial conditions. This could be attributed to several key domestic macro–financial risk factors such as a narrowing current account surplus relative to GDP, a decline in both gross and net international reserves, and a significant tightening of U.S. monetary policy (Eguren-Martin and Sokol (2022)). These vulnerabilities suggest that the ringgit has become more reactive to global shocks, calling for a proactive policy approach. Given Malaysia's floating exchange rate regime, effectively managing exchange rate volatility is crucial to mitigating potential economic disruptions. In this context, this study's findings on the asymmetric impact between upside and downside risks to the exchange rate from external shocks offer valuable insights, guiding the calibration of policy responses.

In light of these findings, it is critical for policymakers to integrate tail–risk assessments into internal decision–making processes, particularly under prolonged tightening of U.S. financial conditions. Policy tools such as foreign exchange interventions, macroprudential buffers, and targeted communication strategies could be deployed more systematically to mitigate the potential fallout from extreme currency movements. Additionally, the case for maintaining sufficient precautionary reserves, and strengthening macroeconomic fundamentals become even more compelling in navigating heightened global economic and financial uncertainty.

7 Conclusion

This study contributes to the literature by employing a quantile regression approach to analyse the conditional distribution of a currency in a small, open economy – specifically, the ringgit returns – under varying U.S. financial conditions. The results reveal that the ringgit has become more susceptible to depreciation risks in the post–2015 period, especially under tighter global financial conditions.

While easing financial conditions are associated with a lower probability of depreciation, the corresponding increase in the likelihood of appreciation is not statistically significant. This asymmetry highlights a downside bias in the ringgit's risk profile. By capturing the full distribution of potential outcomes, the quantile regression framework offers a more comprehensive tool for assessing external vulnerabilities, and currency risks.

Ultimately, this methodology offers practical relevance for policymakers, particularly in crafting robust, forward–looking strategies that address both the average effects, and the extremes of exchange rate dynamics. It underscores the importance of integrating risk–sensitive tools into the policy process to navigate the evolving challenges posed by global financial spillovers.

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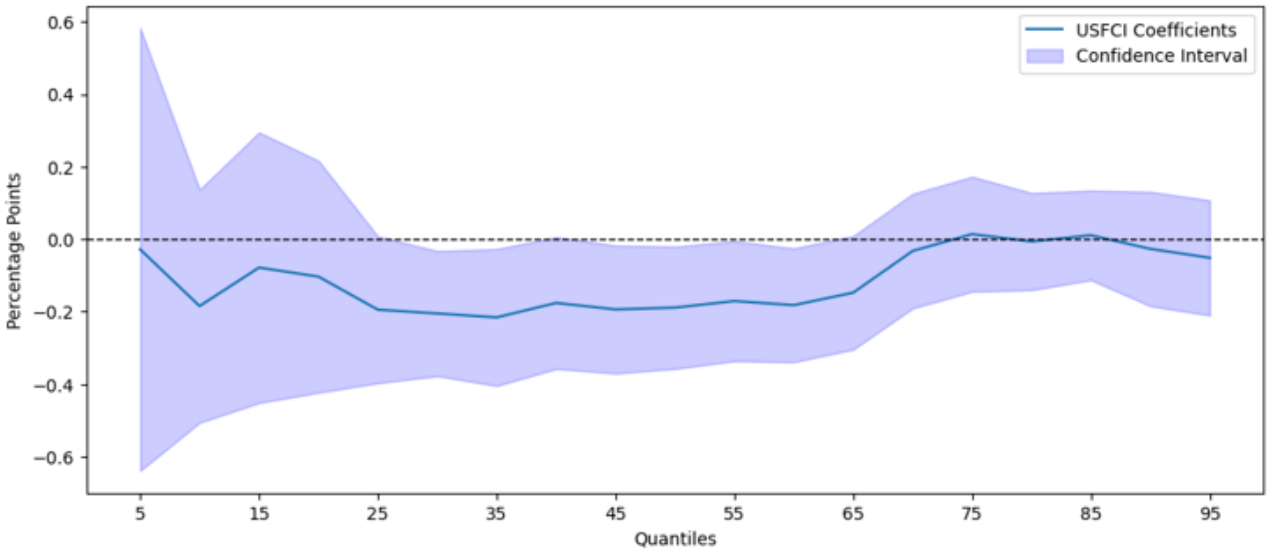
Appendix

In Section 4, we divided the sample into two subperiods – pre–global oil price crash (August 2005 to September 2015) and post–global oil price crash (October 2015 to December 2024) – to assess the effects of tightening U.S. financial conditions on MYR/USD returns. For the pre–oil price crash period, our results indicate that the coefficient estimates for the lower quantiles exhibit higher pseudo–R^2 values compared to those obtained using OLS, suggesting a better model fit in the tails of the return distribution.

Figure 9: Impact of U.S. financial conditions on the conditional quantiles of MYR/USD returns (Pre–oil price crash: August 2005 – September 2015)



Similarly, for the post–oil price crash period, the coefficient estimates for the lower quantiles continue to demonstrate higher pseudo–R^2 values relative to the OLS estimates, indicating a superior model fit in capturing the behaviour of returns in the lower tail of the distribution.

Table 5: Goodness of fit measure (Pre–oil price crash: August 2005 – September 2015)

Quantiles	Coefficient of U.S. FCI	Significant at 5%	R^1 (Quantile) (%)
5	-0.028	No	0.47
10	-0.184	No	1.03
15	-0.078	No	2.13
20	-0.103	No	2.13
25	-0.194	Yes	3.15
30	-0.205	Yes	4.62
35	-0.216	Yes	4.48
40	-0.176	Yes	3.66
45	-0.194	Yes	2.93
50	-0.189	Yes	1.95
55	-0.171	Yes	1.28
60	-0.182	Yes	1.48
65	-0.147	No	0.56
70	-0.032	No	0.21
75	0.014	No	0.03
80	-0.006	No	0.01
85	0.011	No	0.03
90	-0.027	No	0.18
95	-0.051	No	0.73
OLS	-0.130	No	2.20

Figure 10: Impact of U.S. financial conditions on the conditional quantiles of MYR/USD returns (Post–oil price crash: October 2015 – December 2024)

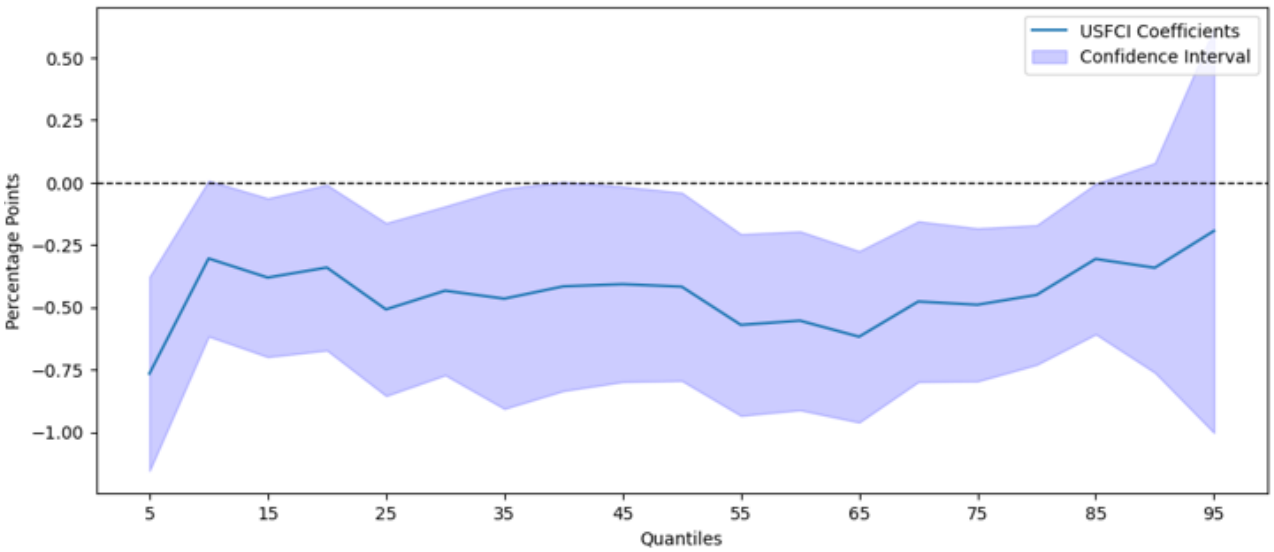


Table 6: Goodness of fit measure (Post–oil price crash: October 2015 – December 2015)

Quantiles	Coefficient of U.S. FCI	Significant at 5%	R^1(Quantile) (%)
5	-0.766	Yes	6.39
10	-0.305	Yes	5.55
15	-0.381	Yes	5.65
20	-0.341	Yes	6.33
25	-0.509	Yes	5.75
30	-0.434	Yes	4.71
35	-0.466	Yes	3.79
40	-0.416	Yes	2.75
45	-0.408	Yes	1.87
50	-0.417	Yes	1.17
55	-0.570	Yes	1.36
60	-0.554	Yes	1.59
65	-0.618	Yes	2.72
70	-0.477	Yes	2.47
75	-0.490	Yes	1.72
80	-0.451	Yes	0.98
85	-0.307	No	0.12
90	-0.342	No	0.66
95	-0.194	No	0.30
OLS	-0.440	Yes	4.60