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To Link this Article: <http://dx.doi.org/10.6007/IJARAFMS/v13-i2/17003> DOI:10.6007/IJARAFMS /v13-i2/17003

**Received:** 01 April 2023, **Revised:** 03 May 2023, **Accepted:** 25 May 2023

**Published Online:** 07 June 2023

**In-Text Citation:** (Shazali et al., 2023)

**To Cite this Article:** Shazali, K. H. I., Jusoh, A. A., Moksini, H., & Zaghlol, A. K. (2023). Switching in Exchange Rate Regime: Impacts and Exposure to Sectors in Malaysia. *International Journal of Academic Research in Accounting Finance and Management Sciences*, 13(2), 327–338.

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Vol. 13, No. 2, 2023, Pg. 327 - 338

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## Switching in Exchange Rate Regime: Impacts and Exposure to Sectors in Malaysia

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### Abstract

The purpose of this study is to analyze the exposure of the specific exchange rate to the sectors due to the changes in the exchange rate regimes. To evaluate the exposure and the consequence of policy change, two models were used. The data was from Malaysian listed firms' stock returns and foreign exchange rates. The secondary data of 128 firms were chosen using the Bloomberg database from Bursa Malaysia. The firm's stock price and exchange rates were collected from January 1990 to July 2010. 20 years data were specifically chosen to obtain the exchange rate regime cycle before, during, and after pegging. The monthly returns and excess returns were computed from the data collected. As a result, the notion that no firms were exposed to the USD during the pegged period is no longer valid. The finance sector showed a significant exposure against the USD. This was probably due to the movement of the MYR against the USD. The exposure to the firms may also have been influenced by the cross-exchange rate of MYR with other currencies.

**Keywords:** Exchange Rate, Sector, Peg, Panel Data, Exposure, Malaysia

### Introduction

The impact of the COVID-19 pandemic is felt around the world, and Malaysia is no exception. As a result, it is not only inducing inflationary pressures but also putting Malaysia's currency at risk of depreciation versus the USD. According to Bernama (2022), MYR has declined as a result of the steep rise in the value of USD and is predicted to continue to decline as a result of the US Federal Reserve's decision to raise interest rates. The country's economists remain concerned with the current scenario, which has compelled the governments to come up with solutions to stabilize the value of the local currency. The challenges the administration faced during the Asian Financial Crisis (AFC) of 1998 and the Global Financial Crisis of 2008 (GFC) are carefully examined. The peg of the MYR to the USD and the latter, enacting fiscal and monetary policy, were two of the steps the government took to lessen the effects of both crises. Would using the pegging approach the best course of action to lessen the current crisis?

To answer the above question, datasets from a specific period before, during, and after 1998 AFC were used to measure the validity of changes in the exchange rate regime that have an

impact on the exchange rate exposure focusing on the sectors that contributed to the Malaysian economy. This study will provide the decision maker with additional information when deciding whether to peg or de-peg the currency against the USD as well as any other currencies that may be relevant. Therefore, policymakers will be able to come up with a wiser solution by choosing the appropriate exchange rate regime that would minimize the impact of the ongoing financial difficulty that the country is experiencing.

The data from a certain time period before, during, and after the 1998 AFC will be used to test the validity of the idea that changing the exchange rate regime has an impact on the exchange rate exposure in order to respond to the question posed. Additionally, the sectors that supported the Malaysian economy were the main emphasis of this study.

### Literature Review

The Malaysian economy, which were popularly described as small and open, depends on exports to grow. Early in the 20th century, Malaysia's agricultural sector expanded, replacing tin as the main industry during the nation's early economic development. Consequently, Malaysia diversified into an industrialized nation with a GDP that grew at a rate of about 8% to 9% between 1991 and 1997.

Looking back into the year 2011, four years after the crisis, Malaysian semiconductor exporters were the largest contributing about 30% of Malaysia's total manufacturing sector output. As an open economy, Malaysia is greatly exposed to external influences including globalization and foreign capital investments which have played a major role. Malaysia was also not spared and affected by the financial crises and recessions between 1997 and 2008. The Malaysian export sector had to endure a sweltering year in 2009 after overseas shipments slumped by 16.6% and a drop in fixed investments at 5.5%. Malaysia's economy was then dragged down even further as panicky firms canceled their investment or delayed investment decisions.

It is apparent that the Malaysian economic growth relied on its exports, foreign investment, and services during the period of crises, and most of the sectors involved with exports were mainly agricultural and industrial products. Delfeld (2010) found that 40% of the source of growth for the Malaysian GDP comes from the industry, 10% from agriculture, and the remaining 50% from the services sector. As reported by the Department of Statistics Malaysia (2020), the contributing sectors to the Malaysian economy remain unchanged, namely 57.7% from services, 7.4% from agriculture, and the remaining 34.9% from the industry.

According to Kodres and Ilzetzki et al (2019), the foreign exchange market is one of the largest markets in the world, and most countries use the USD as their capital reserve. Exchange rate changes will affect investment values as well as business operations. A fall in the exchange rate will cause the price of imports to be raised while exporters will have the preference to either lower the price for their buyers or remain unchanged to increase their profit margins. As a result, this will create internationally competitive domestic producers. Therefore, when the import volumes drop, the export volumes should rise. Then the output at home should rise to lead to higher economic growth so that there is a decrease in unemployment. Therefore, the exchange rate of the currency is exposed to exchange rate risks. If the risk of the exchange rate becomes greater, it will worsen the economic situation of the countries concerned which can then lead to a financial crisis. This exposure will affect the bottom line or profitability of the firms, especially those firms that have international dealings.

Therefore, this study is to evaluate the impact and exposure of the exchange rate regimes on the industry sectors in Malaysia. The behavior of the stock return of the firms by computing

the excess returns and the foreign exchange rate will be utilized. This was supported by Lansing et al (2022); Jain and Strobl (2017); Sadaqat and Butt (2016); Nebaneh and Ndobe (2010); Shapiro (2009); Muller & Verschoor (2006); Dominguez and Tesar (2006) and Bodnar and Wong (2003) that mentioned on the sensitivity of the firms' value or assets on currency exchange rate over the time which is uncertain and also depends on its exports and imports, its involvement in foreign operations, the currency denomination of its competition, and the competitiveness of its input and output markets. Therefore, the exchange rate exposure was appropriately defined as the relationship between excess returns and the changes in the exchange rate for a firm.

### Methodology

Quantitative research using the deductive technique was applied in this study. As a result, testable hypotheses were established at the start of the study process. The hypothesis served as a guide for regressing and performing the research models in order to examine and determine whether the results were rejected or affirmed. The secondary data was collected from January 1990 to July 2010 to run two research models. Both models were chosen based on the study by (Bacha et al., 2009). It is an adaptation of an existing study. The research model was applied by (Anisak and Mohamad, 2020; Bacha et al., 2013; De Jong et al., 2006), and Parsley and Popper, 2006).

The model will be able to determine the significant exchange rate for an individual firm by employing multiple bilateral exchange rates rather than a single trade-weighted exchange rate. It is also supported by Bacha O. et al. (2009), Imoughele et.al. (2015) and Isa et. al. (2021). The specific exchange rate exposure of the firm was calculated as follows.

The first model is shown in Equation (1) below

$$R_{it} = \alpha + \beta_1 \text{USD} + \beta_2 \text{SGD} + \beta_3 \text{JPY} + \beta_4 \text{GBP} + e_{it} \quad \dots\dots\dots (1)$$

Where:

- $R_{it}$  : The excess returns of the firms, whereby the returns of stock (i) in month(t) less the returns on the market index for the month(t). The market index is proxied by 30 of the largest firms' stock FTSE Bursa Malaysia KLCI
- $\alpha$  : The intercept of the regression line
- $\beta_1 \text{USD}$  : The sensitivity of the US Dollar (USD)
- $\beta_2 \text{SGD}$  : The sensitivity of the Singapore Dollar (SGD)
- $\beta_3 \text{JPY}$  : The sensitivity of the Japanese Yen (JPY)
- $e_{it}$  : An error term with a zero mean and is uncorrelated with other explanatory variables, whereby the residual stock (i) in month (t) less the returns on the market index for the month(t).

According to Equation (1), a firm's excess returns are a function of or influenced by changes in the four exchange rates. The excess returns are used to calculate the firm's marginal exposure. The prior study by Bacha O. et al. backs this up (2009). To minimise the problem, a Generalized Autoregressive Conditional Heteroskedasticity (GARCH) (1, 1) specification to Eq. (1) and testing at a 5% level of significance were added and used. Furthermore, despite the

fact that there are an infinite number of different forms of non-linear models, only a small number of non-linear models are suitable for modelling financial data, according to (Chris Brooks, 2008). The ARCH or GARCH models, which are used for modelling and forecasting volatility, are the most prevalent non-linear financial models, while switching models allow the behaviour of a series to follow various processes at different points in time. Furthermore, a Wald test was performed to account for any potential multicollinearity, as De Jong et al (2006) indicate that the specification in Eq. (1) tends to underestimate exposure due to multicollinearity in the exchange rates. The Wald test was used to examine if all four exchange rate coefficients were concurrently equal to zero at the 5% level of significance. This test was performed on all firms that demonstrated no exposure to any of the currencies when applying Eq (1). The Wald test is rejected if the currency coefficient is significant at the 5% level. As a result, the firm will be classified as being exposed to that currency.

Because the model given in Eq. (1) can only estimate the exchange rate exposure for a single sample firm, the second model is used to examine the exchange rate exposure across all sample firms and firms of subgroup firms. The panel data analysis is carried out by stacking each of the 128 sample firm's data as panel data and estimating an overall seemingly unrelated regression model using a random-effects GLS regression model (SUR). The Hausman test was used to determine which model, between the random effect and the fixed effect, would better match the data. This model has the advantage of accommodating not only cross-sectional correlation between samples but also pooling all data from all firms for all years. Hence, by combining cross-section observation time series, panel data provides "more meaningful data, more variability, less collinearity among variables, a greater degree of freedom, and greater efficiency" (Gujrati, 2009).

The fixed or random effect model can be chosen by assessing the existence of a correlation between the missing cross-sectional features and the explanatory factors using the following hypothesis

H0: There is no relationship between the missing cross-sectional features and the explanatory variables.

H1: A relationship exists between the missing cross-sectional features and the explanatory variables.



The second model is shown in Equation (2) below:

$$R_o = [R_i] = \begin{bmatrix} \alpha_1 \\ \vdots \\ \alpha_n \end{bmatrix} + \begin{matrix} \beta_{11} \text{USD}_1 + \beta_{12} \text{SGD}_1 + \beta_{13} \text{JPY}_1 + \beta_{14} \text{GBP}_1 \\ \beta_{11} \text{USD}_t + \beta_{12} \text{SGD}_t + \beta_{13} \text{JPY}_t + \beta_{14} \text{GBP}_t \\ \vdots \\ \beta_{n1} \text{USD}_1 + \beta_{n2} \text{SGD}_1 + \beta_{n3} \text{JPY}_1 + \beta_{n4} \text{GBP}_1 \\ \beta_{n1} \text{USD}_t + \beta_{n2} \text{SGD}_t + \beta_{n3} \text{JPY}_t + \beta_{n4} \text{GBP}_t \end{matrix} + \begin{bmatrix} e_1 \\ \vdots \\ e_n \end{bmatrix}$$

Whereby,  $R_o$  is the overall/across-sample return.

### Results and Discussions

Based on the regression Eq. (1) and panel data Eq. (2), the empirical results show the variance in currency exposure by various sectors of the economy which is aligned with the previous studies. It is to evaluate the extend of the variation in connection with the exposure of firms by industry sectors in Malaysia.

Table 1 shows the number of firms exposed to the four currencies. For the overall period, all the firms that fell under these four sectors were exposed to all four currencies except for the plantation sector, which indicated zero number of firms being exposed against the GBP. All the sectors showed great exposure against the USD followed by JPY and SGD. This was to be expected since the US, Japan and Singapore are Malaysia's main trading partners.

The crisis period showed that the numbers of firms exposed to the USD for trading and services and plantation sectors were reduced, but JPY showed that the largest currencies were exposed, a number of six and seven firms were exposed. This was expected because of the participation of Japanese firms in the development of Malaysia's export-oriented manufacturing sector since 1970. As mentioned in the seminar conducted in Japan, the second-largest source of foreign investments in approving projects in the manufacturing sector in Malaysia from 1998 to June 2003 was Japan. Regardless of the firm's business activities related to industrial products and finance sectors, they were exposed to the USD, showing a total of seven and six firms that were exposed.

As for the peg period, the number of firms that were exposed to USD for industrial products and finance was reduced to four and two, which is about a 40% to 60% decrease. There was an increase to eight firms that were exposed to the JPY for the trading and services sector compared to the crisis period. However, the plantation sector was reduced to four firms that were exposed. Surprisingly for SGD, the number of firms increased to 50% for industrial products and trading and services sectors, while for the plantation and finance sectors, the number of firms exposed remains unchanged. Then again, the GBP showed the lowest number of firms exposed to all sectors and zero number of firms exposed under the plantation sectors.

The de-peg (unpeg) period showed very interesting results. The number of firms that were exposed to the USD was slightly higher for the industrial products and trading and services sectors, while for the finance sector, the number of firms exposed remains unchanged when compared to the period of the peg. The JPY showed the highest exposure for the firms under

trading and services, and the plantation sectors for the period of crisis and pegged; the de-pegged period showed a decreasing number of firms exposed to both sectors which indicated three firms under the trading and services sector were exposed to the JPY and one firm under the plantation sector. These circumstances may be influenced by the government’s intervention and Malaysia’s managed float regime with a weighted average of a basket of foreign currencies. Surprisingly, during the de-peg period, the number of firms exposed to the GBP increased drastically for sectors for industrial products and trading and services, each showing ten and eight firms being exposed. As for SGD, the number of firms exposed in the industrial products sector is unchanged at any of the sub-periods, it remains 6 firms were exposed. Firms under the trading and services sector show a zero number of firms being exposed and the firms under the finance sectors show an increasing number of firms exposed to four firms.

Table 1

Result from Equation (1) – Firms Exposure to Exchange Rate by Sectors and Sub-Period

Sector	No of Firms by Sector	OVERALL				CRISIS				PEG				UNPEG			
		5% Significant level				5% Significant level				5% Significant level				5% Significant level			
		USD	SGD	JPY	GBP	USD	SGD	JPY	GBP	USD	SGD	JPY	GBP	USD	SGD	JPY	GBP
Industrial Products	26	10	6	6	5	7	3	6	3	4	6	4	2	6	6	5	10
Trading & Services	23	13	4	6	3	3	3	6	4	5	6	8	3	6	0	3	8
Plantation	14	7	1	3	0	3	3	7	1	3	3	4	0	1	2	1	1
Finance	14	12	1	1	1	6	3	4	2	2	3	2	1	2	4	3	2

Table 2 shows the number of firms that were exposed to one or more than one currency. Out of 77 firms that fell under these four sectors, 26 firms showed zero exposure against all four currencies for the overall period, 29 were exposed to one currency, 17 were exposed to two currencies, four were exposed to three currencies and only one firm was exposed to the three currencies for plantation and finance sectors, but both sectors were exposed to the three currencies with the amount of one firm each for the period of crisis and peg. The de-peg period showed that only one firm under the plantation sector was exposed to three currencies while none of the firms under the finance sector were exposed to three currencies.

During the crisis, 38 firms were not exposed to any currency, 22 firms were exposed to one currency, 11 firms were exposed to two currencies, four firms were exposed to three currencies and two firms were exposed to four currencies. The two firms that were exposed to four currencies were the firms under the industrial products and finance sectors.

The peg period compared to the period during the crisis shows a slightly increased from 38 to 39 firms were not exposed to any currency, but the number of firms under the industrial products and trading and services had decreased to 13 and 10 firms, while firms under the plantation and finance sectors showed the increasing to seven and nine firms that were not exposed to any currencies. Does this mean that most of the firms under the plantation and finance sectors are dealing with the US currency? Nevertheless, the number of firms exposed to all four currencies becomes zero.

During the de-peg (unpeg) period, the total number of firms not exposed to any currencies is expected to decrease when compared to the peg period. However, the result shows that the total number of firms with insignificant exposure against all four currencies slightly increased from 39 during the peg period to 40. The changes were contributed by firms under the

plantation and trading and services sectors. By looking at the inconsistent event, it can be concluded that the impact of the exchange rate against the firms' exposure is still a puzzle and remains mysterious which aligns with the findings by (Bacha et al., 2009; Bordin, 2008; Dominguez and Tesar, 2006).

Table 2

*Firms Exposed to Number of Currencies by Sectors and Sub-Period*

Sector	No of Firms by Sector	OVERALL					CRISIS					PEG					UNPEG				
		5% Significant level					5% Significant level					5% Significant level					5% Significant level				
		Zero	One	Two	Three	Four	Zero	One	Two	Three	Four	Zero	One	Two	Three	Four	Zero	One	Two	Three	Four
Industrial Products	26	10	7	7	2	0	15	6	3	1	1	13	10	3	0	0	10	8	6	1	1
Trading & Services	23	9	6	5	2	1	13	5	4	1	0	10	5	7	1	0	11	7	5	0	0
Plantation	14	5	7	2	0	0	5	5	3	1	0	7	5	1	1	0	11	2	0	1	0
Finance	14	2	9	3	0	0	5	6	1	1	1	9	3	1	1	0	8	1	5	0	0
Total	26	29	17	4	1	1	38	22	11	4	2	39	23	12	3	0	40	18	16	2	1

Table 3, the panel data and pooled analysis of the cross-section (SUR) random effects, indicates that the finance sector was exposed at a 5% significant level against any of the four currencies. The finance sector indicates an exposure of 5% which is at a significant level against the USD over all the periods of regimes except during the de-peg period. Surprisingly, even though Malaysia's currency was pegged to the USD, the exposure is still there. The explanation for this incidence may be related to the cross-section of the exchange rate factors as explained by Shapiro et al (2009) and other firms' risk profiles. As explained earlier, insignificant exposure against the USD during the de-peg period may be due to the managed float regime and the USD possibly being one of the foreign currencies in the basket of currencies. The JPY also showed a 5% significant level of exposure for the finance sector during the crisis period but with a positive (+ve) beta coefficient and the SGD showed a 10% significant level with a positive (+ve) beta coefficient.

The plantation sector showed an insignificant exposure over the whole period of the regime except during the crisis, the firms showed a very weak exposure against the JPY at a 10% significant level with a positive (+ve) beta coefficient. This has been explained by Bacha et al (2009), where this occurrence is due to this sector which is one of the sectors that are highly export-driven and appears to have benefited from the change in the exchange rate regime.

Firms under the industrial products and trading and services sectors showed an exposure at a 5% significant level only during the crisis period against the USD, JPY, and GBP. The USD showed an exposure for both sectors with negative (-ve) beta coefficients. However, the JPY also showed exposure for both sectors but with a positive (+ve) beta coefficient. The GPB only showed an exposure for the trading and services sector with a negative (-ve) beta coefficient.

Table 3: Result from Equation (2) – The panel data and pooled analysis of the cross-section (SUR) random effects



Sector	OVERALL				CRISIS				PEG				UNPEG			
	5% Significant level				5% Significant level				5% Significant level				5% Significant level			
	USD	SGD	JPY	GBP	USD	SGD	JPY	GBP	USD	SGD	JPY	GBP	USD	SGD	JPY	GBP
Industrial Products	0.1885	0.5737	0.5971	0.1314	0.0595	0.817	0.0126	0.1662	0.5291	0.3976	0.3867	0.5289	0.7466	0.4545	0.4203	0.2084
Trading & Services	0.6731	0.5505	0.645	0.3681	0.0412	0.7482	0.0001	0.0334	0.5174	0.8014	0.307	0.7465	0.5132	0.6932	0.2626	0.2447
Plantation	0.7966	0.5526	0.5483	0.6887	0.5042	0.9946	0.0743	0.3357	0.7441	0.9178	0.3327	0.9872	0.3169	0.1565	0.4349	0.1234
Finance	0.000	0.5813	0.8814	0.3135	0.0007	0.7878	0.0036	0.2238	0.0024	0.179	0.2199	0.2615	0.2404	0.0641	0.4222	0.5124

It can be concluded that there are differences in the types and extent of exposure among the sectors over the different periods of the regime. The varied differences were also implied for the direction and magnitude of the exposure. Therefore, it was found that the exchange rate exposure varied by sectors and time variants, and this is also supported by (Bacha et al., 2009; Muller and Verschoor, 2007; Nebaneh and Ndobbe, 2010; Wen and Tang, 2010). However, from this study, some of the results indicate unexpected results, hence; the hypothesis is partially accepted to support the variation in exposure by industrial sectors.

### Conclusion

According to the findings, when looking at sectors in Malaysia, it was decided to choose the most contributing sectors to the country's economic growth. Surprisingly, the expectation that none of the firms were exposed to the USD during the pegged period had vanished and no longer. The finance sector showed a significant exposure against the USD. This result was probably due to the movement of the MYR against USD, whereby the cross-exchange rate with other currencies may have contributed to exposure to the firms. Park and Alba (2007) suggested that the reason for the Asian currency crisis of 1997-98 was the overvaluation of East Asian currencies that affected the current account. Park and Alba (2007) mentioned that the twin roots of the overvaluation of those currencies were those currencies being closely pegged to the USD and the sharp appreciation of the USD against the Japanese yen since April 1995.

The researchers and practitioners are caught in a bind as a result of the contradictory findings. Even though it is impossible to have a currency with zero exposure, changes in the exchange rate system might reduce the firms' risk. Additional elements that may influence the enterprises' exposure, such as the firms' business activity and risk profile, must be evaluated by the researchers. Bordin (2008) argues that a correlation exists between the changes in the foreign exchange rate and the value of a firm. Although the theoretical underpinnings of exchange rate exposure were demonstrated as proof, the empirical analysis is rather insufficient due to the complexity of this relationship.

This study can provide some recommendations to policymakers in the government, regardless of the conventional or Islamic economic systems. There is much more to learn from this study in order to find the optimal strategy and tools to reduce and decrease the firms' exchange rate vulnerability. A comparison study of the influence of changes in currency rate regimes within or across countries on Shariah-compliant and non-shariah-compliant enterprises.

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