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The Impact of Exchange Rate on Malaysia Wood Export

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ABSTRACT

Malaysia has been a major wood producer and exporter since 1970s. The Malaysian wood industry has grown from being a producer and exporter of logs to primary and higher value-added products such as sawntimber, plywood, veneer, and mouldings. The export contribution of wood also plays a significant development for the Malaysian export sector. For Malaysian wood export, being one of the sector that influenced by the exchange rate volatility, the study on the impact of exchange rate on export is considered important. This study uses Granger causality approach to analyze the relationship between exchange rate and wood export. Chow test is used to examine the structural change of exchange rate regime; pegged exchange rate regime and managed float exchange rate. The quarterly data of exchange rate and wood export from 1997-2008 were employed for this study. The result indicated that there is a structural break in the third quarter of 2005 to the fourth quarter of 2008 which real exchange rate is significant and positively correlated to timber export under managed floating exchange rate regime. Thus, understanding the relationship between exchange rate and timber export performance is important for Malaysia to further develop the direction of the industry.

Keywords: Exchange rate, timber export, international trade, cointegration, granger-causality and chow-test.

1. INTRODUCTION

Malaysia is among developing countries which experience significant economic growth. Exports of manufactured products and natural resources have contributed much to the development of Malaysian economy. Furthermore, with land covered by almost 60 percent of natural forest, it is complicated to exclude the forest-based industry in further developing the national economy. To date, Malaysia is one of the major producer and exporter of wood products in the world. The Malaysian wood industry has grown massively from sawmilling, secondary processing to tertiary activities. At international level, Malaysia ranked in the top tenth of supplier for sawn timber, plywood and furniture from 2002-2008.

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Malaysia is also the largest exporter of plywood and furniture in the world. The export of plywood showed rising trends from 1982-2005 especially for European countries (The International Tropical Timber Organization, 2010). In the overall export of wood products from Malaysia, the significant progress obviously noticed in the export of wooden furniture compared to other major wood products from Malaysia.

Over the years, the relationship between the exchange rate and international trade has been analyzed. Indeed, 1997 Asian financial crisis has drove policy makers in the region including Malaysia to study the impacts of exchange rate on trade flows which Malaysia considered as the second most trade-dependent country (after Singapore in the ASEAN region). Malaysia takes different action and introduces the Malaysian model that comprised the core macroeconomic measures of interest rates, monetary and fiscal policies. One of the measures is stabilizing the exchange rate which is Malaysia Ringgit was fixed at 3.80 to the US dollar (Khor, 2009). In other words, among all, exchange rate fluctuation is one of the factors that are likely to determine the economic performance of a country.

Therefore, it is necessary to evaluate the relationship of exchange rate on Malaysian timber export as this sector is recognized as one of the main foreign exchange earner for national economy. This study will facilitate the government policy in enhancing the timber industry and choose the appropriate action in boosting the export performance of the industry.

The main objectives of this study aims to analyze the relationship between exchange rate and export earning of Malaysian timber products. This study is structured as follow: introduction, literature review, data and methodology, result and discussion. Finally conclusion will summarize this paper.

2. LITERATURE REVIEW

The relationship between exchange rate and export has received considerable attention from researchers since the collapse of fixed exchange rate in the early 1970s. A variety of theoretical and empirical model attempts to analyze the effects of exchange rate appreciation and depreciation. Theoretically, real exchange rate changes may have an impact on macroeconomics. When the country's real exchange rate depreciates, it will increase the aggregate demand of its products. A fall of the real exchange rate means the country's product become relatively cheaper in comparison to the products of other countries and hence the demand for the country's export may increase. However, according to Marshall-Lerner condition, depreciation will only be success if volumes of trade are elastic to price changes (Salvatore, 2004). Besides, the policy maker believed that exchange rate appreciation would be detrimental to exports and encourage

import. The Mundell-Flemming model rules for small open economies, an exchange rate appreciation will hurt export and encourage imports of a country. Empirically, Arslan (1993) found exchange rate depreciation has important role to boost the export growth to help Turkey recover rapidly from the debt crisis of late seventies. In addition, Thapa (2002) conducted a study on Nepal and suggested that depreciation of real exchange rate enhances international competitiveness of Nepal's domestic goods and boost their net export. Nabli and Marie-Ange (2002) conclude from the study on export performance of Middle Eastern and North African countries that the exchange rate overvaluation caused major loss and decreasing their export competitiveness. Saadiah and Kamaruzzaman (2008) make a study on exchange rate and export performance of Indonesia, Malaysia, Thailand and Singapore. They found that the real exchange rate undervaluation can be used to promote export while an overvaluation will tend to reduce export. In contrast, Lai and Miller (2005) on their study in Singapore summarize that the exchange rate depreciation not significantly improve export of the country. Alam (2010) on his study on Bangladesh found that Bangladesh export-price is inelastic and depreciation of the currency does not have much impact on Bangladesh export.

For Malaysian timber industry, being one of the most sector that much influenced by the exchange rate volatility, the further analysis on the link of exchange rate and export is considered important. As far as we are concern, there is no specific study deal with the link of exchange rate and Malaysian timber export as such has been carried out. Given the limitation of empirical study on area of timber export and exchange rate in Malaysia, this study deemed to bridge the gap by empirically analyze the link of exchange rate on the Malaysian timber export earnings.

3. DATA AND METHODOLOGY

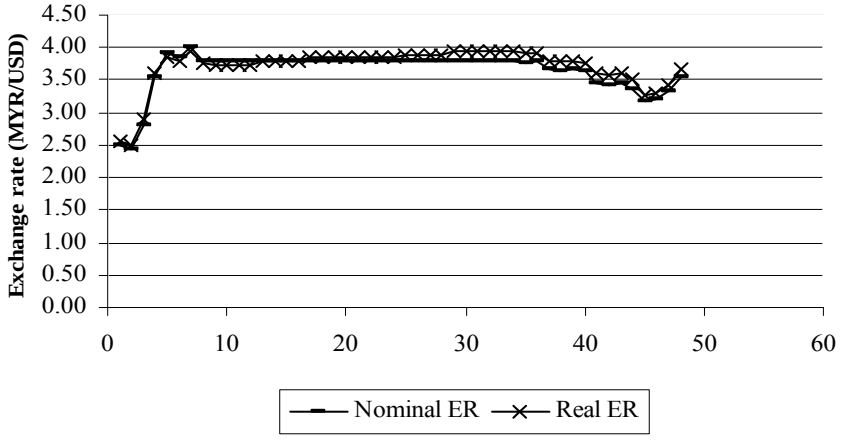
This study replicates the approach of Alam (2010) to analyze the relationship between exchange rate and Malaysian timber export. An important question is which exchange rate is appropriate for this study, either nominal or real exchange rate? The researchers have different views on the strength and lacks of both types. Nominal exchange rates are accused to overestimate the existing exchange rate uncertainty. However, the nominal exchange rates are preferred in short term analysis compared to long term. The real exchange rate can be defined as the nominal exchange rate that takes the inflation differentials among the countries into the account (Kipici and Kesyireli, 1997). Real exchange rate mainly related to macroeconomic variables such as resource endowments, technology and preference. The important fact is real exchange rate can be used as an indicator of the competitiveness in the foreign trade of a country. Thus, for this study, we used real exchange rate to analyze the impact on the export earnings of timber.

The quarterly data covers the period from 1997 to 2008 have been employed for this study. The data for nominal exchange rate was extracted from Central Bank of Malaysia (2010), the total export of Malaysian timber products were compiled from Maskayu Monthly Bulletin of Malaysian Timber Industry Board (1997, 1998….2008) and consumer price index (CPI) was taken from International Monetary Fund (IMF). The nominal exchange rate has been converted to real exchange rate by multiplying the nominal exchange rate of Malaysian Ringgit/US Dollar by the ratio of foreign price level to domestic price level. Consumer price index (index, 2000=100) has been used as proxy domestic price and foreign price as well.

$$RER = NER \times (CPI^{MAS}/CPI^{US})$$

In the above equation, RER refer as a real exchange rate, NER is a nominal exchange rate and CPI is consumer price index. Figure 1 shows the nominal exchange rate and real exchange rate of Malaysia.

Figure 1: Nominal vs. Real Exchange Rate for Malaysia, 1997-2008

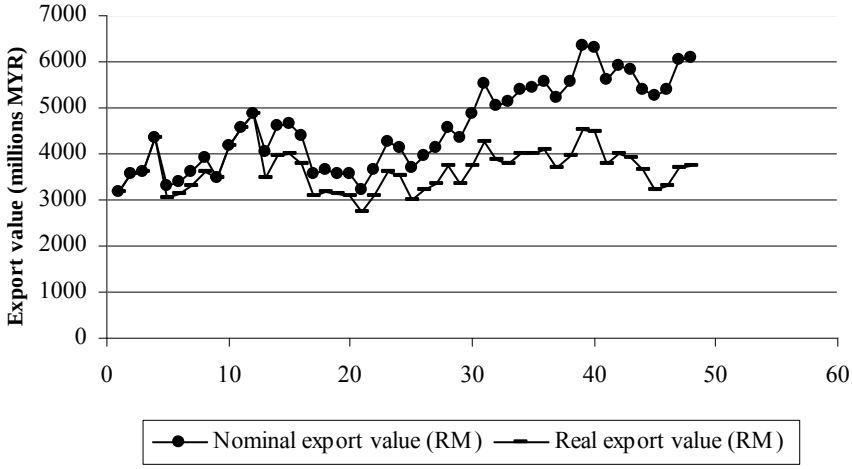


Source: Central Bank of Malaysia (2010)

In between, to reduce the price effects on Malaysian timber export, the nominal export has been transformed into real terms. To obtain the real export for Malaysian timber products, the GDP deflator (index, 2000=100) was used as a proxy to deflate the nominal export. As expected, nominal export grows faster than real export because it includes inflation. Real export growth appears more moderate because the calculation has separated out any pricing effects (Figure 2).

Real Export = Nominal export value / GDP deflator

Figure 2: Nominal vs. Real Export Value of Malaysian Timber Products, 1997-2008



Source: Malaysian Timber Industrial Board (various issues)

3.1 Statement of The Hypotheses

This study expects negative relationship exist between real exchange rate and the export performance of timber. In other words, if the real exchange rate increase (Malaysian Ringgit depreciates), this will increase the competitiveness of the timber products and hence encourages export earnings.

3.2 Unit Root Test

The unit root test is performed to examine the relevant time series for stationarity. The most common tests are known as Dickey-Fuller (DF) or Augmented Dickey-Fuller (ADF) and Philip Perron (PP). An important assumption of DF test is that the error term ε_t are independently and identically distributed. The ADF test adjusts the DF test to take care of possible serial correlation in the error terms by adding the lagged difference terms of the regressand. However, the PP is based on the Philip (1987) Z-test, which involves transforming the test statistic to eliminate any autocorrelation in the model. It uses nonparametric statistical methods to take care of the serial correlation in the error terms without adding lagged difference terms. In this study, both tests have been used to test for unit root. ADF is used for this study because of the power of test which is the (time) *span* of the data is based on 40 observations and if there are structural breaks in a time series, the unit root tests may not catch them. The first regression equation (1.1) (Ordinary Least Square (OLS) model), puts the real exchange rate as the independent variables of total export of timber products.

$$y_t = \alpha_0 + \beta_1 x_{t-1} + \varepsilon_t \quad (1.1)$$

The above equation shows that y is the real export, x is real exchange rate, ε is the error term, α and β is the parameters.

3.3. Granger Causality

Granger causality is statistical causality, which based on the premise that information on future value of a variable is contained in its past values. That is, we can predict future value based on past values. Thus,

$$\Delta y_t = \alpha + \Sigma \beta_j \Delta y_{t-I} + \varepsilon_t \quad (1.2)$$

However, if lagged values of x variable (real exchange rate) can improve the forecast of the y (timber export), they are said to Granger cause y:

$$\Delta y_t = \alpha + \Sigma \beta_j \Delta y_{t-i} + \Sigma \theta_i \Delta x1_{t-i} + \varepsilon_t \quad (1.3)$$

The regression (1.3) refers to Granger causality test to analyze the long run relationship between real exchange rate and timber export by looking at the coefficient of error term as long run causality. To test cointegration and causality, the procedures involves three steps. The first step refers to unit root test which is performed earlier in this analysis. The second step is to test for cointegration using the Johansen maximum likelihood approach. The purpose of cointegration test is to determine the cointegration between the groups of series. If such a combination exists, the variables are said to be cointegrated which interpreted as a long run equilibrium relationship among the variables.

4. RESULTS

To confirm that the results will not generate any spurious inferences, the unit root test is performed. Prior to unit root test, both series export and real exchange rate were graphed in log levels to analyze the stationary of the data. The export data was stationary at level and export was non stationary. Export data was integrated at order one (I(1)) and no further differencing of data or unit root testing is required (Table 1). However, integrated at order 1 does not necessarily mean that the series are cointegrated (Alam, 2009). For granger causality test it is important to know whether the variables are cointegrated, then a vector autogression in first differences will be misspecified. The first differencing of all the non stationary variables puts too many unit roots and any potentially important long-term relationship between the variables will be unclear (Alam, 2009). To straight to the point, we adopt the VAR model as proposed by Alam and test for the Granger Causality. From the equation (1.3), to see the variables are cointegrating by using Johansen test.

Table 1: Unit Root Test for Export (EX) and Real Exchange Rate (ER)

Method	Model	Variable	t- statistic
ADF	Constant	Ln_ER	- 8.2573**
		Ln_EX	- 2.5818*
	Trend	Ln_ER	- 2.5507*
		Ln_EX	- 6.6728**
PP	Constant	Ln_ER	- 4.3986**
		Ln_EX	- 3.6097**

* and ** indicate rejection of null hypothesis of non-stationary at 1% and 5% level of significance.

Null hypothesis: the variables are non-stationary.

Table 2: Cointegration between ER and EX

No. of cointegrated eq^{ns}	Trace statistics*	5% critical value	Max- Eigen Statistics**	5% critical value
r = 0	27.051	14.26460	19.79188	14.26460
r < 1	7.2593	3.841466	7.259351	3.841466

Trace test indicates 2 cointegrating equation(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level

Max-eigenvalue test indicates 2 cointegrating equation(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level

The result indicated that the rejection of the hypothesis of 'no cointegration' equations at 5% level of significance (Table 2). So we conclude that ER is cointegrated with EX, in other words there is long-run relationship between ER and EX.

Nevertheless, when involving time series data, it may occur structural changes with the values of parameters of the model do not remain the same through the period. We use Chow test to examine the structural change of exchange rate regime on export of major timber products. The Chow test rejected the null hypothesis which computed F value does exceed the critical F value at 5 percent significance level (Table 3). This implies that there is a structural break in data.

We divided the data into 2 sub-samples with the information that Malaysia gone through two periods of exchange rate regimes i) 1998:4 to 2005:2 (pegged exchange rate regime) and ii) 2005:3 to 2008:4 (managed float exchange rate

regime[4]). The results of OLS with different sub-samples are presented below (Table 4 and Table 5).

Table 3: Chow Break-point Test

Chow Breakpoint Test: 2006Q1			
Null Hypothesis: No breaks at specified breakpoints			
Varying regressors: All equation variables			
Equation Sample: 1997Q1 2008Q3			
F-statistic	3.637019	Prob. F(2,43)	0.0347
Log likelihood ratio	7.345568	Prob. Chi-Square(2)	0.0254
Wald Statistic	7.274038	Prob. Chi-Square(2)	0.0263

Table 4: Effect of Real Exchange Rate towards Timber Export
Pegged exchange rate regime (1998:4 to 2005:2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	24.54862	1.898665	12.92941	0.0000
ER	-1.892071	1.409012	-1.342835	0.1914
R-squared	0.067276		Log likelihood	17.02401
Adjusted R-squared	0.029967		F-statistic	1.803205
Durbin-Watson stat	0.739637		Prob(F-statistic)	0.191391

Table 5: Effect of Real Exchange Rate towards Timber Export
Managed floating exchange rate regime (2005:3 to 2008:4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	20.40894	0.387951	52.60698	0.0000
ER	1.290584	0.300538	4.294241	0.0013
R-squared	0.626365		Log likelihood	18.56135
Adjusted R-squared	0.592398		F-statistic	18.44051
Durbin-Watson stat	1.050815		Prob(F-statistic)	0.001268

[4] The managed float of exchange rate implies that the Central Bank would intervene in the foreign exchange market to smoothen short-term fluctuations.

Table 4 shows that, real exchange rate is not significant and is negatively related to timber export during pegged exchange rate regime while Table 5 shows that the real exchange rate is significant at 1% level of significant and positively related to timber export during managed floating exchange rate regime. It proves that floating exchange rate is one of the factors that affect Malaysia timber export. R^2 value obtained from this equation is about 0.6263 percent means that 62 percent of the variation in timber exports under this regime is explained by real exchange rate.

5. DISCUSSION

The results show significant positive relationship between real exchange rate and timber export performance during managed float exchange rate regime however this study expects negative relationship exist between real exchange rate and the export performance of timber. In the other hand, insignificant result of exchange rate to timber export during pegged exchange rate regime shows that pegged exchange rate is not a factor that affects Malaysia timber export even it shows negative sign as the hypothesis.

CONCLUSION

This study evaluate on the relationship between exchange rate and timber export in Malaysia. In general, we observe that real exchange rate is a significant factor in influencing the export performance of Malaysian timber industry during managed floating exchange rate regime. However, real exchange rate is not a sole factor that affects Malaysian timber export since it only explained 62 percent of the variation in timber export. The overall performance of the industry might be shaped by other internal and external factors such raw materials supply, investment, labor force, technology, policies as well as negotiations at international level. Nevertheless, for this study we focus only on small part of the important variables that believed has significant impact to the industry. To further extend, the research should be undertaken in considering other factors in modelling the export performance of Malaysian timber industry.

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