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Abstract
The purpose of this paper is to examine the asymmetric behavior in the adjustment of exchange rate pass-through to consumer price index in Thailand. This research applies advanced threshold cointegration model proposed by Enders and Siklos (2001). Both the Threshold Autoregressive (TAR) and Momentum Threshold Autoregressive (MTAR) models result showed the evidence of cointegration in the non-zero threshold value. Furthermore, both models revealed that the adjustment towards long-run equilibrium are asymmetric. The adjustment during exchange rate depreciation significantly affect inflation, while the adjustment during exchange rate appreciation is not significant. This paper suggests that policy makers should have a different reaction in policy decision between the depreciation and appreciation of exchange rate pass-through to consumer price index.

Keywords: Exchange rate, pass-through, consumer price index, asymmetric, Threshold Autoregressive, Momentum Threshold Autoregressive.

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1. Introduction

There has been numerous empirical research conducted on the exchange rate pass-through to inflation. However, the exchange rate pass-through phenomena are still a major concern in the current world economies (Devereux and Yetman, 2002; Devereux, 2004; Choudhri *et al*., 2005). Fluctuation of the exchange rate is usually transferred to aggregate inflation in a short period of time in developing countries compared to developed nations. Understanding the magnitude and effects of the aggregate exchange rate pass-through, as well as its causes is important, particularly for developing countries.

Thailand offers an interesting case to study the exchange rate pass-through. Figure 1 shows the relationship between consumer price and exchange rate in Thailand. It can be observed that there are two major turning points in the exchange rate. The Thai Baht starts to depreciate in 1996 and appreciate gradually from 2001 onward. During 1996 – 1998, when the exchange rate depreciates substantially, inflation tends to be high (around 6 - 8%). The exchange rate appreciates during the period from 2001 to 2008, however inflation did not decrease proportionately. This seems to suggest that there is possibility of an asymmetric adjustment. Though there is an obvious effect of Thai Baht depreciation on the consumer price, prices do not fall as much when the Thai Baht appreciates. Therefore, this paper aims to examine the asymmetric behavior in the adjustment of exchange rate pass-through to consumer price index in Thailand.

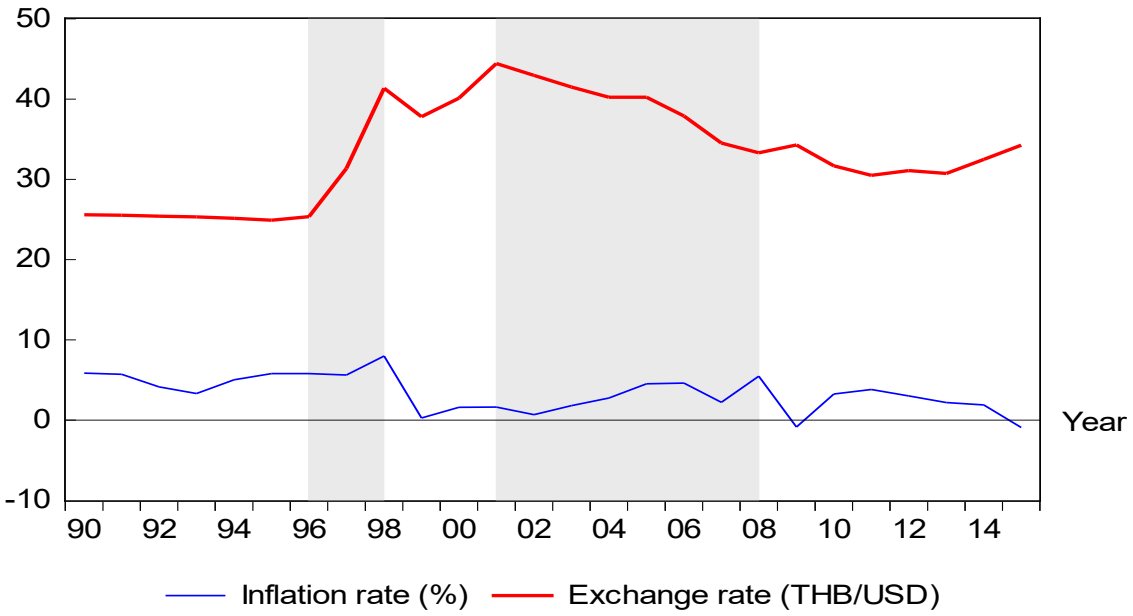

Figure 1: The relationship between consumer price and exchange rate in Thailand

2. Literature Review

2.1 Theory of Exchange Rate Pass-Through

Many papers written on exchange rate pass-through have used the theories of competition, cost theories and credibility of monetary policy to explain the degree of price adjustment and factors affecting exchange rate pass-through (Central Bank of Iceland, 2011). The exchange rate pass-through happens as exchange rate movement affects the imported inputs used in domestic production. However, its effect can be weak if the domestic market faced a greater

competition (Bacchetta and Wincoop, 2003). Moreover, the marketing and distribution costs of a product affect the level of exchange rate pass-through as they are part of the product price. If these cost of the product have a greater share in the product price, the pass-through would be weak (Burstein *et al*., 2003). The stability of monetary policy or inflation rate also weakens the exchange rate pass-through (Taylor, 2000).

The exchange rate pass-through measures the percentage change in domestic consumer price caused by percentage change in exchange rate. The concept states the import price in denominated currency of domestic importing country (P_t^{im}) should be equal to the export price (P_t^{ex}) after multiplying the exchange rate of the importing country (E_t). Thus,

$$P_t^{im} = P_t^{ex}.E_t \tag{1}$$

It is assumed that P_t^{ex} is the product of mark-up (λ_t) multiplying by the marginal cost of production(C_t), which is:

$$P_t^{ex} = \lambda_t.C_t \tag{2}$$

By substituting $P_t^{ex} = \lambda_t.C_t$ into Equation (1), we can obtain the import price denominated in the importing country's currency as:

$$P_t^{im} = \lambda_t.C_t.E_t \tag{3}$$

Using log transformation, we obtain:

$$P_t^{im} = \alpha_1\lambda_t + \alpha_2 C_t + \alpha_3 E_t \tag{4}$$

The pass-through is denoted by α_3 as the measure of partial elasticity of import price with respect to the exchange rate (see Sek and Kapsalyamova, 2008 and Sek *et al*., 2015).

2.2 Literature Review

The relationship between the exchange rate pass-through to domestic price, as well as the degree of changes that take place, have been acknowledged by many authors. Menon (1993) examined the pass-through relationship of exchange rate changes in prices of Australian imports of passenger motor vehicles. Tekin and Yazgan (2009) studied the exchange rate pass-through to prices of internationally traded goods in Turkey. María-Dolores (2009) investigated the degree of exchange rate pass-through to the prices of imports in the European Union. Chang and Tsong (2010) had used a panel data to estimate the change vis-à-vis monetary policy to import prices in the emerging market economy. Besides, the relationship between exchange rate pass-through and domestic prices has been examined in a handful of studies on symmetric adjustment process (Miljkovic *et al*., 2003; Doyle, 2004; Kara and Öğünç, 2009; Ghosh and Rajan, 2009; and Takhtamanova, 2010). Most of these empirical studies applied Johansen cointegration modeling. Despite being enlightening, they could not state how the positive exchange rate pass-through differs from the negative pass-through.

On the other hand, there are a few researches that tried to investigate the possibility of asymmetric exchange rate pass-through. A study of exchange rate pass-through in Brazil by Correa and Minella (2006) showed that when the exchange rate volatility is below certain threshold, agents perceived changes as more persistent than otherwise; therefore, the pass-

through is higher. The study also analyzed pass-through behavior on demand conditions. The findings showed that when demand is above the threshold, the pass-through is high. Otherwise, it becomes zero. Besides, Wimanda (2014) investigated the impacts of exchange rate depreciation and money growth on inflation in Indonesia using a threshold model. The results indicated that there are threshold effects of money growth on inflation, but no threshold effect of exchange rate depreciation on inflation.

Moreover, the study of Przystupa and Wróbel (2011) and Doğan (2013) revealed an asymmetry response of consumer price index to output gap. The pass-through is affected positively by the aggregate demand conditions, means that when the economy is growing, exchange rate changes are transmitted to prices to a larger extent than the other way round. In addition, Ghoshray (2008) investigated the asymmetric adjustment of rice export prices in Thailand and Vietnam. The results concluded that the nature of asymmetry is captured by the Momentum Threshold Autoregressive model which suggests that the path of adjustment to the long run equilibrium relation is relatively faster when the price differential is decreasing than opposed the case when it is increasing. It is argued that with an aim towards achieving self-sufficiency, the governments tend to react towards a decrease in the price of agricultural commodity. Strategies developed involve in matching the country's rice price decreases but not rice price increases. Much of the time the policy makers are silent or inactive when the rice price increase, thus create an asymmetric response. Another study by Delatte and López-Villavicencio (2012) investigated the asymmetric effect of exchange rate variations on prices in United States, United Kingdom, Germany, and Japan using nonlinear autoregressive distributed lag (NARDL) model. The results show that prices react differently to exchange rate appreciations and depreciations, in particular, depreciations are passed through prices more than appreciations.

2.3 The Rationale behind Asymmetric Exchange Rate Pass-Through

Koutmos and Martin (2003) reviewed that there are three possible causes of asymmetric responses to exchange rate movements. There are hysteresis behavior (Baldwin, 1988), asymmetric pricing behavior (Knetter, 1994; Marston, 1990 and Goldberg, 1995), and asymmetric hedging behavior (Bodnar et al., 1998)[1]. Among these, hysteresis behavior and asymmetric pricing behavior can explained our main interest of asymmetric exchange rate pass-through into consumer price. Hysteretic pertains to effects that persist after the original causes of the effects no longer exist. Baldwin (1988) shows that temporary exchange rate fluctuations can have persistent (i.e. hysteretic) effects on trade prices and quantities. If market-entry costs are sunk, sufficiently large real exchange rate shocks can alter domestic market structure and thereby induce hysteresis in import prices and quantities. The finding of Knetter (1994) showed that export price adjustment is asymmetric with respect to currency fluctuations in at least two circumstances. If firms face capacity constraints in distribution networks or quantitative trade restrictions, then pricing-to-market may be greater during depreciations of the exporter's currency. If firms attempt to build market share subject to the threat of trade restrictions, then pricing-to-market may be greater during appreciations of the exporter's currency. Marston (1990) and Goldberg (1995) also documented asymmetric pricing-to-market behavior.

[1] Asymmetric hedging explained the behavior of firm that took one-side of hedging. For example, firms with net long positions (i.e. net exporters with foreign currency receivables) may be inclined to hedge against domestic currency appreciations yet remain unhedged against domestic currency depreciations. Alternatively, firms with net short positions (i.e. net importers with foreign currency payables) may be inclined to hedge against domestic currency depreciations yet remain unhedged against domestic currency appreciations.

3. Methodology and Data

For this study, the consumer price index was used as a proxy of P_t^{im}, the industrial production index (IPI) was employed for C_t, and E_t represented by the bilateral exchange rate for Thailand against the US Dollar (EXR). Thus, our long-run model becomes:

$$CPI_t = \alpha_0 + \beta_1 EXR_t + \beta_2 IPI_t + \mu_t \quad (5)$$

The data used for this study were monthly data spans from 2002M01 to 2010M07. The source of data for consumer price index (base-year 2011) was Bureau of Trade and Economic Indices, Ministry of Commerce, Thailand. The data for exchange rate (Thai Baht per US Dollar) and the industrial production index (base-year 2000) were collected from Bank of Thailand.

The objective of this study is to analyze the exchange rate pass-through into consumer price in the framework of cointegration and asymmetric adjustment. The first step is to examine the stationarity of the data or the integration of the data using the well-known augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests. Next, the asymmetric cointegration developed by Enders and Siklos (2001) are employed. Both the Threshold Autoregressive (TAR hereafter) and Momentum Threshold Autoregressive (MTAR hereafter) methods will be employed in the empirical estimations. The difference between these two methods are the TAR model can capture a deep cycle process if, for example, when the variation above the threshold level are more prolonged than below the threshold level. Meanwhile the MTAR is capable of capturing sharp sequential movement and especially valuable when the series exhibits more momentum in one direction than the other. The threshold value can be zero or non-zero. And if it is non-zero, it can be estimated using Chan's (1993) method of searching over all possible threshold values to minimize the residual sum of squares (RSS).

From the estimated regression, residuals will be extracted and tested for stationarity. For the three variables to be cointegrated, the residuals must be stationary at level. The estimation of ρ_1 and $\rho_2$is as the following regression:

$$\Delta\mu_t = I_t\rho_1\mu_{t-1} + (1 - I_t)\rho_2\mu_{t-1} + \varepsilon_t, \quad (6)$$

where ε_t is a white-noise disturbance and μ_t is the residual. The residuals (μ_t) in Equation (5) are extracted to Equation (6) for further estimation and I_t is the Heaviside indicator function, such that:

$$I_t = \begin{cases} 1 & if\ \mu_{t-1} \geq \tau \\ 0 & if\ \mu_{t-1} < \tau \end{cases} \text{ TAR model,} \qquad M_t = \begin{cases} 1 & if\ \Delta\mu_{t-1} \geq \tau \\ 0 & if\ \Delta\mu_{t-1} < \tau \end{cases} \text{ MTAR model}$$

where τ is the threshold value.

The test equation will be:

$$\Delta\mu_t = I_t\rho_1\mu_{t-1} + (1 - I_t)\rho_2\mu_{t-1} + \sum_{i-1}^{\rho-1}.\gamma_t\Delta\mu_{t-1} + \varepsilon_t \quad (7)$$

The TAR model captures deviation from the equilibrium in level or long-run while MTAR signifies an accumulation of change in the deviation. If μ_{t-1} is above the threshold, the

adjustment coefficient is $\rho_1\mu_{t-1}$ and if μ_{t-1} is below the threshold, the adjustment coefficient is $\rho_2\mu_{t-1}$.

The null hypothesis of no cointegration and symmetric shown below:

1. $\rho_1 = \rho_2 = 0$, F-statistics
2. $\rho_1 = \rho_2$, F-equal

If Hypothesis 1 and 2 are rejected, we can conclude that there is a long-run cointegration relationship among the variables and the error correction term is asymmetric.

4. Result and Discussion

The results of Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) unit root test presented in Table 1 indicated that all variables, namely consumer price index (CPI), industrial production index (IPI) and exchange rate (EXR) are integrated of order I(1). From the results, all three variables failed to reject the null hypothesis of non-stationary, except for IPI in PP test that assumed constant with trend. The confirmation of the same order of integration suggests that we can proceed to conduct the Engle and Siklos Asymmetric cointegration test.

Table 1: ADF and PP Unit Root Tests

	Level				First Difference			
	ADF		PP		ADF		PP	
Var.	C	C w T	C	C w T	C	C w T	C	C w T
CPI	-0.5462	-3.1075	-0.3676	-2.6558	-6.9279[a]	-6.8931[a]	-6.9561[a]	-6.9218[a]
EXR	-1.7018	-2.7899	-1.0855	-2.5112	-7.0582[a]	-7.0249[a]	-7.0699[a]	-7.0370[a]
IPI	-1.1219	-3.1474	-1.6013	-5.4368[a]	-16.553[a]	-16.459[a]	-18.624[a]	-18.506[a]

Note: C & C w T denotes constant & constant with trend respectively. Schwarz information criterion (SIC) is used to select the optimum lag order and **a** denote significance at 1% level.

Enders and Siklos (2001) test is required to validate the presence of asymmetric cointegration against the symmetric cointegration. The results presented in Table 2 revealed that there are three-lag changes in residuals. Besides that, the Monte Carlo experiment able to search for the critical value at 5% level of significance. Note that in the TAR model using the threshold value $\tau = 0$, the value of F-statistics 5.4642 is smaller than 7.1956 at 5 per cent critical value. Therefore, we conclude that cointegration does not exist. Subsequently, we used Chan's technique (1993) to search for the unknown threshold value. The threshold value found by Chan in TAR-consistent is -2.4642, hence, we found that cointegration exists as the value of F-statistics 8.9808 is higher than 8.3744 at 5 per cent critical value.

Moving to MTAR model with threshold value $\tau = 0$, the value of F-statistics 5.4651 is smaller than 7.6869, we cannot reject the null hypothesis which states that cointegration does not exist. Furthermore, using MTAR-consistent with threshold searched by Chan's techniques, we found threshold value of -1.4221 and F-statistic equals to 16.1497, which is higher than the 9.5148 critical values at 5 per cent. This allows us to conclude that the variables are cointegrated. These two evidences of cointegration permit us to continue investigating the nature of cointegration adjustment, whether it is symmetric or asymmetric.

Table 2: TAR and MTAR Cointegration and Asymmetric Cointegration Test

	TAR	TAR consistent	M-TAR	M-TAR consistent
$\rho 1^a$	-0.1937 (0.0926)	-0.1134 (0.0792)	-0.1919 (0.0951)	-0.1179 (0.0670)
$\rho 2^a$	-0.2530 (0.0903)	-0.4263 (0.1031)	-0.2521 (0.0891)	-0.7514 (0.1349)
$\gamma 1^a$	-0.1642 (0.1073)	-0.1420 (0.1043)	-0.1679 (0.1074)	-0.1005 (0.0989)
$\gamma 2^a$	0.1672 (0.1078)	0.1867 (0.1047)	0.1661 (0.1078)	0.1912 (0.0984)
$\gamma 3^a$	0.2199 (0.1019)	0.2087 (0.0987)	0.2134 (0.1031)	0.1899 (0.0931)
Lags	3	3	3	3
τ	0	-2.4642	0	-1.4221
F-statistics	5.4642	8.9808[b]	5.4651	16.1497 [b]
F-equal	0.2392	6.5560 [b]	0.2408	19.4331 [b]

Note: F-equal hypothesis $\rho_1 = \rho_2$, F-statistics hypothesis $\rho_1 = \rho_2 = 0$. The optimal lags are determined based on AIC, b denote significance at 5% level.

Considering the F-equal statistics in TAR-consistent and MTAR-consistent which are higher than the critical value provided by Monte Carlo at 5 per cent level of significance, we found that the positive and negative exchange rate have different effects on inflation, the speed of adjustment may not be necessarily constant.

The asymmetric test of cointegration for TAR, TAR-consistent, MTAR and MTAR-consistent was conducted, where the null hypothesis of symmetric adjustment that is $p_1 = p_0$ against the alternative hypothesis of asymmetric adjustment. Using the standard F-statistics, the result showed that there is an asymmetric cointegration.

To obtain the coefficients for the long-run cointegration model, the Dynamic Ordinary Least Squares (DOLS) estimation was done. The equation obtained was presented below. The result revealed the long-run coefficient of EXR is negative and significant at 1 per cent, while for IPI, it is positive and also significant at 1 per cent.

$$CPI_t = 103.0942 - 0.9234\, EXR_t + 0.10975\, IPI_t + \mu_t$$
$$(13.4892) \quad (-6.8271) \quad (6.5529)$$
$$R^2 = 0.9085$$
$$P - value = 0.0000$$

The asymmetric error correction adjustment is estimated based on the threshold value in TAR-consistent and MTAR-consistent. In selecting the number of lags length to be used, we applied the most common approach for testing, starting from the maximum lags to the minimum. The procedure is to acquire the optimal and efficient results of asymmetric error correction adjustment.

Table 3 shows the asymmetric error correction results. The results revealed that the exchange rate has an asymmetric impact on domestic inflation in Thailand. The speed of positive adjustment of both models are quite similar; with the TAR model showing an estimated value of 11%, and the MTAR model with 12% of the error correction in the following month with the level of significance at 5% and 1%, respectively. On the other hand, the negative adjustment speed of both the TAR and MTAR models are less than 5% and is insignificant. This finding is consistent with the actual experience in Thailand. When the value of Thai Baht depreciated, the prices of most of the domestic goods and services increased, however, when there was an appreciation of Thai Baht, the prices of goods and services did not decrease. Meanwhile, in the international market, an appreciation of domestic currency

implies that domestic goods and services are more expensive, hence resulting in the buying of more foreign products which subsequently lead to a lower demand and production in the domestic market.

Table 3: Asymmetric Error Correction

	TAR-consistent	MTAR-consistent
λ^+	-0.1103 [b] (-2.1434)	-0.1156[a] (-2.7700)
λ^-	-0.0497 (-0.9633)	-0.0419 (-1.0577)
R^2	0.2050	0.3324
DW Statistics	2.0186	1.9045
F-statistics	4.9022	3.2557

Note: **a** denote significance at 1% level, **b** denote significance at 5% level.

5. Conclusion and Policy Recommendation

This study focuses on the fluctuation of the exchange rate pass-through to consumer price index in Thailand. The empirical estimation applied the threshold (TAR) and momentum threshold (MTAR) model proposed by Enders and Siklos (2001). The result showed the evidence of cointegration in the non-zero threshold value. Furthermore, the adjustment processes are asymmetric. The exchange rate depreciation has a significant impact on consumer price index, while the appreciation does not. The results are consistent with our expectation that currency appreciation might generate less effect on consumer price while currency depreciation might have a more significant impact on consumer price. Although the import price is lower during currency appreciation, the importers keep the benefits of currency appreciation in the form of higher profit by not reducing the domestic prices of goods and services (possible if they are not in competitive markets). However, when there is currency depreciation, the importers will pass-through the increase in import cost to the consumer by raising the domestic prices of goods and services.

The result has important policy implication for Thailand policy makers or the Apex Bank of Thailand. This finding highlights the importance of having the awareness that exchange rate fluctuation has a different impact on CPI. Hence, the government shall have a different policy reaction towards the depreciation and appreciation of Thailand exchange rate. During depreciation of the domestic currency, there is a need for policy makers to monitor the prices of imported goods and services because the importers can pass-through the effect of currency depreciation by raising the domestic prices of goods and services. Thus, if the central bank targets mild inflation pressure, they have to take the exchange rate depreciation into account and stabilize its fluctuations. This is a necessary move because it significantly affects consumer prices.

References

Bacchetta, P. and E. Van Wincoop (2003) "Why Do Consumer Prices React Less Than Import Prices To Exchange Rates" *Journal of the European Economic Association* **1**, 662–670.

Baldwin, R. (1988) "Hysteresis in Import Prices: The Beachhead Effect" *American Economic Review* **78**, 773–785.

Bodnar, G. M., G. S. Hayt and R. C. Marston (1998) "Wharton Survey of Financial Risk Management By U.S. Non-Financial Firms" *Financial Management* **27**, 70–91.

Burstein, A. T., J. C. Neves and S. Rebelo (2003) "Distribution Costs and Real Exchange Rate Dynamics During Exchange Rate Based Stabilizations" *Journal of Monetary Economics* **50***,* 1189–1214.

Central Bank of Iceland (2011) "Exchange Rate Pass-Through" *Monetary Bulletin* No.2, Central Bank of Iceland.

Chan, K. S. (1993) "Consistency and Limiting Distribution of the Least Squares Estimator of a Threshold Autoregressive Model" *The Annals of Statistics* **21**, 520-533.

Chang, J. C. and C. C. Tsong (2010) "Exchange Rate Pass-Through and Monetary Policy: A Cross-Commodity Analysis" *Emerging Markets Finance and Trade* **46**, 106–120.

Choudhri, E. U., H. Faruqee and D. S. Hakura (2005) "Explaining the Exchange Rate Pass-Through in Different Prices" *Journal of International Economics* **65**, 349–374.

Correa, A. S. and A. Minella (2006) "Nonlinear Mechanisms of the Exchange Rate Pass-Through - A Phillips Curve Model with Threshold for Brasil" *Working Paper Series Do Banco Central* **122**, 1–31.

Delatte, A. L. and A. López-Villavicencio (2012) "Asymmetric Exchange Rate Pass-Through: Evidence from Major Countries" *Journal of Macroeconomics* **34**, 833–844.

Devereux, M. B. (2004) "Should the Exchange Rate Be a Shock Absorber?" *Journal of International Economics* **62**, 359–377.

Devereux, M. B. and J. Yetman (2002) "Menu Costs and the Long-Rub Output-Inflation Trade-Off" *Economics Letters* **76**, 95–100.

Dickey, D. A and W. A. Fuller (1979) "Distribution of The Estimators for Autoregressive Time Series with a Unit Root" *Journal of American Statistical Association* **74**, 427-431.

Dickey, D. A. and W. A. Fuller (1981) "Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root" *Econometrica* **49**, 1057-1072.

Doğan, B. Ş. (2013) "Asymmetric Behavior of the Exchange Rate Pass-Through to Manufacturing Prices In Turkey" *Emerging Markets Finance and Trade* **49**, 35–47.

Doyle, E. (2004) "Exchange Rate Pass-Through in a Small Open Economy: The Anglo-Irish Case" *Applied Economics* **36**, 443–455.

Enders, W. and P. L. Siklos (2001) "Cointegration and Threshold Adjustment" *Journal of Business and Economic Statistics* **19**, 166–176.

Ghosh, A. and R. S. Rajan (2009) "What is the Extent of Exchange Rate Pass-Through in Singapore? Has it Changed Over Time?" *Journal of the Asia Pacific Economy* **14**, 61–72.

Ghoshray, A. (2008) "Asymmetric Adjustment of Rice Export Prices: The Case of Thailand and Vietnam" *International Journal of Applied Economics* **5**, 80-91.

Goldberg, P. K. (1995) “Product Differentiation and Oligopoly in International Markets: The Case of the U.S. Automobile Industry” *Econometrica* **63**, 891–951.

Kara, H. and F. Öğünç (2009) "Inflation Targeting and Exchange Rate Pass-Through: The Turkish Experience" *Emerging Markets Finance and Trade* **44**, 52–66.

Knetter, M. M. (1994) "Is Export Price Adjustment Asymmetric? Evaluating the Market Share and Marketing Bottlenecks Hypotheses" *Journal of International Money and Finance* **13**, 55–70.

Koutmos, G. and A.D. Martin (2003) "Asymmetric Exchange Rate Exposure: Theory and Evidence" *Journal of International Money and Finance* **22**, 365–383.

María-Dolores, R. (2009) "Exchange Rate Pass-Through in Central and East European Countries", *Eastern European Economics*, **47**, 42–61.

Marston, R.C. (1990) "Pricing to Market in Japanese Manufacturing" *Journal of International Economics* **29**, 217–236.

Menon, J. (1993) "Exchange Rate Pass-Through: Australian Imports of Motor Vehicles" *International Economic Journal* **7**, 93–109.

Miljkovic, D., G. W. Brester and J. M. Marsh (2003) "Exchange Rate Pass-Through, Price Discrimination, and US Meat Export Prices" *Applied Economics* **35**, 641–650.

Phillips, P. C. B. and P. Perron (1988) "Testing for a Unit Root in Time Series Regression" *Biometrika* **75**, 335–346.

Przystupa, J. and E. Wróbel (2011) "Asymmetry of the Exchange Rate Pass-Through" *Eastern European Economics* **49**, 30–51.

Sek, S. K. and Z. Kapsalyamova (2008) "Exchange Rate Pass-Through and Volatility: Impacts on Domestic Prices in Four Asian Countries" *Munich Personal RePEc Archive MPRA* 11130

Sek, S. K., X. Q. Teo and Y. N. Wong (2015) "A Comparative Study on the Effects of Oil Price Changes on Inflation" *Procedia Economics and Finance* **26**, 630–636.

Takhtamanova, Y. F. (2010) "Understanding Changes in Exchange Rate Pass-Through" *Journal of Macroeconomics* **32**, 1118–1130.

Taylor, J. B. (2000) "Low Inflation, Pass-Through, and The Pricing Power of Firms" *European Economic Review* **44**, 1389–1408.

Tekin, R. B. and M. E. Yazgan (2009) "Exchange Rate Pass-Through in Turkish Export and Import Prices" *Applied Economics* **41**, 2221–2228.

Wimanda, R. E. (2014) "Threshold Effects of Exchange Rate Depreciation and Money Growth on Inflation Evidence From Indonesia" *Journal of Economic Studies* **4**, 196–215.