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16 January 2017

Online at <https://mpra.ub.uni-muenchen.de/81213/>  
MPRA Paper No. 81213, posted 08 Sep 2017 06:01 UTC

# Malaysia-Japan Commodity Trade and Asymmetric Effects of Exchange Rate Changes

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## ABSTRACT

Asymmetry analysis is a new norm in applied research and the link between the trade balance and the exchange rate is no exception. In this paper we investigate the asymmetric response of the trade balance of each of the 60 industries that trade between Malaysia and Japan. We find short-run asymmetric effects of exchange rate changes on the trade balance of 50 industries (including the two largest industries), short-run adjustment asymmetry in 47 industry, and short-run impact asymmetry in 30 industries. However, short-run asymmetric effects lasted into the long run only in limited number of industries. Results were industry-specific at best.

**JEL Classification:** F31

**Key words:** Nonlinear ARDL, Asymmetry, 60 Industries, Malaysia, Japan

## I. Introduction

As more and more economies in Asia move toward industrialization and specialize in high-tech industries, trade among themselves, especially with advanced economies such as Japan grows. Malaysia is one such example that has transferred itself from an agriculture-based economy to industry-based economy. Indeed, almost 45% of the trade between Malaysia and Japan is conducted by two industries one of which is electronic. Gas, natural and manufactured has 23% share and electrical machinery, apparatus and appliances has 20.6% trade share. The rest of trade is conducted by 58 other industries with different shares, mostly small but some with relatively large shares.<sup>1</sup> Which industry's trade balance is sensitive to changes in the real bilateral ringgit-yen exchange rate? This question was recently addressed by Bahmani-Oskooee and Harvey (2017) as far as aggregate bilateral trade balance between the two countries was concerned. They found no evidence of any long-run significant effects of real ringgit-yen rate on the bilateral trade balance. Even introducing nonlinear adjustment of the exchange rate for the purpose of asymmetry analysis was futile.<sup>2</sup>

Suspecting that Bahmani-Oskooee and Harvey's (2017) findings suffer from aggregation bias, we disaggregate bilateral trade flows of the two countries by industry and consider the response of trade balance of 60 industries that trade between the two countries to changes in the real bilateral exchange rate. Our hope is to identify industries that could benefit from ringgit-yen depreciation and those that are hurt by ringgit-yen appreciation. To gain insight to movement of the real ringgit-yen exchange rate we plot it over our study period in Figure 1.

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<sup>1</sup> The evidence from Bahmani-Oskooee and Harvey (2017) suggests that Japan is the third largest partner of Malaysia, next to China and Singapore.

<sup>2</sup> A few old studies also did not find any significant link between Malaysia's trade balance with the world. The list includes Lal and Lowinger (2001), Duasa (2007) and Yusoff (2007, 2010). Since these studies used trade data between Malaysia and rest of the world, they also suffer from aggregation bias.

Figure 1 goes about here

Rest of the paper is organized in the following manner. In Section II we introduce the models and methods. We then report our findings in Section III and provide a summary in Section IV. Variables definitions and data sources appear in an Appendix.

## II. The Models and Methods<sup>3</sup>

Almost all studies that try to assess the short-run and long-run effects of exchange rate changes on the trade balance rely upon error-correction modelling and cointegration approach. These methods require specifying a reduced form trade balance model. Theoretical derivation by Rose and Yellen (1987) has identified level of economic activities in two trading partners and the real bilateral exchange rate as three main determinants of the trade balance between two countries. Indeed, Bahmani-Oskooee and Harvey (2017) included the three determinants in their model. Therefore, we follow their specification with a slight modification so that our specification is suitable to commodity level data, as follows:

$$\text{LnTB}_{j,t} = \alpha_0 + \alpha_1 \text{LnIP}_t^{\text{ML}} + \alpha_2 \text{LnIP}_t^{\text{JP}} + \alpha_3 \text{LnREX}_t + \varepsilon_t \quad (1)$$

where  $TB_j$  is the trade balance of industry  $j$ . In order to be able to specify the model in log linear form, the trade balance is defined as Malaysian imports of industry  $j$  from Japan over its exports of the same industry to Japan. Since data used in this study are monthly, the only measure of economic activity at monthly frequency is index of industrial production. Therefore, in (1)  $\text{IP}^{\text{ML}}$  and  $\text{IP}^{\text{JP}}$  denote index of industrial production in Malaysia and Japan, respectively. Finally, the real bilateral exchange rate, i.e., the real ringgit-yen rate is identified by REX.

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<sup>3</sup> The models and methods in this section closely follows Bahmani-Oskooee and Harvey (2017).

Once (1) is estimated by the Ordinary Least Squares method or any method, we expect an estimate of  $\alpha_1$  to be positive and an estimate of  $\alpha_2$  to be negative. This is mostly due to the fact that an increase in Malaysian economic activity is supposed to lead to a rise in its imports and an increase in Japanese economic activity is expected to lead to an increase in Malaysian exports.<sup>4</sup> As for expected estimate of  $\alpha_3$ , if a real depreciation of ringgit against the yen or a decline in REX is to reduce Malaysian imports of industry  $j$  and boost its exports of industry  $j$  to Japan, a positive estimate is expected.

Magee (1973) argued theoretically and Bahmani-Oskooee (1985) demonstrated empirically that short-run effects of exchange rate changes could be different than its long-run effects. Specifying (1) in an error-correction format will enable us to assess the short-run effects too. Indeed, Pesaran *et al.*'s (2001) ARDL approach has the advantage of obtaining the short-run and long-run estimates in one step as outlined below:

$$\begin{aligned} \Delta LnTB_{j,t} = & \beta_o + \sum_{i=1}^{n1} \beta_{1,i} \Delta LnTB_{j,t-i} + \sum_{i=0}^{n2} \beta_{2,i} \Delta LnIP_{t-i}^{ML} + \sum_{i=0}^{n3} \beta_{3,i} \Delta LnIP_{t-i}^{JP} + \sum_{i=0}^{n4} \beta_{4,i} \Delta LnREX_{t-i} \\ & + \gamma_0 LnTB_{j,t-1} + \gamma_1 LnIP_{t-1}^{ML} + \gamma_2 LnIP_{t-1}^{JP} + \gamma_3 LnREX_{t-1} + \xi_t \end{aligned} \quad (2)$$

Once (2) is estimated by the OLS method, short-run effects are embodied in the coefficient estimates that are attached to first-differenced variables. The long-run effects are inferred by the estimates of  $\gamma_1$ - $\gamma_3$  normalized on  $\gamma_0$ . To avoid spurious regression problem, Pesaran *et al.* (2001) recommend applying the F test to establish joint significance of lagged level variables as a sign of cointegration. They tabulate new critical values for the F test that account for integrating properties

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<sup>4</sup> Note that if the increase in economic activity is due to an increase in production of import-substitute goods, an estimate of  $\alpha_1$  could be negative and that of  $\alpha_2$  could be positive (Bahmani-Oskooee 1986).

of variables. Indeed, we could have combination of I(0) and I(1) variables and this is another advantage of this method.

Suppose we estimate (2) and find out that like most previous studies the normalized long-run exchange rate elasticity is insignificant. Should we conclude that the real bilateral exchange rate has no significant long-run effects on the trade balance of that specific industry? Recent asymmetry analysis by Bahmani-Oskooee and Fariditavana (2015, 2016) says no. Nonlinear adjustment of the real exchange rate which is used to assess asymmetric effects of exchange rate changes may change the picture and yield significant outcome. The main reason for asymmetric effects is traders' expectations which are said to be different to currency depreciations compared to appreciations. Another reason is the evidence that import and export prices react to exchange rate changes asymmetrically (Bussiere 2013) which implies that the trade balance should also react to exchange rate changes asymmetrically.

In order to assess possibility of asymmetric effects of exchange rate changes, we too follow Shin *et al.* (2014) and construct  $\Delta LnREX$  first. We then generate two new time-series variables, one representing only ringgit appreciation and the other one only ringgit depreciation. The first one we denote by POS that is constructed as partial sum of positive changes in  $\Delta LnREX$  and the second one is denoted by NEG and constructed as partial sum of negative changes in  $\Delta LnREX$ .<sup>5</sup> Shin *et al.* (2014) then recommend replacing  $LnREX$  in (2) by POS and NEG variables to arrive at:

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<sup>5</sup> Note that at any time  $t$ , the partial sum of positive changes in a variable is the cumulative sum of that variable up to time  $t$  where negative values are replaced by zeros. By the same token, partial sum of negative changes are the cumulative sum where positive values are replaced by zeros.

$$\begin{aligned}
\Delta LnTB_{j,t} = & \beta_o + \sum_{i=1}^{n1} \beta_{1,i} \Delta LnTB_{j,t-i} + \sum_{i=0}^{n2} \beta_{2,i} \Delta LnIP_{t-i}^{ML} + \sum_{i=0}^{n3} \beta_{3,i} \Delta LnIP_{t-i}^{JP} \\
& + \sum_{i=0}^{n4} \beta_{4,i} \Delta POS_{t-i} + \sum_{i=0}^{n5} \beta_{5,i} \Delta NEG_{t-i} + \gamma_0 LnTB_{j,t-1} + \gamma_1 LnIP_{t-1}^{ML} \\
& + \gamma_2 LnIP_{t-1}^{JP} + \gamma_3 POS_{t-1} + \gamma_4 NEG_{t-1} + \xi_t \quad (3)
\end{aligned}$$

Since constructing the partial sum variables introduce nonlinearity into the adjustment of the exchange rate, Shin et al. (2014) label models like (3) as nonlinear ARDL models whereas, (2) is referred to as the linear ARDL model.

Once (3) is estimated by the OLS method, a few asymmetry hypothesis could be tested.

First, short-run asymmetric effects will be established if  $\hat{\beta}_{4,i}$  is different than  $\hat{\beta}_{5,i}$  at each lag order  $i$ . Second, short-run “adjustment asymmetry” will be established if number of optimum lags assigned to  $\Delta POS$  is different than the number of optimum lags assigned to  $\Delta NEG$  variable, i.e., if  $n_4 \neq n_5$ . Third, short-run cumulative or impact asymmetry will be established if  $\sum \hat{\beta}_{4,i} \neq \sum \hat{\beta}_{5,i}$ .

Finally, long-run asymmetric effects of exchange rate changes will be verified if  $-\hat{\gamma}_3/\hat{\gamma}_0 \neq -\hat{\gamma}_4/\hat{\gamma}_0$ .

The Wald test will be applied to establish the last two inequalities. Note also that the F test has to be applied first to verify asymmetry cointegration. Indeed, Shin *et al.* (2014, p. 291) recommend treating the POS and NEG variables as a single variable in testing for cointegration such that the critical value of the F test remains the same when we move from (2) to (3). This is mostly due to dependency between POS and NEG variables.<sup>6</sup>

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<sup>6</sup> For some other application of these methods see Delatte and Lopez-Villavicencio (2012), Verheyen (2013), Gogas and Pragidis (2015), Durmaz (2015), Baghestani and Kherfi (2015), Pal and Mitra (2016), Al-Shayeb and Hatemi-J.(2016), Lima et al. (2016), Nusair (2017), Arize et al. (2017), and Gregoriou (2017).

### III. The Results

Although our goal is to assess asymmetric effects of the real ringgit-yen changes by estimating the nonlinear model (3), in the absence of any previous study and for comparison purpose we also estimate the linear model (2). As mentioned before, we consider the trade balance of 60 industries that trade between the two countries. These industries all together engage in almost 100% of the trade between Malaysia and Japan. A few points deserve attention. First, monthly data beginning with April 2001- December 2015 (total of 177 observations) are used to carry out the empirical exercise. Second, a dummy variable is included in every model to account for the impact of (if any) Global Financial Crisis of 2008. This dummy is denoted by  $DM^{FC}$  in the tables. Third, a maximum of eight lags is imposed on each first-differenced variable and Akaike's Information Criterion (AIC) is used to select an optimum model in each case. Thus, all estimates in all tables belong to optimum models. Finally, since different estimates and different diagnostic statistics are subject to different critical values, we collect them in the notes to each table and use them to identify significant estimates. If an estimate is significant at the 10% level, we identify it by \*. If it is significant at the 5% level, we identify it by \*\*. This makes it easy to review the tables and summarize the results.

Estimates of the linear ARDL model (2) are considered first by reporting the estimates in Tables 1-3

Tables 1-3 go about here

As can be seen, we report short-run effects of exchange rate changes in Table 1.<sup>7</sup> Clearly, there is at least one significant short-run coefficient estimate in 36 industries, implying that the trade

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<sup>7</sup> Due to high volume of short-run estimates, in order to save space, we restrict ourselves to reporting only the short-run effects of exchange rate changes.



balance of 36 industries are affected by changes in the real value of ringgit against yen. However, the short-run effects translated into the long-run significant effects are in nine industries only. These long-run estimates are reported in Table 2. Out of nine industries, only two coded as 42 and 59 will benefit from ringgit depreciation since the coefficient estimate is positive.<sup>8</sup> The remaining seven industries coded as 43, 61, 74, 79, 83, 85, and 88 will be hurt by ringgit depreciation. These are industries for which either the Malaysian or Japanese import demands are price inelastic. None of the two largest industries, i.e., 34 (Gas, natural and manufactured) with 23% share of trade and 77 (Electrical machinery, apparatus, and appliances) with 20.5% share of trade are affected in the long run. The level of economic activity in Malaysia and Japan seem to have significant long-run effects in more industries than the real exchange rate, reflected by significant coefficient estimate attached to  $LnIP^{MY}$  variable in 23 industries and to  $LnIP^{JP}$  in 22 industries.

In order for the long-run effects to be valid, we now must establish cointegration. The results of the F test and several other diagnostic statistics are reported in Table 3. In most industries in which at least one of the variables was significant in the long run, our calculated F statistic is significant, supporting cointegration. In some industries (e.g., 02, Dairy products) in which there was at least one significant long-run coefficient estimate but the F statistic is insignificant, we use an alternative test known as  $ECM_{t-1}$  or the t-test. Under this alternative test, we use normalized long-run estimates and long-run model (1) and generate the error term. Denoting this error term by ECM, we go back to error-correction model (2) and replace the linear combination of lagged level variables by  $ECM_{t-1}$ . We then impose the same optimum number of lags that are reported in Table 1 and estimate the new specification. A significantly negative coefficient obtained for  $ECM_{t-1}$ .

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<sup>8</sup> In sum, the Rose and Yellen (1989, p. 67) definition of the J-curve, i.e., short-run negative or insignificant effects combined with long-run significant and positive effects is supported only in two small industries coded as 42 and 59. For a review article on the J-curve effect see Bahmani-oskooee and Hegerty (2010).

$\alpha_1$  will support cointegration. It must be noted that the t-test that is used to judge significance of this coefficient has a non-standard distribution. Like the F test, Pesaran et al. (2001, p. 303) also tabulate an upper bound and a lower bound critical values for this t-test. Using these critical values, cointegration is supported not just in industry 02 but also in others.

Reported in Table 3 are some additional diagnostic statistics. First, to test for serial correlation in each optimum model, we report the Lagrange Multiplier statistic. From Table 3 we gather that it is significant only in one industry coded 04. Clearly, in 59 remaining models residuals are autocorrelation free. To determine if optimum models are correctly specified, we report Ramsey's RESET test. It is significant in almost half of the models, implying misspecified models in half of the cases. How stable are short-run and long-run coefficient estimates? To answer this question, we apply the well-known CUSUM and CUSUMSQ tests to the residuals of each model. These two tests are denoted by CU and CUQ in Table 3. Indicating stable estimates by "S" and unstable ones by "U", as can be seen, most estimates are stable, at least by CUSUM test. Finally, we report size of adjusted  $R^2$  to infer goodness of fit in each model.

How do the results change if we shift to the estimates of nonlinear models that are reported in Tables 4-7.

Tables 4-7 go about here

Due to volume of the results, short-run effects of ringgit appreciation ( $\Delta POS$ ) are reported in Table 4 and those of ringgit depreciation ( $\Delta NEG$ ) are reported in Table 5. From these two tables we gather that either  $\Delta POS$  or  $\Delta NEG$  carry at least one significant coefficient except in industries coded 08, 11, 23, 24, 25, 29, 41, 59, 81, and 97. This increase in significant short-run effects in 50 industries in the nonlinear models compared to only 36 industries from the linear model (Table 1) must be attributed to separating ringgit appreciation from ringgit depreciation or to nonlinear

adjustment of the real exchange rate. The two largest industries 34 and 77 are among those that are affected by changes in the value of ringgit. Comparing the lag length associated with  $\Delta POS$  in Table 4 to the lag length associated with  $\Delta NEG$  in Table 5, we gather that the lag lengths are different in all industries except those that are coded as 11, 23, 24, 25, 28, 29, 41, 52, 59, 67, 72, 81, and 97. This supports short-run “adjustment asymmetry” in most industries including the two largest industries, 34 and 77. Comparing the size of coefficient estimates in Table 4 to those in Table 5, we also gather that they are different in every lag length almost in all industries. This supports short-run asymmetric effects of ringgit appreciation versus ringgit depreciation. However, the sum of these coefficient are significantly different in 30 industries. This is judged by the significant Wald test that is reported as Wald-S in Table 7. As mentioned in the previous section, a significant Wald test rejects equality of the sum, providing support for short-run cumulative or impact asymmetric effects of ringgit appreciation versus depreciation. While the largest industry, 34 is among the list, the second largest, 77 is not.

In how many industries short-run asymmetric effects translate into long-run asymmetric effects? To answer this question we consider long-run normalized estimates of the nonlinear models reported in Table 6. As can be seen, either the POS or NEG variable carries a significant coefficient in only 11 industries. These industries are coded as 06, 41, 42, 43, 51, 59, 61, 66, 79, 85, and 93. Furthermore, since either the F statistic or  $ECM_{t-1}$  is significant in all of these 11 industries, estimates are meaningful. Since the NEG variable carries significantly positive coefficient in industries 06, 42, and 59 and the POS variable also carries a positive coefficient in industries 66, and 93, Bahmani-Oskooee and Fariditavana’s (2016) definition of the J-curve using asymmetry cointegration is supported. Note also that the long-run effects are asymmetric only in five industries coded 02, 06, 41, 43, and 79. Only in these industries the Wald test reported as

Wald-L in Table 7 is significant, rejecting the equality of normalized coefficient estimates attached to the POS and NEG variables. None of the two large industries is in the list. All other diagnostics are similar to those of the linear models.

## **V. Summary and Conclusion**

Ever since the introduction of the J-curve concept by Magee (1973) and Junz and Rhomberg (1973), the link between the trade balance and the real exchange rate has attracted a great interest by researchers. Application of error-correction modelling and cointegration to distinguish the short run effects of a depreciation on the trade balance from its long-run effects has introduced another avenue of research to test the J-curve phenomenon. Using these methods when the exchange rate carried a long-run insignificant coefficient, that was interpreted as support for lack of the J-curve effect or support for lack of any significant link between the real exchange rate and the trade balance. However, given recent advances in econometric methods, that conclusion seems to be incomplete and could be due to assuming the effects of exchange rate changes to be symmetric. Application of asymmetry error-correction modelling and asymmetry cointegration reveals that currency appreciation could have different effects than currency depreciation. Since separating appreciations from depreciations introduce nonlinear adjustment of the real exchange rate, nonlinear models reveal relatively more significant link between the trade balance and the real exchange rate changes.

A previous study (Bahmani-Oskooee and Harvey 2017) applied Pesaran et al.'s (2001) linear ARDL approach and Shin et al.'s (2014) nonlinear ARDL approach to investigate the J-curve phenomenon between Malaysia and its 11 trading partners. In the case of Malaysia-Japan, while they find short-run asymmetric effects of real ringgit-yen rate, no long-run effects were discovered, neither in the linear model nor in the nonlinear model. Suspecting that these results

suffer from aggregation bias, we disaggregate the bilateral trade flows between Malaysia and Japan by industry and consider the response of the trade balance of 60 industries to exchange rate changes. Our goal is to identify industries that could benefit from ringgit depreciation and those that could be hurt from appreciation.

Our findings could be best summarized by saying that there was more evidence of the significant results from the nonlinear models compared to linear models. Concentrating on the nonlinear approach, we found support for the short-run asymmetric effects of ringgit-yen changes on the trade balance of 50 out of 60 industries. The two largest industries, i.e., industry coded 34 (Gas, natural and manufactured) with 23% trade share and 77 (Electrical machinery, apparatus, and appliances) with 20.5% trade share were both found to be affected in the short run by ringgit appreciation as well as by ringgit depreciation. We also found evidence of short-run adjustment asymmetry in 47 industries and short-run cumulative or impact asymmetry in 30 industries. However, the short-run asymmetry effects lasted into the long-run asymmetric effects only in five industries none of which was large.

Like previous studies, our findings are industry specific. For example, in industry coded 06 (Sugar, sugar preparations and honey) the linear model revealed that the real ringgit-yen rate has no long-run significant effects on the trade balance of this industry. If we were to rely upon only the linear model, the process would have stopped here. However, the nonlinear model revealed that when exchange rate nonlinearity is allowed, a depreciation will improve this industry's trade balance and an appreciation will hurt. Or consider industry 52 (Inorganic chemicals). Again, the linear model did not support any significant long-run link between the real ringgit-yen rate and the trade balance of this industry. However, the nonlinear model revealed that while an appreciation will have no significant long-run effects, a depreciation has significant

adverse effect on the trade balance of this industry. As ringgit depreciates against yen, this industry's trade balance worsens. This could be due to inelastic import demand either by Malaysia or by Japan. Such findings were masked by previous research and could only be discovered by disaggregation. Future research should consider this avenue of research by using industry level data from other countries.

## Appendix

### Data Definition and Sources

Data are retrieved over the period monthly period April 2001 to December 2015 (177 observations for each variable) through the following sources.

- a. Malaysian External Trade Statistics (METS), A Malaysian Department of Statistics database
- b. Datastream

#### *Variables*

$TR_j$  = Trade balance of industry  $j$  defined as the ratio of Malaysian imports from Japan over its exports to Japan. The sample contains 60 trading industries based on the Standard International Trade Classification (SITC) 2 digit level (source *a*).

$DM^{FC}$  = Dummy variable to capture the Global Financial Crisis effect such that time 2008=1, otherwise 0.

$IPI^{ML}$  = Industrial production index of Malaysia is used to proxy for economic activity in Malaysian economy (source *b*).

$IPI^{JP}$  = Industrial production index of Japan measures the economic activity in Japanese economy (source *b*).

$REX$  = The real bilateral exchange rate of the Malaysian Ringgit against Japanese yen. It is defined as  $REX = (P_{MY} \cdot NEX / P_{JP})$  where  $NEX$  is the nominal exchange rate defined as the number of yen per ringgit,  $P_{MY}$  is the price level in Malaysia (measured by CPI) and  $P_{JP}$  is the price level in Japan (also measured by CPI). Thus, a decline in  $REX$  reflects a real depreciation of the ringgit. The nominal exchange rate and price levels data come from source *b*.

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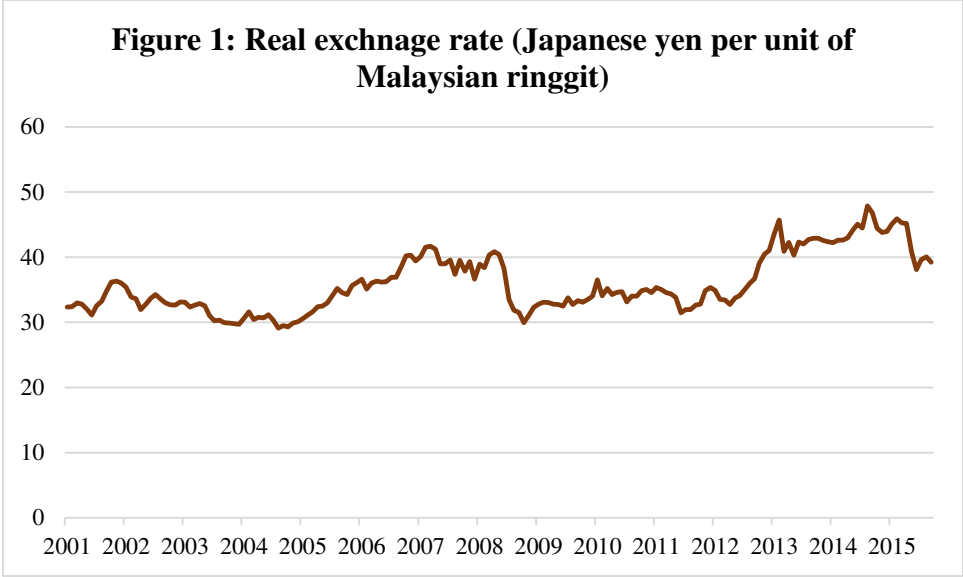
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Industry (Trade Share)	Short-Run Coefficient Estimates							
	$\Delta \ln REX_t$	$\Delta \ln REX_{t-1}$	$\Delta \ln REX_{t-2}$	$\Delta \ln REX_{t-3}$	$\Delta \ln REX_{t-4}$	$\Delta \ln REX_{t-5}$	$\Delta \ln REX_{t-6}$	$\Delta \ln REX_{t-7}$
02-Dairy products and birds' eggs(0.0044)	9.3854*							
03-Fish, crustaceans and molluscs,and preparations thereof (0.2963)	-3.7251*	-5.2531**	-3.8802*	1.5831	-2.4484	-8.5275**	1.2963	-5.5013**
04-Cereals and cereal preparations(0.1206)	-3.5862**	-3.0528*						
05-Vegetables and fruits(0.0291)	-6.9286**	-3.3429*	-4.4989**	-3.6951**	-5.5861**	-5.9422**		
06-Sugars, sugar preparations and honey(0.0181)	-2.9077							
07-Coffee, tea, cocoa, spices, and manufactures thereof(0.5864)	-3.2623	.9164	-4.1116*	-3.6182	-1.7661	-5.3861**		
08-Feeding stuff for animals (notincluding unmilled cereals) (0.13)	-.7968							
09-Miscellaneous edible productsandpreparations(0.1362)	-.9067	-1.5395	-5.4002	-3.287*	-2.5209	-1.8750	-4.8942**	-5.8941**
11-Beverages(0.0341)	-2.6095							
12-Tobacco and tobacco manufactures thereof(0.062)	-3.9902							
22-Oil seeds and oleaginousfruits(0.0035)	.7674	-3.9432	5.6909**					
23-Crude rubber (including synthetic and reclaimed)(0.5363)	-2.8785							
24-Cork and wood(0.4828)	.3247							
25-Pulp and waste paper(0.0084)	1.7095							
26-Textile fibres (other than wool tops) n.e.s.(0.3932)	-4.6668							
27-Crude fertilizers and crude minerals n.e.s.(0.0713)	1.5968	-1.1183	-3.2188	-1.0668	-.3295	-.9445	-1.3554	-8.3549**
28-Metalliferous ores and metal scrap(0.3186)	-4.0349	1.4317	-3.7822	3.8912	1.1412	-4.3376	.0069	-8.6948**
29-Crude animal and vegetable materials, n.e.s.(0.2432)	.3520							
33-Petroleum, petroleum products and related materials(1.9052)	-5.8440							
34-Gas, natural and manufactured(23.204)	-2.2293							
41-Animal oils and fats(0.0017)	-4.4612							
42-Fixed vegetable oils and fats,crude, refined or fractionated(1.1475)	-1.9568	-8.0537**						
43-Animal or vegetable oils and fats, processed n.e.s.(0.1651)	2.1801	2.0483	3.1426**					
51-Organic chemicals(1.6318)	-2.8064	-.2474	-1.3191	-4.138**	2.9755	-7.5918**		
52-Inorganic chemicals(0.7059)	-7.764**	-5.6145**	-4.6006	-2.5601	-2.3493	-.3801	-1.3627	-10.5737**
53-Dyeing, tanning and colouring materials(0.3557)	-1.7809	-1.4602	-4.7028**	-2.6318	-1.6910	-5.8186**	2.4410	-7.508**
54-Medicinal and pharmaceutical products(0.0808)	1.9804	-.8531	-8.7465**	-7.3794**	5.5787*	-.2787	-8.0277**	
55-Essential oils and resinoids and perfume materials n.e.s.(0.3973)	-7.0637**	-5.3457**	-1.6146	-2.8371	-3.1983	-6.6189**	-3.0873	-4.466*
56-Fertilizers, manufactured(0.1543)	-3.3213	-9.3839*	-3.3183	-15.5461**				
57-Plastics in primary forms(1.6504)	-1.4697	-2.768*	-2.4796	-1.3630	-1.4211	-.7814	-4.0567**	-6.124**

58-Plastics in non-primary forms(1.4905)	-4.244**	-4.5278**	-1.3475	-4.8589**	.0858	-3.0826	-4.3015*	-8.7955**
59-Chemical materials and products,n.e.s.(1.1425)	-.6460							
61-Leather, leather manufactures, n.e.s. (0.009)	-.2701							
62-Rubber manufactures, n.e.s.(0.4574)	-5.2494**	-.5211	-2.7680	-4.7592**	2.2650	-4.374**	-2.7675	-5.6185**
63-Cork and wood manufactures(excluding furniture)(2.1818)	-1.4713	-4.3009**						
64-Paper, paperboard, and articles of paper pulp n.e.s. (0.4644)	-2.1473	-2.3588	-1.5702	-3.0112	-1.4572	-2.5203	-3.6566*	-9.3093**
65-Textile yarn, fabrics, made-up articles, n.e.s. (0.6052)	-2.6274							
66-Non-metallic mineral manufactures n.e.s.(0.8049)	-1.9805							
67-Iron and steel(3.3492)	-1.9554							
68-Non-ferrous metals(4.0781)	-5.0632**	-3.5405	-2.6328	-1.4906	-5.3406**	-3.0429	.0941	-10.0032**
69-Manufactures of metal, n.e.s.(1.2476)	-3.097*	-2.6948*	-.9826	-.7107	.5164	-3.7668**	-.0156	-5.0844**
71-Power generating machinery and equipment(1.0305)	.3731	-4.611**						
72-Machinery specialized for particular industries(2.7412)	-.7986							
73-Metalworking machinery(0.6886)	-4.5599*	-5.1118**	1.5374	-3.7826	-4.4479*	-2.1340	-5.7806**	-6.5953**
74-General industrial machinery and equipment, n.e.s. (3.004)	-3.3309**							
75-Office machines and automatic data processing equipment(2.7071)	-3.2373*	-2.1356	-2.6268	-1.5911	-1.0284	-3.6662**	-.8042	-5.2875**
76-Telecommunications and sound recording n.e.s.(3.5753)	-3.2109*	-3.0915*	1.0279	-4.6851**	2.8927	-5.6533**	-3.7886*	
77-Electrical machinery, apparatus and appliances, n.e.s. (20.5712)	-2.6134	-1.5515	-1.4537	-1.1462	-4.2704*	-5.9009**	2.1874	-6.1973**
78-Road vehicles (including air-cushion vehicles)(5.4245)	.7673	-1.1835	-5.004*	-6.1213**	-.4272	-6.4046**	-1.3028	-7.9518**
79-Others transport equipment(0.339)	-6.4017							
81-Prefabricated buildings, sanitary, plumbing, heating n.e.s. (0.0475)	2.1919							
82-Furniture and parts thereof(0.816)	-1.1418	3.9206*	-3.4334	1.3668	-2.0410	-7.0782**		
83-Travel goods, handbags and similar containers(0.0177)	.8408							
84-Articles of apparel and clothing accessories(1.0494)	-1.7109							
85-Footwear(0.0124)	4.4017	2.7025	-2.7295	-5.3475	9.7304**	12.4925**		
87-Professional instruments and apparatus, n.e.s.(2.7079)	-1.5418							
88-Photographic apparatus, equipment and supplied and optical goods, n.e.s.(1.0832)	-1.7273	2.0994	-1.4936	4.8238**	.5594	-1.4627	1.2103	-7.6322**
89-Miscellaneous manufactured articles, n.e.s.(2.82)	-6.5693**	-1.2953	-4.3208	-4.3387	-.7742	-6.1809**	-2.238	-8.8478**
93-Special transactions and commodities (0.374)	-2.2529*	-3.0098**	-1.8908	-1.6099	-1.4165	-3.8775**	-.2357	-2.6319*
97-Gold, non-monetary(0.189)	2.6646							

Notes: \* (\*\*) show the significance at the 10% and 5% respectively. The critical values of standard t-distribution, i.e., 1.64 and 1.96 are used to arrive at \* and \*\*, respectively. Abbreviation n.e.s. refers to not elsewhere defined.

Industry (Trade Share)	Long-Run Coefficient Estimates				
	<i>Constant</i>	<i>DM<sup>FC</sup></i>	<i>ln IPI<sup>ML</sup></i>	<i>ln IPI<sup>IP</sup></i>	<i>ln REX<sub>t</sub></i>
02-Dairy products and birds' eggs(0.0044)	-.8388**	2.0686*	-10.6905**	14.1338*	-.9457
03-Fish, crustaceans and molluscs,and preparations thereof(0.2963)	-5.399**	-.9864	1.2252	9.5485*	4.2845
04-Cereals and cereal preparations(0.1206)	.0857**	.0675	-1.5887	-.5213	2.0898
05-Vegetables and fruits(0.0291)	-3.4439**	-.0864	1.0938	2.5045	.7800
06-Sugars, sugar preparations and honey(0.0181)	-5.0438**	-.5519	-7.2681**	11.9589**	1.1367
07-Coffee, tea, cocoa, spices, and manufactures thereof(0.5864)	-2.4945**	-.2132	-.4975	3.7315	1.7174
08-Feeding stuff for animals (notincluding unmilled cereals)(0.13)	-1.0356**	.2350	-.0100	6.7011	-4.1919
09-Miscellaneous edible productsandpreparations(0.1362)	-3.2872**	-.5362	-1.2626	7.8919*	2.0102
11-Beverages(0.0341)	-1.5312**	-.2360	3.8038**	-2.5577	.5466
12-Tobacco and tobacco manufactures thereof(0.062)	.0500	-.7757	-12.7813*	15.0109	-1.9764
22-Oil seeds and oleaginousfruits(0.0035)	3.9697**	-.4394	-3.4265**	-2.9620	1.7836
23-Crude rubber (including synthetic and reclaimed)(0.5363)	-4.3219**	-2.5354**	9.4442**	9.2080	-2.2354
24-Cork and wood(0.4828)	-4.7071**	-.7692**	2.467**	-.3594	1.0826
25-Pulp and waste paper(0.0084)	5.5408**	3.2615*	-4.3382	-11.4651	-.0342
26-Textile fibres (other than wool tops) n.e.s.(0.3932)	.2592**	-.1933	-2.2102	8.7377	-8.6095
27-Crude fertilizers and crude minerals n.e.s.(0.0713)	-2.0843**	-.5232	-3.1564*	6.599**	.1428
28-Metalliferous ores and metal scrap(0.3186)	-1.3113**	-.7126	-1.9972	6.0976	-1.9129
29-Crude animal and vegetable materials, n.e.s.(0.2432)	-.5311**	-.0932	-1.7813	2.8735	-.9625
33-Petroleum, petroleum products and related materials(1.9052)	.9104**	-.1685	-2.3236	1.4755	-2.5094
34-Gas, natural and manufactured(23.204)	-7.5018**	-1.0628	-2.1017	10.8879*	.7991
41-Animal oils and fats(0.0017)	9.9701**	.9175	29.2604**	-5.6637**	-15.7720
42-Fixed vegetable oils and fats,crude, refined or fractionated(1.1475)	4.4081**	-.0908	-5.5208**	-2.0767	4.9519**
43-Animal or vegetable oils and fats, processed n.e.s.(0.1651)	-1.4585**	-.0741	.6585	2.2516*	-2.6963*
51-Organic chemicals(1.6318)	-.6699**	-.2263	-6.9535**	6.4819	3.3468
52-Inorganic chemicals(0.7059)	-3.4757**	-.8157	-.8765	8.7401	-.2079
53-Dyeing, tanning and colouring materials(0.3557)	-1.8246**	-.8365	-4.5448	7.4702	3.2245
54-Medicinal and pharmaceutical products(0.0808)	-6.8587**	-.9854	5.4331**	6.9974*	-3.8753
55-Essential oils and resinoids and perfume materials n.e.s.(0.3973)	-3.902**	-1.0702*	-3.4738	9.7457**	3.3235
56-Fertilizers, manufactured(0.1543)	-5.7097**	-.3142	.2252	12.4212**	-5.6640
57-Plastics in primary forms(1.6504)	-2.7093**	-.5253	-2.2852	8.4605**	2.3560
58-Plastics in non-primary forms(1.4905)	-4.3043**	-.9796	-2.1524	13.0133**	.3624
59-Chemical materials and products,n.e.s.(1.1425)	2.9781**	-.0485	-8.225**	-3.5113	7.3716**

61-Leather, leather manufactures, n.e.s. (0.009)	1.2945**	.3934	8.4927**	-5.0304*	-7.2971**
62-Rubber manufactures, n.e.s.(0.4574)	-5.277**	-.7840	2.9609	11.8647**	-2.3094
63-Cork and wood manufactures(excluding furniture)(2.1818)	1.9015**	-.0118	-8.1547**	2.0371	2.8208
64-Paper, paperboard, and articles of paper pulp n.e.s. (0.4644)	-4.2214**	-1.2064	-2.0325	1.4689**	2.3378
65-Textile yarn, fabrics, made-up articles, n.e.s. (0.6052)	-.9504**	-.0064	-2.2353	7.9640	-4.1373
66-Non-metallic mineral manufactures n.e.s.(0.8049)	-.4408**	-.4382	-5.9229*	7.2774	.6175
67-Iron and steel(3.3492)	-1.5189**	.1504	.6725	6.3468	-4.4492
68-Non-ferrous metals(4.0781)	-4.7601**	-.8645	-3.2004	16.0492**	.5382
69-Manufactures of metal, n.e.s.(1.2476)	-1.8234**	-.4081	-1.8250	4.9313*	1.0920
71-Power generating machinery and equipment(1.0305)	-1.1117**	-.0092	-.3934	4.2545	-.9084
72-Machinery specialized for particular industries(2.7412)	1.2673**	.1908	-3.9369**	1.4419	1.2829
73-Metalworking machinery(0.6886)	-5.4629**	-.8495	1.4557	13.6783**	-4.0780
74-General industrial machinery and equipment, n.e.s. (3.004)	-1.2891**	.0847	2.7170	5.0117	-6.0034**
75-Office machines and automatic data processing equipment(2.7071)	-3.8173**	-.6746	-1.4610	11.6131**	.7356
76-Telecommunications and sound recording n.e.s.(3.5753)	-3.2325**	-.8221	-3.1068	13.882**	.5461
77-Electrical machinery, apparatus and appliances, n.e.s. (20.5712)	-1.1912**	-.7722	-11.9401**	9.6153	9.2986
78-Road vehicles (including air-cushion vehicles)(5.4245)	-1.0493**	-.6927	-5.8499*	8.5470	1.1042
79-Others transport equipment(0.339)	1.5317**	.1216	-.8560	6.5007	-9.3114**
81-Prefabricated buildings, sanitary, plumbing, heating n.e.s.(0.0475)	.49653	.6657	3.4759	1.5384	-5.6528
82-Furniture and parts thereof(0.816)	.1876**	.0439	-7.8796**	.9079	8.5247
83-Travel goods, handbags and similar containers(0.0177)	-.7309**	.7636	5.4645**	1.4350	-7.6515**
84-Articles of apparel and clothing accessories(1.0494)	.4283**	.0469	-4.1959	1.3132	2.0431
85-Footwear(0.0124)	-5.3671**	.1078	10.3887**	1.2278	-9.7125**
87-Professional instruments and apparatus, n.e.s.(2.7079)	-.2579**	.0784	-1.3431	3.3802	-1.6775
88-Photographic apparatus, equipment and supplied and optical goods, n.e.s.,(1.0832)	2.549**	-.2447	-1.7924	1.67711	-3.2159**
89-Miscellaneous manufactured articles, n.e.s.(2.82)	-4.4947**	-1.903*	-6.21989	15.4114*	7.8795
93-Special transactions and commodities (0.374)	-2.2669**	-.8838**	-3.8949**	7.6625**	3.9058
97-Gold, non-monetary(0.189)	1.2667	.4731	-3.0301	4.1618	-3.9417

Notes: \* (\*\*) show the significance at the 10% and 5% respectively. The critical values of standard t-distribution, i.e., 1.64 and 1.96 are used to arrive at \* and \*\*, respectively. Abbreviation n.e.s. refers to not elsewhere defined.

Industry (Trade Share)	Diagnostics						
	F <sub>PSS</sub> <sup>a</sup>	ECM <sub>t-1</sub>	Adj. R <sup>2</sup>	LM	RESET	CU	CUQ
02-Dairy products and birds' eggs(0.0044)	3.2544	-.2899(3.9082)**	.5116	1.0517	.4792	S	S
03-Fish, crustaceans and molluscs,and preparations thereof(0.2963)	3.3341	-.1859(4.2179)**	.7344	.3883	5.0973**	S	U
04-Cereals and cereal preparations(0.1206)	2.8372	-.2837(3.7652)*	.5614	3.0624*	6.1325**	S	U
05-Vegetables and fruits(0.0291)	5.2459**	-.3814(5.1822)**	.4443	.5551	2.391	S	U
06-Sugars, sugar preparations and honey(0.0181)	2.928	-.4999(4.0132)**	.5847	.7455	.4671	S	S
07-Coffee, tea, cocoa, spices, and manufactures thereof(0.5864)	2.7521	-.2259(3.7659)*	.5054	.9574	3.849**	S	U
08-Feeding stuff for animals (notincluding unmilled cereals)(0.13)	1.2433	-.168(2.5887)	.5540	.0195	2.4134	S	U
09-Miscellaneous edible productsandpreparations(0.1362)	4.8331**	-.2017(4.9128)**	.7472	.1670	7.3006**	S	U
11-Beverages(0.0341)	3.3791	-.3588(4.0755)**	.3902	.6225	2.0875	S	S
12-Tobacco and tobacco manufactures thereof(0.062)	1.6811	-.1921(2.9965)	.6547	.3651	3.0263*	S	S
22-Oil seeds and oleaginousfruits(0.0035)	8.84**	-.4065(6.7886)**	.4633	1.6038	.9738	S	U
23-Crude rubber (including synthetic and reclaimed)(0.5363)	3.0971	-.1313(3.8303)**	.8428	.1032	1.3123	S	U
24-Cork and wood(0.4828)	5.6886**	-.5937(5.2526)**	.4863	.6003	.0976	S	S
25-Pulp and waste paper(0.0084)	2.6388	-.1835(3.6635)*	.6499	.4396	.0090	S	S
26-Textile fibres (other than wool tops) n.e.s.(0.3932)	3.387	-.1941(4.2286)**	.7309	.9508	3.0716*	S	S
27-Crude fertilizers and crude minerals n.e.s.(0.0713)	4.2797*	-.3249(4.7267)**	.5511	.0647	4.7399**	S	U
28-Metalliferous ores and metal scrap(0.3186)	2.8023	-.2713(3.9066)**	.6246	.0050	3.7291*	S	U
29-Crude animal and vegetable materials, n.e.s.(0.2432)	2.2774	-.2892(3.3901)	.5187	.0760	1.1067	S	S
33-Petroleum, petroleum products and related materials(1.9052)	2.3514	-.1879(3.5382)*	.5936	1.6212	.4686	S	S
34-Gas, natural and manufactured(23.204)	2.2977	-.3408(3.4815)*	.2999	.5383	1.3913	S	S
41-Animal oils and fats(0.0017)	2.9864	-.141(4.2264)**	.9036	.0567	.0392	S	U
42-Fixed vegetable oils and fats,crude, refined or fractionated(1.1475)	20.355**	-.7286(10.4033)**	.3484	.6817	.6055	S	S
43-Animal or vegetable oils and fats, processed n.e.s.(0.1651)	5.5076**	-.4463(5.0802)**	.3460	.8226	.0121	S	S
51-Organic chemicals(1.6318)	4.3119*	-.2097(4.7639)**	.7531	1.2581	2.8144*	S	U
52-Inorganic chemicals(0.7059)	2.9882	-.2459(3.9358)**	.5222	.5460	2.2657	S	U
53-Dyeing, tanning and colouring materials(0.3557)	4.1994*	-.1952(4.6515)**	.7401	.2630	4.2244**	S	U
54-Medicinal and pharmaceutical products(0.0808)	6.5648**	-.3681(5.7446)**	.4716	.9595	2.8298*	S	S
55-Essential oils and resinoids and perfume materials n.e.s.(0.3973)	3.9922*	-.2317(4.5128)**	.6607	.7415	3.1576*	S	U
56-Fertilizers, manufactured(0.1543)	3.2116	-.3523(3.8021)**	.3283	1.4298	11.1264**	S	S
57-Plastics in primary forms(1.6504)	4.4848**	-.179(4.7354)**	.7771	.5398	.6649	S	U
58-Plastics in non-primary forms(1.4905)	5.4711**	-.1969(5.2757)**	.8567	.1593	4.9013**	S	U
59-Chemical materials and products,n.e.s.(1.1425)	4.3326*	-.2177(4.5984)**	.7718	2.1852	1.4233	S	U

61-Leather, leather manufactures, n.e.s. (0.009)	4.7874**	-.4327(5.2394)**	.6195	1.9861	2.7247*	S	S
62-Rubber manufactures, n.e.s.(0.4574)	4.6977**	-.2012(4.9208)**	.7532	.7239	3.5839*	S	U
63-Cork and wood manufactures(excluding furniture)(2.1818)	4.0706*	-.2938(4.5467)**	.7959	.1363	.0058	S	S
64-Paper, paperboard, and articles of paper pulp n.e.s. (0.4644)	3.9264*	-.1438(4.4173)**	.8155	.4727	6.0271*	S	U
65-Textile yarn, fabrics, made-up articles, n.e.s. (0.6052)	3.6322	-.1947(4.2915)**	.7216	1.3687	.1215	S	U
66-Non-metallic mineral manufactures n.e.s.(0.8049)	3.1702	-.1745(4.0242)**	.8043	.6661	2.1531	S	S
67-Iron and steel(3.3492)	5.5215**	-.2819(5.3186)**	.5618	1.2402	8.1958**	S	U
68-Non-ferrous metals(4.0781)	4.647**	-.1884(4.9495)**	.8455	.6716	6.6898**	S	U
69-Manufactures of metal, n.e.s.(1.2476)	5.4285**	-.2538(5.3196)**	.6655	.5717	4.7744**	S	U
71-Power generating machinery and equipment(1.0305)	3.0552	-.2057(3.8384)**	.5795	.0934	4.5912**	S	U
72-Machinery specialized for particular industries(2.7412)	2.9605	-.2718(4.0342)**	.5715	.2027	2.5781	S	U
73-Metalworking machinery(0.6886)	5.4078**	-.2386(5.2678)**	.7260	.2747	3.8642**	S	U
74-General industrial machinery and equipment, n.e.s. (3.004)	3.4370	-.2183(4.2014)**	.6664	.1592	3.0217*	S	U
75-Office machines and automatic data processing equipment(2.7071)	4.5263**	-.1773(4.8224)**	.8368	.3167	5.7853**	S	U
76-Telecommunications and sound recording n.e.s.(3.5753)	3.4019	-.1443(4.1483)**	.8612	1.2736	3.4242*	S	U
77-Electrical machinery, apparatus and appliances, n.e.s. (20.5712)	3.2901	-.1637(4.2127)**	.8284	.4969	.7668	S	U
78-Road vehicles (including air-cushion vehicles)(5.4245)	5.208**	-.2282(5.1047)**	.8103	1.3743	5.482**	S	U
79-Others transport equipment(0.339)	6.087**	-.4382(5.5735)**	.4062	.2962	4.502**	S	S
81-Prefabricated buildings, sanitary, plumbing, heating n.e.s.(0.0475)	2.6598	-.2288(3.7403)*	.5569	.0685	.5417	S	S
82-Furniture and parts thereof(0.816)	3.3187	-.1622(4.1713)**	.7749	.1547	5.9562**	S	U
83-Travel goods, handbags and similar containers(0.0177)	3.0081	-.2412(4.0233)**	.5998	.6040	3.0054*	S	S
84-Articles of apparel and clothing accessories(1.0494)	4.4212**	-.2311(4.7698)**	.6251	.6070	.0635	S	U
85-Footwear(0.0124)	12.8814**	-.5254(7.906)**	.4701	1.1538	1.4038	S	S
87-Professional instruments and apparatus, n.e.s.(2.7079)	3.8278*	-.2127(4.4745)**	.6903	.5457	1.6208	S	U
88-Photographic apparatus, equipment and supplied and optical goods, n.e.s.,(1.0832)	5.059**	-.4604(5.0742)**	.6809	.1623	7.2324**	S	U
89-Miscellaneous manufactured articles, n.e.s.(2.82)	3.1296	-.1545(4.1254)**	.7665	.6108	5.3097**	S	U
93-Special transactions and commodities (0.374)	3.5256	-.1838(4.476)**	.8157	.8155	3.5882*	S	U
97-Gold, non-monetary(0.189)	3.0056	-.2656(3.854)**	.5829	.0288	.1881	S	S

Notes:

a. The F test due to Pesaran et al. (2001) is denoted by  $F_{PSS}$ . At the 10% (5%) significance level when there are three exogenous variables ( $k=3$ ), its critical value is 3.77(4.35). This comes from Pesaran et al. (2001, Table CI-Case III, page 300). \* indicates a significant statistic.

b. LM is the Lagrange Multiplier test of residual serial correlation. It is distributed as  $\chi^2$  with one degree of freedom (first order). Its critical value at 10% (5%) level is 2.71 (3.84).

c. RESET is Ramsey's test for misspecification. It is distributed as  $\chi^2$  with one degree of freedom (first order). Its critical value at 10% (5%) level is 2.71 (3.84).

d. CU and CUQ are CUSUM and CUSUMQ respectively to test stability of all coefficients.

e. Number inside the parenthesis next to  $ECM_{t-1}$  is the absolute value of the t-ratio, denoted by  $t_{BDM}$  in the text. Its critical value of -3.46 (-3.78) at 10% (5%) level comes from Pesaran et al. (2001, Table CII-Case III, page 303).

f. Abbreviation n.e.s. stands for not elsewhere defined.

g. Trade share is in percentage calculated for the year 2015.



**Table 4: Short-Run Estimates (Appreciation) from Nonlinear ARDL Model**

Industry (Trade Share)	Short-Run Coefficient Estimates							
	$\Delta POS_t$	$\Delta POS_{t-1}$	$\Delta POS_{t-2}$	$\Delta POS_{t-3}$	$\Delta POS_{t-4}$	$\Delta POS_{t-5}$	$\Delta POS_{t-6}$	$\Delta POS_{t-7}$
02-Dairy products and birds' eggs(0.0044)	-4.3445	-17.6249*						
03-Fish, crustaceans and molluscs,and preparations thereof(0.2963)	-11.183**	-6.917	-7.8799*	-5.0973	-6.3683	-9.4491**		
04-Cereals and cereal preparations(0.1206)	-13.143**							
05-Vegetables and fruits(0.0291)	-4.3058	-11.698**	1.3384	-9.8246**	-4.2169	-7.2872**		
06-Sugars, sugar preparations and honey(0.0181)	-1.4558							
07-Coffee, tea, cocoa, spices, and manufactures thereof(0.5864)	-10.5516**	0.797578	-8.0049*	-9.1314**	0.523332	-9.8541**		
08-Feeding stuff for animals (notincluding unmilled cereals)(0.13)	-4.7499							
09-Miscellaneous edible productsandpreparations(0.1362)	-7.1722*	-7.1296**	-10.628**	-5.6332	-6.9439*	-3.7502	-4.6671	-9.435**
11-Beverages(0.0341)	-6.4918							
12-Tobacco and tobacco manufactures thereof(0.062)	-1.5178	2.679**	-1.6598*					
22-Oil seeds and oleaginousfruits(0.0035)	-1.3581	-5.5266	1.5351**					
23-Crude rubber (including synthetic and reclaimed)(0.5363)	.1467							
24-Cork and wood(0.4828)	-.0196							
25-Pulp and waste paper(0.0084)	1.7877							
26-Textile fibres (other than wool tops) n.e.s.(0.3932)	-1.5197**	-5.1254	-1.6965**	-11.2263*				
27-Crude fertilizers and crude minerals n.e.s.(0.0713)	-0.57784	-.2742	-8.151*	-10.889**				
28-Metalliferous ores and metal scrap(0.3186)	-8.8904*							
29-Crude animal and vegetable materials, n.e.s.(0.2432)	.7492							
33-Petroleum, petroleum products and related materials(1.9052)	-2.0169**	-9.3187	-3.8953	-1.6271*	-.5354	-19.002**		
34-Gas, natural and manufactured(23.204)	-6.9582	-.1133**	-12.9759	1.3962	-2.0349**			
41-Animal oils and fats(0.0017)	-7.5327							
42-Fixed vegetable oils and fats,crude, refined or fractionated(1.1475)	-5.5431							
43-Animal or vegetable oils and fats, processed n.e.s.(0.1651)	5.7163**	7.1392**	5.5214**	2.9555	3.7121	2.5784	6.8516**	
51-Organic chemicals(1.6318)	-6.8476*	-3.3268	-2.6009	-12.596**	5.0513	-12.99**		
52-Inorganic chemicals(0.7059)	-16.989**							
53-Dyeing, tanning and colouring materials(0.3557)	-3.5297	2.8256	-1.6219**					
54-Medicinal and pharmaceutical products(0.0808)	-7.2004	-6.2194**	-13.908**	-1.5249	5.3061	-2.1846	-14.4267**	
55-Essential oils and resinoids and perfume materials n.e.s.(0.3973)	-1.8629**	-7.4699*	.6892	-6.9046	-6.6183	-9.2981**		
56-Fertilizers, manufactured(0.1543)	-1.0361*	-3.911**	-5.90772	-2.4771**	-2.5154**			
57-Plastics in primary forms(1.6504)	-3.12902	-8.3879**	-3.4229	-8.0344**				
58-Plastics in non-primary forms(1.4905)	-6.1659	-1.6949**	-8.0996*	-8.085*	-1.0280	2.1013	-1.8537**	

59-Chemical materials and products,n.e.s.(1.1425)	-2.4597							
61-Leather, leather manufactures, n.e.s. (0.009)	-6.28944							
62-Rubber manufactures, n.e.s.(0.4574)	-2.1476**	-5.70835	-7.48*	-11.4302**				
63-Cork and wood manufactures(excluding furniture)(2.1818)	-6.8194*							
64-Paper, paperboard, and articles of paper pulp n.e.s. (0.4644)	-8.5815**	-10.1879**	-7.4319*	-8.875**	-8.7795**	-0.30574	-8.3031**	
65-Textile yarn, fabrics, made-up articles, n.e.s. (0.6052)	-3.3567**	-3.2811	-1.2251**	-7.7464*				
66-Non-metallic mineral manufactures n.e.s.(0.8049)	-2.2773**	-7.0196	-2.52653	-9.2864**	-2.7636	-1.801**		
67-Iron and steel(3.3492)	-2.0146**							
68-Non-ferrous metals(4.0781)	-.9309**	1.6972	-10.249**					
69-Manufactures of metal, n.e.s.(1.2476)	-9.5898**	-5.1222**	-0.79602	-3.92861	.5557	-9.2752**		
71-Power generating machinery and equipment(1.0305)	-1.7567**							
72-Machinery specialized for particular industries(2.7412)	-5.4457*							
73-Metalworking machinery(0.6886)	-8.7187**	-5.1937	-1.1005**	-7.4416	-5.4694	-8.6742*		
74-General industrial machinery and equipment, n.e.s. (3.004)	-1.2244**	-4.3121	-4.5206	-8.5684**				
75-Office machines and automatic data processing equipment(2.7071)	-8.2158**	-3.4553	-8.6335**					
76-Telecommunications and sound recording n.e.s.(3.5753)	-12.9018**							
77-Electrical machinery, apparatus and appliances, n.e.s. (20.5712)	-12.2783**							
78-Road vehicles (including air-cushion vehicles)(5.4245)	-8.1104	1.6868	-2.1721**	-16.8492**				
79-Others transport equipment(0.339)	-19.1605**	-.5585	-9.0229	-3.6973**	-4.0115	-6.5064	-7.7225**	-21.4965**
81-Prefabricated buildings, sanitary, plumbing, heating n.e.s.(0.0475)	-.5900							
82-Furniture and parts thereof(0.816)	-2.3951							
83-Travel goods, handbags and similar containers(0.0177)	-4.11123	-10.9479**	-10.372**					
84-Articles of apparel and clothing accessories(1.0494)	-4.5684	.0006	-3.0781	-6.3399**				
85-Footwear(0.0124)	2.4799**	4.535	9.5756	-2.0777**				
87-Professional instruments and apparatus, n.e.s.(2.7079)	-6.4744**	-2.44317	-2.9991	-3.6919	3.28415	-7.0306**		
88-Photographic apparatus, equipment and supplied and optical goods, n.e.s.(1.0832)	-4.1394	-.3242	-1.1135	-7.7911**	-2.1343	-8.3905**	0.4924	-11.9163**
89-Miscellaneous manufactured articles, n.e.s.(2.82)	-15.0327**	-1.1231	-8.6819	-13.6609**				
93-Special transactions and commodities (0.374)	-7.7898**	-5.4046**	-3.9917	-3.1273	-1.684	-6.6312**		
97-Gold, non-monetary(0.189)	2.1599							

Notes: \* (\*\*) show the significance at the 10% and 5% respectively. The critical values of standard t-distribution, i.e., 1.64 and 1.96 are used to arrive at \* and \*\*, respectively. Abbreviation n.e.s. refers to not elsewhere defined.

**Table 5: Short-Run Estimates (Depreciation) from Nonlinear ARDL Model**

Industry (Trade Share)	Short-Run Coefficient Estimates							
	$\Delta NEG_t$	$\Delta NEG_{t-1}$	$\Delta NEG_{t-2}$	$\Delta NEG_{t-3}$	$\Delta NEG_{t-4}$	$\Delta NEG_{t-5}$	$\Delta NEG_{t-6}$	$\Delta NEG_{t-7}$
02-Dairy products and birds' eggs(0.0044)	18.9616**							
03-Fish, crustaceans and molluscs,and preparations thereof(0.2963)	4.2638	-4.9138	-1.0365	5.5847*	-.2027	-7.6814**	3.5668	-8.4966**
04-Cereals and cereal preparations(0.1206)	3.4439	-5.1728*						
05-Vegetables and fruits(0.0291)	-8.9968**	3.7941	-9.123**	2.1	-8.43**			
06-Sugars, sugar preparations and honey(0.0181)	-1.5331	-8.4668**						
07-Coffee, tea, cocoa, spices, and manufactures thereof(0.5864)	2.9085							
08-Feeding stuff for animals (notincluding unmilled cereals)(0.13)	2.0809							
09-Miscellaneous edible productsandpreparations(0.1362)	1.3113							
11-Beverages(0.0341)	.2073							
12-Tobacco and tobacco manufactures thereof(0.062)	-5.1176	-3.5799**						
22-Oil seeds and oleaginousfruits(0.0035)	3.0618							
23-Crude rubber (including synthetic and reclaimed)(0.5363)	-4.8141							
24-Cork and wood(0.4828)	.5307							
25-Pulp and waste paper(0.0084)	-.5125							
26-Textile fibres (other than wool tops) n.e.s.(0.3932)	2.4286							
27-Crude fertilizers and crude minerals n.e.s.(0.0713)	5.0647	-.6448	1.8596	5.3832	-1.4405	.6013	1.9509	-12.219**
28-Metalliferous ores and metal scrap(0.3186)	-.8204							
29-Crude animal and vegetable materials, n.e.s.(0.2432)	.1187							
33-Petroleum, petroleum products and related materials(1.9052)	4.5307							
34-Gas, natural and manufactured(23.204)	4.2992	1.1117**						
41-Animal oils and fats(0.0017)	-2.6431							
42-Fixed vegetable oils and fats,crude, refined or fractionated(1.1475)	.1582	-1.8687**						
43-Animal or vegetable oils and fats, processed n.e.s.(0.1651)	-1.0087							
51-Organic chemicals(1.6318)	.8899							
52-Inorganic chemicals(0.7059)	-.6854							
53-Dyeing, tanning and colouring materials(0.3557)	1.6688	-2.3951	4.1777	-4.3004	-.6459	-8.163**	7.0362**	-3.2051**
54-Medicinal and pharmaceutical products(0.0808)	9.1071*							
55-Essential oils and resinoids and perfume materials n.e.s.(0.3973)	.2444							
56-Fertilizers, manufactured(0.1543)	2.2776							
57-Plastics in primary forms(1.6504)	1.5749	1.9724	-.9253	3.8500	-3.0628	2.6574	-4.3691*	-7.9314**
58-Plastics in non-primary forms(1.4905)	-.6694	4.8913	1.5528	-2.8898	.5865	-7.2029*	1.3417	-14.645**
59-Chemical materials and products,n.e.s.(1.1425)	.6188							

61-Leather, leather manufactures, n.e.s. (0.009)	4.2409	.6278	9.1319**	2.4523	-5.4608	9.4156**		
62-Rubber manufactures, n.e.s.(0.4574)	1.4894	2.8239	2.3588	.5049	2.8435	-5.5238	-.6617	-8.5387**
63-Cork and wood manufactures(excluding furniture)(2.1818)	.9323	-8.7315**	-.7939	-.3875	-1.5753	-9.0209**		
64-Paper, paperboard, and articles of paper pulp n.e.s. (0.4644)	4.3566	2.8633	3.9866	3.0118	3.4876	-2.5319	2.8485	-3.6037**
65-Textile yarn, fabrics, made-up articles, n.e.s. (0.6052)	6.1845*	1.15	8.6919**					
66-Non-metallic mineral manufactures n.e.s.(0.8049)	10.3197**							
67-Iron and steel(3.3492)	5.6106							
68-Non-ferrous metals(4.0781)	4.6085	-5.7873	5.2787	1.4387	-6.0435*	-3.2634	2.2645	-15.9875**
69-Manufactures of metal, n.e.s.(1.2476)	1.6782							
71-Power generating machinery and equipment(1.0305)	8.6661**	-9.8264**	2.6367	.5213	-3.6312	-2.7944	4.7138	-9.2339**
72-Machinery specialized for particular industries(2.7412)	2.6112							
73-Metalworking machinery(0.6886)	7.7634**	-3.6455	3.6073**					
74-General industrial machinery and equipment, n.e.s. (3.004)	1.8977							
75-Office machines and automatic data processing equipment(2.7071)	2.1802	-1.7216	2.3751	-2.8015	.1790	-5.4643**	.2895	-9.4302**
76-Telecommunications and sound recording n.e.s.(3.5753)	3.7698	-4.6031*	4.798*	-7.1407**	7.1429**	-1.4061**	1.9965	-8.142**
77-Electrical machinery, apparatus and appliances, n.e.s. (20.5712)	5.3338	-2.9048	2.3716	-1.3466	-4.15698	-7.1664*	7.5867**	-10.928**
78-Road vehicles (including air-cushion vehicles)(5.4245)	8.8985**	-1.9094	1.7804	2.594012	-.7612	-9.7471**	1.5309	-3.5113**
79-Others transport equipment(0.339)	-4.995							
81-Prefabricated buildings, sanitary, plumbing, heating n.e.s.(0.0475)	4.0262							
82-Furniture and parts thereof(0.816)	.5105	9.2048**						
83-Travel goods, handbags and similar containers(0.0177)	6.2233	9.0527**						
84-Articles of apparel and clothing accessories(1.0494)	.3645							
85-Footwear(0.0124)	-7.1771	3.5379	-2.9533**	8.3607	10.0013*	18.7504**		
87-Professional instruments and apparatus, n.e.s.(2.7079)	1.629							
88-Photographic apparatus, equipment and supplied and optical goods, n.e.s.,(1.0832)	.3324	2.7141	-2.2426	14.4945**				
89-Miscellaneous manufactured articles, n.e.s.(2.82)	1.9406	-.3291	1.4156	2.5413	-.6234	-7.7619*	1.140733	-14.592**
93-Special transactions and commodities (0.374)	3.7365*							
97-Gold, non-monetary(0.189)	3.0849							

Notes: \* (\*\*) show the significance at the 10% and 5% respectively. The critical values of standard t-distribution, i.e., 1.64 and 1.96 are used to arrive at \* and \*\*, respectively. Abbreviation n.e.s. refers to not elsewhere defined.

<b>Table 6: Long-Run Coefficient Estimates of Nonlinear ARDL Model</b>						
<b>Industry (Trade Share)</b>	<b>Long-Run Coefficient Estimates</b>					
	<i>C</i>	<i>DM<sup>FC</sup></i>	<i>ln IPI<sup>ML</sup></i>	<i>ln IPI<sup>PP</sup></i>	<i>POS<sub>t</sub></i>	<i>NEG<sub>t</sub></i>
02-Dairy products and birds' eggs(0.0044)	-2.8764**	1.5477**	11.1038*	-7.4400	-.7023	5.257
03-Fish, crustaceans and molluscs,and preparations thereof(0.2963)	-2.9826**	.0074	-1.7085	9.4419	6.8570	5.8656
04-Cereals and cereal preparations(0.1206)	.7701**	.2009	-4.8382	3.2682	2.0721	.8710
05-Vegetables and fruits(0.0291)	-2.7354**	.3291	2.9129	.3346	1.2431	1.8486
06-Sugars, sugar preparations and honey(0.0181)	2.2375**	-.1267	2.1409	-3.0777	1.8707*	5.1552**
07-Coffee, tea, cocoa, spices, and manufactures thereof(0.5864)	-1.3406**	.6854	-1.6962	3.3043	2.1555	1.6856
08-Feeding stuff for animals (notincluding unmilled cereals)(0.13)	-2.2435**	.1925	-4.4284	11.8654	-4.5491	-6.0659
09-Miscellaneous edible productsandpreparations(0.1362)	-.7454**	.5619	-1.0279	2.7966	1.918	1.7636
11-Beverages(0.0341)	-1.6282**	-.3031	-1.5767	3.4409	.249	-1.5511
12-Tobacco and tobacco manufactures thereof(0.062)	-3.9596**	-2.3724	-1.9367	2.5437	-3.7235	-3.4668
22-Oil seeds and oleaginousfruits(0.0035)	4.4623**	-.3261	-2.4004	-3.2904	.3952	.2993
23-Crude rubber (including synthetic and reclaimed)(0.5363)	-5.4425**	-2.6007	-5.7145	25.1274	-2.8887	-7.9614
24-Cork and wood(0.4828)	-3.5135**	-.7651**	3.8294	-2.0229	1.1800	1.6466
25-Pulp and waste paper(0.0084)	5.2929**	4.2985**	-3.0949**	20.6123	1.6491	-7.1244
26-Textile fibres (other than wool tops) n.e.s.(0.3932)	-.9078**	.1330	-10.4795	14.1634	-.8159	-2.9000
27-Crude fertilizers and crude minerals n.e.s.(0.0713)	-.8244**	-.0875	-.4808	2.0373	.3112	1.1459
28-Metalliferous ores and metal scrap(0.3186)	.2326**	-.2968	4.4145	-4.7284	-2.2792	-.1794
29-Crude animal and vegetable materials, n.e.s.(0.2432)	-.8534**	-.0967	.8621	-.1801	-.6859	.2202
33-Petroleum, petroleum products and related materials(1.9052)	2.5179**	.5343	1.2135	-5.1962	3.1913	4.5645
34-Gas, natural and manufactured(23.204)	-5.1284**	-.5107	-.6261	7.0155	6.6220	7.2401
41-Animal oils and fats(0.0017)	6.0077**	-.1085	-15.4493	-4.2252	-13.3447	-2.804**
42-Fixed vegetable oils and fats,crude, refined or fractionated(1.1475)	10.8298**	-.1906	-3.3856*	-4.8449*	4.8941**	5.6241**
43-Animal or vegetable oils and fats, processed n.e.s.(0.1651)	-6.0219**	-.334**	3.0999**	.7473	-3.0573**	-2.2249**
51-Organic chemicals(1.6318)	2.5117**	.4637	-10.4255**	6.5689	5.1274*	4.0955
52-Inorganic chemicals(0.7059)	-1.933**	.2383	-8.7454	13.3913	-4.6451	-7.711*
53-Dyeing, tanning and colouring materials(0.3557)	-.2418**	-.4140	-7.4903	8.8209	2.4545	1.4326
54-Medicinal and pharmaceutical products(0.0808)	-8.1336**	.0755	-.2140	9.7002*	-2.5824	-4.4454
55-Essential oils and resinoids and perfume materials n.e.s.(0.3973)	.3428**	.1331	-8.3226*	8.4668	2.4174	.7991
56-Fertilizers, manufactured(0.1543)	-6.0487**	1.1530	-14.8573	4.8296**	.5554	-4.0166
57-Plastics in primary forms(1.6504)	-.8797**	.3072	-1.2116	4.0594	2.2110	2.5244
58-Plastics in non-primary forms(1.4905)	-3.2182**	-.0825	-2.0595	12.2889	5.0382	5.0998
59-Chemical materials and products,n.e.s.(1.1425)	5.4453**	-.0351	-7.0206	-4.9177	7.4948**	7.9121*

61-Leather, leather manufactures, n.e.s. (0.009)	-2.9235**	.8555**	3.1458	-.1893	-8.8024**	-10.8198**
62-Rubber manufactures, n.e.s.(0.4574)	-5.1306**	.2192	.6121	11.5703	-1.7062	-2.6468
63-Cork and wood manufactures(excluding furniture)(2.1818)	2.5095**	-.5217	-4.3095	-1.0515	3.5236	4.8206
64-Paper, paperboard, and articles of paper pulp n.e.s. (0.4644)	-2.3104**	.5686	-.5108	7.1302	2.1741	2.3328
65-Textile yarn, fabrics, made-up articles, n.e.s. (0.6052)	-.6585**	1.0751	-11.0553	13.5705	1.2121	-1.4249
66-Non-metallic mineral manufactures n.e.s.(0.8049)	.9283**	.3844	-9.5868	8.6005	8.4054*	7.5240
67-Iron and steel(3.3492)	-3.4335**	.3952	-1.7066	8.6694	-3.8068	-4.6504
68-Non-ferrous metals(4.0781)	-5.1779**	-.4958	-8.2153	25.0299*	1.4916	-.3447
69-Manufactures of metal, n.e.s.(1.2476)	.3146**	.2366	-3.9962	4.0460	1.4162	.7279
71-Power generating machinery and equipment(1.0305)	-2.758**	-.0884	1.2197	6.2306	-.1701	.0313
72-Machinery specialized for particular industries(2.7412)	1.9533**	.1809	-5.4719*	2.8412	1.7562	1.2717
73-Metalworking machinery(0.6886)	-2.6166**	.9617*	-.6950	6.5670	-3.3125	-3.8973
74-General industrial machinery and equipment, n.e.s. (3.004)	-2.9884**	.2731	-.0117	6.7854	-2.0925	-2.8376
75-Office machines and automatic data processing equipment(2.7071)	-3.5921**	-.3622	-4.0977	6.0355*	1.4154	.4043
76-Telecommunications and sound recording n.e.s.(3.5753)	-4.4072**	-1.4809	-8.7081	28.7514	1.1062	-.7832
77-Electrical machinery, apparatus and appliances, n.e.s. (20.5712)	.9891**	-.3205	-9.9868	7.4882	7.4946	7.8083
78-Road vehicles (including air-cushion vehicles)(5.4245)	-.4417**	-.1738	-7.7522	10.4589	3.0286	2.2984
79-Others transport equipment(0.339)	-1.5552**	.2341	-4.9913**	2.9294*	-5.1737**	-9.8284**
81-Prefabricated buildings, sanitary, plumbing, heating n.e.s.(0.0475)	-1.8751**	.7640	12.025*	-8.3962	-4.9194	-1.9578
82-Furniture and parts thereof(0.816)	2.5531**	.8665	-4.1008*	6.5578	3.286243	.2542
83-Travel goods, handbags and similar containers(0.0177)	-2.6811**	1.7368**	2.7367	3.5562	-5.5881	-6.7758
84-Articles of apparel and clothing accessories(1.0494)	2.386**	0.206812	-8.6193	3.9123	5.9873	5.0294
85-Footwear(0.0124)	-12.5522**	.05111	4.5512	6.3634	-8.6629**	-10.3042**
87-Professional instruments and apparatus, n.e.s.(2.7079)	-.3096**	.2284	-1.5027	2.4903	.85213	.9809
88-Photographic apparatus, equipment and supplied and optical goods, n.e.s.,(1.0832)	2.3439**	.4808	-3.2272	.2333	-.3818	-.6698
89-Miscellaneous manufactured articles, n.e.s.(2.82)	-1.9994**	-.76944	-14.5362	21.6949	6.7949	3.7099
93-Special transactions and commodities (0.374)	.4248**	.1245	-3.5043	3.3717	3.7636*	3.7962
97-Gold, non-monetary(0.189)	.1663*	.5519	.8176	-.6206	-3.6324	-2.3105

Notes: \* (\*\*) show the significance at the 10% and 5% respectively. The critical values of standard t-distribution, i.e., 1.64 and 1.96 are used to arrive at \* and \*\*, respectively. Abbreviation n.e.s. refers to not elsewhere defined.

**Table 7: Nonlinear Model Diagnostic Statistics**

Industry (Trade Share)	Diagnostics								
	F <sub>PSS</sub> <sup>a</sup>	ECM <sub>t-1</sub>	Adj. R <sup>2</sup>	LM	RESET	CU	CUQ	Wald-S	Wald-L
02-Dairy products and birds' eggs(0.0044)	7.2597**	-.524(6.795)**	.5150	.8598	.0149	S	S	4.2933**	7.0093**
03-Fish, crustaceans and molluscs,and preparations thereof(0.2963)	3.5914	-.1901(4.71)**	.7492	.7183	5.5366**	S	U	6.1652**	.0746
04-Cereals and cereal preparations(0.1206)	2.8135	-.2958(4.18)**	.5790	1.3564	6.5389**	S	U	3.5781**	.8524
05-Vegetables and fruits(0.0291)	4.147*	-.3853(5.08)**	.4664	.2347	3.6538*	S	U	1.2275	1.0071
06-Sugars, sugar preparations and honey(0.0181)	6.785**	-.9301(6.22)**	.6003	.0178	.4570	S	S	.8607	32.1317**
07-Coffee, tea, cocoa, spices, and manufactures thereof(0.5864)	3.2863	-.289(4.528)**	.5181	.1263	3.4382*	S	U	9.5267**	.0014
08-Feeding stuff for animals (notincluding unmilled cereals)(0.13)	1.0411	-.1663(2.5833)	.5523	.0230	2.0798	S	S	1.2648	.6260
09-Miscellaneous edible productsandpreparations(0.1362)	5.4242**	-.2763(5.75)**	.7500	.0717	6.1664**	S	U	20.0041**	.0184
11-Beverages(0.0341)	3.1586	-.3727(4.12)**	.3927	1.2816	1.5458	S	U	.5268	1.5806
12-Tobacco and tobacco manufactures thereof(0.062)	1.7899	-.2167(3.36)	.6859	.3721	2.0547	S	S	2.6332*	.0725
22-Oil seeds and oleaginousfruits(0.0035)	7.3907**	-.4145(6.69)**	.4226	1.9585	.0831	S	U	.5770	.0347
23-Crude rubber (including synthetic and reclaimed)(0.5363)	2.7459	-.1457(4.05)**	.8441	.2562	.4064	S	U	.4694	1.6052
24-Cork and wood(0.4828)	4.766**	-.6093(5.33)**	.4842	.8622	.1804	S	S	.0498	1.0962
25-Pulp and waste paper(0.0084)	3.1289	-.2025(4.44)**	.6509	.3111	.0503	S	S	.8695	1.9688
26-Textile fibres (other than wool tops) n.e.s.(0.3932)	2.9885	-.2008(4.41)**	.7442	1.4198	2.5723	S	S	10.3898**	.2303
27-Crude fertilizers and crude minerals n.e.s.(0.0713)	3.9737*	-.3589(4.87)**	.5698	.0225	5.4833**	S	U	2.1726	.5347
28-Metalliferous ores and metal scrap(0.3186)	1.9668	-.2336(3.46)	.6058	.9278	1.8788	S	U	.8832	.7820
29-Crude animal and vegetable materials, n.e.s.(0.2432)	1.9672	-.3337(3.4696)	.5180	.1445	1.5527	S	S	.0255	.6502
33-Petroleum, petroleum products and related materials(1.9052)	4.443**	-.3086(5.13)**	.6212	.0546	.0335	S	S	11.7926**	.8327
34-Gas, natural and manufactured(23.204)	1.8831	-.3386(3.4019)	.3389	.8086	1.0648	S	S	10.4797**	.0049
41-Animal oils and fats(0.0017)	3.3161	-.1665(4.49)**	.9061	.1702	.0339	S	U	.0915	4.8158**
42-Fixed vegetable oils and fats,crude, refined or fractionated(1.1475)	17.9037**	-.7439(10.6)**	.3531	.3541	.4568	S	S	.7374	1.0427
43-Animal or vegetable oils and fats, processed n.e.s.(0.1651)	8.2828**	-.635(6.968)**	.3847	1.7490	.4046	S	S	19.3045**	3.2208*
51-Organic chemicals(1.6318)	5.0226**	-.2692(5.67)**	.7621	.4853	3.1862*	S	U	11.1451**	.2808
52-Inorganic chemicals(0.7059)	2.3052	-.2638(3.843)*	.5107	1.4418	.9321	S	U	4.8883**	1.7184
53-Dyeing, tanning and colouring materials(0.3557)	3.3820	-.1835(4.53)**	.7441	.0933	4.5313**	S	U	.0023	.2731
54-Medicinal and pharmaceutical products(0.0808)	6.0345**	-.4577(6.09)**	.4895	2.5793	3.1783*	S	S	13.4927**	1.7459
55-Essential oils and resinoids and perfume materials n.e.s.(0.3973)	3.5447	-.2727(4.76)**	.6640	1.0316	3.2839*	S	U	5.6481**	.0136
56-Fertilizers, manufactured(0.1543)	3.5973	-.3524(4.77)**	.3909	.1231	1.7047	S	S	24.283**	.8597
57-Plastics in primary forms(1.6504)	3.945*	-.1883(4.84)**	.7832	.8316	2.1181	S	U	1.7491	.0169
58-Plastics in non-primary forms(1.4905)	4.2894*	-.1664(5.01)**	.8618	.1638	5.5141**	S	U	.9969	.0787
59-Chemical materials and products,n.e.s.(1.1425)	3.5887	-.2171(4.59)**	.7704	2.1342	1.4994	S	U	.2344	.0410

61-Leather, leather manufactures, n.e.s. (0.009)	5.0204**	-.4568(5.41)**	.6325	1.5413	2.7264*	S	S	3.166*	2.5133
62-Rubber manufactures, n.e.s.(0.4574)	4.8037**	-.2162(5.41)**	.7722	.8048	4.2315**	S	U	5.2339**	.6444
63-Cork and wood manufactures(excluding furniture)(2.1818)	3.2266	-.285(4.458)**	.7991	.0051	.0092	S	S	.9031	.7789
64-Paper, paperboard, and articles of paper pulp n.e.s. (0.4644)	4.9569**	-.2069(5.46)**	.8327	.0905	7.4096**	S	U	1.9857	.0369
65-Textile yarn, fabrics, made-up articles, n.e.s. (0.6052)	3.6022	-.2072(4.95)**	.7489	.4109	4.3632**	S	U	19.4281**	1.1855
66-Non-metallic mineral manufactures n.e.s.(0.8049)	4.3013*	-.2048(5.31)**	.8241	.8243	5.4749**	S	U	23.9181**	.1277
67-Iron and steel(3.3492)	5.278**	-.2968(5.73)**	.5679	2.1545	3.1677*	S	U	4.1011**	.1608
68-Non-ferrous metals(4.0781)	4.0687*	-.1628(5.01)**	.8544	.0073	7.1485**	S	U	.9387	.8386
69-Manufactures of metal, n.e.s.(1.2476)	5.8087**	-.2993(5.98)**	.6733	.8351	3.447*	S	U	15.1946**	.3484
71-Power generating machinery and equipment(1.0305)	2.4969	-.1964(3.812)*	.6062	.3507	3.303*	S	U	.0631	.2173
72-Machinery specialized for particular industries(2.7412)	2.6355	-.2777(4.22)**	.5741	.8573	5.671**	S	U	2.842*	.1024
73-Metalworking machinery(0.6886)	5.8633**	-.2833(6.03)**	.7443	.4871	3.5958*	S	U	24.1871**	.0570
74-General industrial machinery and equipment, n.e.s. (3.004)	4.3343*	-.2412(5.16)**	.7012	1.1810	3.363*	S	U	18.0895**	.1158
75-Office machines and automatic data processing equipment(2.7071)	3.6543	-.1511(4.73)**	.8420	.4418	5.7459**	S	U	.2680	.2258
76-Telecommunications and sound recording n.e.s.(3.5753)	2.6411	-.1101(4.14)**	.8748	.1304	5.4559**	S	U	1.8118	2.1895
77-Electrical machinery, apparatus and appliances, n.e.s. (20.5712)	2.6380	-.1456(4.03)**	.8333	.1628	1.5173	S	U	.0209	.0193
78-Road vehicles (including air-cushion vehicles)(5.4245)	3.8236*	-.1871(4.82)**	.8188	.2817	4.9543**	S	U	1.3127	.0847
79-Others transport equipment(0.339)	9.089**	-.5832(7.45)**	.4625	.6290	3.7544*	S	S	12.3913**	5.7298**
81-Prefabricated buildings, sanitary, plumbing, heating n.e.s.(0.0475)	2.2054	-.2331(3.78)*	.5607	.0717	.4505	S	S	.4310	.4977
82-Furniture and parts thereof(0.816)	2.7433	-.1659(4.27)**	.7702	.0365	3.3912*	S	U	2.5176	.9607
83-Travel goods, handbags and similar containers(0.0177)	2.8059	-.2158(4.10)**	.6242	1.6037	3.4018*	S	S	12.0219**	.7770
84-Articles of apparel and clothing accessories(1.0494)	4.643**	-.2609(5.37)**	.6472	.8295	.1112	S	U	4.6**	.3224
85-Footwear(0.0124)	11.2252**	-.5473(9.56)**	.4876	.1479	2.6564	S	S	.0301	.6377
87-Professional instruments and apparatus, n.e.s.(2.7079)	3.9055*	-.2472(4.92)**	.7000	.0746	1.9763	S	U	6.9448**	.0268
88-Photographic apparatus, equipment and supplied and optical goods, n.e.s.,(1.0832)	4.5069**	-.3259(5.14)**	.6942	1.4937	3.2773*	S	U	13.0499**	.0027
89-Miscellaneous manufactured articles, n.e.s.(2.82)	2.9078	-.1605(4.40)**	.7779	.0202	5.8429**	S	U	1.2479	.7092
93-Special transactions and commodities (0.374)	4.6044**	-.2338(5.29)**	.8203	.1758	3.1186*	S	U	18.79**	.0004
97-Gold, non-monetary(0.189)	2.4994	-.2637(3.82)*	.5809	.0600	.4635	S	S	.0083	.0655

Notes:

- The F test due to Pesaran et al. (2001) is denoted by  $F_{PSS}$ . At the 10% (5%) significance level when there are three exogenous variables ( $k=3$ ), its critical value is 3.77 (4.35). This comes from Pesaran et al. (2001, Table CI-Case III, page 300). \* indicates a significant statistic.
- LM is Lagrange Multiplier test of residual serial correlation. It is distributed as  $\chi^2$  with one degree of freedom (first order). Its critical value at 10% (5%) level is 2.71 (3.84).
- RESET is Ramsey's test for misspecification. It is distributed as  $\chi^2$  with one degree of freedom and its critical value at 10% (5%) level is 2.71 (3.84).
- CU and CUQ are CUSUM and CUSUMQ respectively to test stability of all coefficients.
- Number inside the parenthesis next to  $ECM_{t-1}$  is the absolute value of the t-ratio, denoted by  $t_{BDM}$  in the text. Its critical value of -3.66 (-3.99) at 10% (5%) level of significance when  $k=4$  comes from Pesaran et al. (2001, Table CII-Case III, page 303).
- Abbreviation n.e.s. stands for not elsewhere defined.
- Trade share is in percentage calculated for the year 2015.