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Improving Australia's trade balance: A case study of agro-forest and fish products

Mohammad Abul Kashem | Mohammad Mafizur Rahman | Rasheda Khanam

School of Business Faculty of Business, Education, Law & Arts, University of Southern Queensland, Toowoomba, Queensland, Australia

Correspondence
Mohammad Abul Kashem, School of Business Faculty of Business, Education, Law & Arts, University of Southern Queensland, Toowoomba, QLD 4350, Australia.
Email: kashem24bb@gmail.com

Abstract

The impact of the exchange rate (ER) on the trade balance (TB) has been discussed for many years. However, the issue has not been discussed in sufficient depth, especially in relation to the TB of agricultural products. This paper will gauge this impact on Australia, which has much potential for agro-based trade in the world market. We have applied the Bahmani-Oskooee and Hosny's approach of the linear autoregressive distributed lag model to estimate the Marshall–Lerner condition (MLC) regarding the trade of Australian agro-forest and fish (AFF) products with its five major partner countries. Quarterly data will be used for the period 1988Q1–2020Q4. Our findings support the MLC in case of the major share of Australian AFF trade. The implication is that if the market force depreciates Australian ER, the country's AFF TB will improve in the long-run.

KEYWORDS

agricultural trade balance, Marshall–Lerner condition, Australia

JEL CLASSIFICATION

F12, F14

1 | INTRODUCTION

Ever since the breakdown of Breton Woods System in the early 1970s, when previously fixed exchange rates (ERs) among major currencies were allowed to float, researchers across the world have shown their interest in the effects of ER on international trade. However, the results of their research in this issue have failed to reach any consensus and vary across countries, regions and commodities. Such a variation has led researchers to investigate various ER dynamics, namely impact of ER changes on trade balance (TB) for countries or regions or commodities. The impact of ER changes on the international trade of a country or region is ambiguous, predominantly for three uncertain impacts: which are, first, it is not clear whether the Marshall–Lerner condition (MLC) is valid, second, sectoral level general equilibrium effects may lead to a deterioration of a sector's net external position following a real exchange rate (RER) depreciation due to the resources and consumption relocation and third, the degree of openness of a country's international trade border. Most of the existing studies have evaluated the impact of ER on aggregate trade of the above mentioned dynamic issues, ignoring the potential differences of this impact across sectors. Very limited attention has been paid to individual sectors like agriculture, manufacturing, service or their further segregated subsectors.

Thus, whether the change in the ER contributes to the change of net external position of a country's particular sector such as agricultural, fish and forest products is still a fundamental and basic empirical question. It may either improve or hurt this sector. Bahmani-Oskooee (1985) has taken initiative to fill this vacuum somewhat by analysing the impact of ER on sectoral TB. However, either carefully or inadvertently, the agricultural sector is omitted from his analysis. Therefore, the objective of this paper is to empirically examine the validity of MLC—a famous theoretical phenomenon that foreshadows the impact of ER—regarding the net external TB of Australian agro-forest and fish (AFF) products with her five trading partners: USA, Japan, China, South Korea and Thailand. Earlier studies for different countries and regions focused mainly on industrial or manufacturing products but not on nondurable AFF products (Backus, Kahoe, & Kydland, 1994; Bahmani-Oskooee et al., 2012; Gomes & Paz, 2005; Parikh & Shibata, 2004; Senhadji, 1998a, 1998b). Due to their nondurable characteristic, high dependence on nature, long gestation period for production, and the difference in inventory preserving techniques, the response of ER changing on AFF products may differ from the response of the durable manufacturing products. Furthermore, the impact may differ from other countries' AFF products for land abundant Australia—the most basic input of agricultural output. For this facet of AFF products this research is also a topical innovation and an attempt to fill up a long vacuum of the empirical research world.

TABLE 1 Contribution to AFF trade by major five partners for the period 1988–2020

Trading partner of Australia	Percentage of total AFF imports	Percentage of total AFF exports
USA	11.23	8.31
Japan	10.15	13.01
China	8.16	20.50
Korea	7.25	7.22
Thailand	6.13	5.82

Abbreviation: AFF, agro-forest and fish.
Source: Department of Foreign Affairs and Trade, Australia.

Table 1 shows the trade picture of Australia with her five major trading partners. These five countries have constituted about 43% and 55% of Australian AFF imports and exports, respectively, in 2020. Since Australia is a land abundant country and AFF production needs intensive use of land resources, Australia has much scope to enlarge its contribution by AFF in its total trade share. By considering the above backdrop, this article takes the initiative to test the validity of the MLC between Australia versus her major five AFF products trading partners.

To that end, we present the literature review in Section 2, outline the models and econometric technique in Section 3, explain the results and, report the result summary in Section 4 and draw the conclusions in Section 5.

2 | LITERATURE REVIEW

Depreciation usually increases and decreases import and export prices respectively in terms of foreign currency. So foreigners see that exports are less expensive and the countrymen get that imports are more expensive. Thus it is widely believed that TB improves when depreciation takes the place of the ER of a country. However, later Marshall and Lerner have shown that TB change is mostly a phenomenon of elasticities of import and export, not only of ER. Thus, it is now an established fact that the MLC approach is one kind of rule of thumb that is used to predict whether RER depreciation improves the TB of a country. There have been many studies on this issue across countries, regions, and periods, some of those have already paid attention to the test of the ER sensitivity and status of the MLC in context of Australia. All of these studies are chronologically tabulated in Appendix C.

First, Arndt and Dorrance (1987) take steps to analyse the Australian J-curve, using a self-generated tabular approach for their paper. Based on their findings they opine that nobody can rule out of having J-curve effect on the current account (CA) balance of Australia. However, they conclude that not only ER but also the efficacy of MLC, the competitive power of Australian exporting goods, exogenous factors to change of terms of trade (TOT), and level of domestic or national aggregate spending are key factors to TB improvement.

However, in the next Felmingham (1988) reaches in a converse conclusion. He examines the impact of TOT change on Australian TB using an approach presented by Haynes and Stone (1983) calculating and subsequently constructing a table comprising series of Australian TB and TOT. He also defines TB by import–export ratio. Subsequently, he attempts to relate TB with the current and past values of TOT, and decides that there is no evidence of the Australian J-curve. His findings have subsequently been discussed and economists suggest that one probable weakness of his method is that perhaps his calculated TOT may have had a very low correlation with the actual ER of Australia at that time. Depreciation can change the TOT in either direction depending on the product of elasticities of the exports demand and imports supply. So, a more effective method to examine the impact of depreciation on TB is to relate the TB directly to ER not with else what Felmingham (1988) has not done.

To overcome the weakness of Felmingham (1988)'s study, Karunaratne (1988) tries to investigate the link of Australian TB not only to its TOT, but also to REER. He also concludes that change in REER does not have any significant influence on the Australian CAB. His methodology is also later criticised by Bahmani-Oskooee and Baek (2015) who has considered that there could be strong multicollinearity between the TOT and REER when they are both included in the same model which was perhaps not understood and, hence, addressed by Karunaratne.

None of the above three studies provides any concrete evidence of the nexus between Australian ER and TB in either the short-run, or the long-run. However, using quarterly data for the period of 1977Q1–1988Q4, Bahmani-Oskooee and Pourheydarian (1991) have got sufficient indication that J-curve notion is valid for Australia in the short-run. Furthermore, their results show that devaluation of Australian dollar (AUD) also improves the TB in the long-run.

Bahmani-Oskooee and Niroomand (1998) criticise all the above researches noting that they have not followed proper econometric techniques due to the nonadvancement of time series techniques until their study period. It is true that none of the above studies has tested unit root of the data used though all of them rely on the data with time series dimension. To overcome this fault they use Johansen co-integration technique for 30 countries time series data of different periods individually. Our country of interest, Australia, is also included in this research paper using the annual data for the period of 1960–1992. Addressing all the time series properties of the data this study finds econometrically significant evidence of MLC for Australia for the first time.

Gradually, more studies start to emerge for Australia. Mahmud, Ullah, and Yucel (2004) checks MLC for six developed countries, Australia, Germany, Japan, Norway, United Kingdom and the USA by using the nonparametric technique resorting kernel estimation approach to estimate import and export price elasticities to gauge the MLC. Their results suggest that MLC is valid only for Norway.

Bahmani-Oskooee, Goswami, and Talukdar (2005) further investigates the short- and long-run effect of REER depreciation on Australian aggregate TB with 23 trading partners on a bilateral basis. The study also uses the aggregate trading data for the USA, Japan, China, South Korea and Thailand,—the top five partners, they consider for this study where quarterly data over the 1973–2001 period and co-integration technique of autoregressive distributed lag (ARDL) bound testing and error correction method (ECM) are used. The results show that among the trading partners related to this study except South Korea no other four countries support the J-curve phenomenon for Australia.

Again, Bahmani-Oskooee and Wang (2007a, 2007b) have criticised all the above studies because they are conducted by the data either between Australia and the rest of the world or between Australia and its individual trading partners aggregate data bases. So, these studies are suffering from aggregation bias. To overcome this fault, Bahmani-Oskooee and Wang (2007a, 2007b) have used disaggregated data between Australia and its second largest trading partner—the USA. They test for the annual United States–Australia bilateral trading data for totally 108 industries for the period of 1962–2003 using ARDL bounds testing and ECM approach for co-integration. Out of this 108 categories of products only 23 were AFF commodities. In this research they were able to discover J-curve effects only for 8 AFF commodities out of 23.

Furthermore, Bahmani-Oskooee and Wang (2009) have conducted another research adding two more years' data for the period of 1962–2005. In this paper they again use disaggregate trade data between Australia and the USA by commodity, and have estimated import and export demand models for the same 108 commodities. The results from the bounds testing approach to co-integration and ECM method indicate that in the long-run 41 export industries and 70 import industries are sensitive to the Australian RER.

In next, Bahmani-Oskooee, Shafiullah, and Islam (2017) criticised the study of Bahmani-Oskooee et al. (2005) for using linear model. Using a linear ARDL approach Bahmani-Oskooee et al. (2005) find that Australian bilateral trade, with each of the 23 partners, follows the J-curve effect in the model with the United Kingdom only. However, incorporating the ARDL model that allows for nonlinear adjustment of RER changes, they find that the J-curve effect is valid for four more partners (India, Italy, South Africa and United Kingdom).

Finally, Bahmani-Oskooee and Harvey (2019) have applied nonlinear models and asymmetric analysis approaches for testing the J-curve between Australia and her second largest trading partner—the United States—by using disaggregated data. However, this new approach also does not yield any significantly different outcomes to those of aggregate data or linear and symmetric analyses. They apply this new approach for the industry specific data to the trade flows of 123 industries traded between the United States and Australia and give evidence of an asymmetric J-curve in 28 industries. In addition, they find short-run asymmetric effects of RER changes on the TB of almost all studies, short-run impact asymmetric effects in 27 industries, and significant long-run asymmetric effects in 56 industries.

We would like to keep our literature review limited to Australian perspective. So, we have focused only the RER - TB nexus on the Australian economy. The findings from the above studies are mixed. All the papers before Bahmani-Oskooee and Wang (2007a, 2007b) suffers from aggregation bias where a significant price elasticities with one trading partner could be more than offset by an insignificant price elasticity with another partner. Neither do they follow proper econometric techniques. Moreover, some studies are not concentrated on the MLC meaning that the Australian AFF sector suffers from major knowledge gap regarding the MLC.

We have found only two studies on the MLC for Australian TB. Since they are pursued by aggregate data, these studies may suffer from aggregation bias. None of the papers above has concentrated on the MLC of Australian AFF products. According to our knowledge this is the first attempt to investigate the validity of the MLC for Australian AFF products. Since AFF commodities have some special properties that are dissimilar to industrial products, AFF products' TB may exhibit different behaviour than those of industrial commodities. Furthermore, Australia has a vast land property, unlike the most of the countries in the world. AFF products need intensive use land input in the production process. So, the study has more importance for Australia than other countries involved in AFF trade since a land abundant country has a relatively higher potential for AFF trade. Likewise, AFF products have contributed only 20% to total Australian exports and 10% in overall imports in 2020. Since there are huge unemployed land in Australia the country has much scope for further improvement in AFF TB by producing more AFF products. It is therefore clear that the study may have ample importance for the overall Australian economy and the agricultural sector in particular.

3 | THE MODEL, ECONOMETRIC TECHNIQUE AND DATA

Following Bahmani-Oskooee and Hosny (2013), Australian import demand from the partner country for commodity i would be as follows:

$$\mathrm{Ln\,IM_i^1} = a + b\ln \mathrm{Y_{AUS}} + c\,\mathrm{Ln}\left(\frac{\mathrm{PIM_i}}{\mathrm{PD_{AUS}}}\right) + e_i \tag{1}$$

where $\mathrm{IM_i}$ is the imports of commodity i by Australia from the partner country, $\mathrm{Y_{AUS}}$ is Australian real GDP, $\mathrm{PIM_i}$ is the price of the imported product i and, $\mathrm{PD_{AUS}}$ is the domestic price level in Australia. In this model, Australian real GDP and $\mathrm{PIM_i/PD_{AUS}}$—the relative import price index—are assumed as the key determinants of imports. Considering the usual notion of the conventional economic theories, the sign of the estimated b and c should be positive and negative, respectively.

To obtain comparatively more stable estimated coefficients, Bahmani-Oskooee and Hosny (2013) also recommends to convert Equation (1) into a dynamic adjustment model by incorporating the short-run dynamic adjustment mechanism. Econometricians usually respecify Equation (1) by converting it into an ECM proposed by Pesaran, Shin, and Smith (2001). Thus, our dynamic specification stands as Equation (2) below, keeping coherence with the suggestion of Pesaran et al. (2001) and Bahmani-Oskooee and Hosny (2013). Our empirical estimation will be based on time series analysis using data for the period of 1988Q1–2020Q4 where the linear ARDL estimation technique is employed.

$$\Delta \ln \mathrm{IM}_t^{\mathrm{i}} = \alpha + \sum_{j=0}^{n} \beta_j \Delta \ln \mathrm{Y}_{\mathrm{AUS},I-J} + \sum\nolimits_{j-0}^{n} \gamma_j \Delta \ln \left(\frac{\mathrm{PIMi}}{\mathrm{PD}_{\mathrm{AUS}}} \right)_{t-j} + \sum_{j=1}^{n} \lambda_j \Delta \ln \mathrm{IM}_{t-j}^{\mathrm{i}} + \sigma_0 \ln \mathrm{IM}_{t-1}^{\mathrm{i}} + \sigma_1 \ln \mathrm{Y}_{\mathrm{AUS},J-1} + \sigma_2 \ln \left(\frac{\mathrm{PIM}}{\mathrm{PD}_{\mathrm{AUS}}} \right)_{T-1} + \varepsilon_t. \quad (2)$$

In Equation (2) Pesaran et al. (2001) recommends applying the standard F-test with new critical values to establish the joint significance of the lagged level variable as a sign of co-integration. They also tabulated new critical values to interpret the degree of integration of the variables used in the model (2). Undeniably, variables could be I(0) or I(1), which are very common features of almost all macroeconomic variables. Hence, we believe that there is no need for pre-unit root testing. However, we have calculated and found they are stationary either in level or in first-differenced form, and (ready to share them on request). Once Equation (2) is estimated, the coefficient estimates of the first-differenced variables reflect short-run effects. The long-run effects, that is, the income and relative import price elasticities in Equation (2) are obtained by the estimates of σ_1 and σ_2 that are normalized on σ_0.

Next, we formulate the demand function of partner countries X (= USA, Japan, China, South Korea and Thailand) for Australian AFF commodity exports of i ($\mathrm{EX_i}$) as a function of the country's X income ($\mathrm{Y_X}$) as in (3):

$$\mathrm{Ln\,EX_i^1} = a' + b' \ln Y_{\mathrm{x}} + c' \mathrm{Ln} \left(\frac{\mathrm{PEX_i}}{\mathrm{PD_x}} \right) + \mathrm{e'_i} \quad (3)$$

Again, we expect an estimate of b' and c' should be positive and negative, respectively. Furthermore, the ECM model associated with Equation (3) yields the following shape:

$$\Delta \ln EX_t^{\mathrm{i}} = \alpha' + \sum_{j=0}^{n} \beta'_j \Delta \ln \mathrm{Y}_{\mathrm{X},I-J} + \sum\nolimits_{j-0}^{n} \gamma'_j \Delta \ln \left(\frac{\mathrm{PEXi}}{\mathrm{PD_X}} \right)_{t-j} + \sum_{j=1}^{n} \lambda'_j \Delta \ln \mathrm{EX}_{t-j}^{\mathrm{i}} + \sigma'_0 \ln \mathrm{EX}_{t-1}^{\mathrm{i}} + \sigma'_i \ln \mathrm{Y}_{\mathrm{X},J-1} + \sigma'_2 \ln \left(\frac{\mathrm{PEX}}{\mathrm{PD_X}} \right)_{T-1} + \varepsilon'_t \quad (4)$$

Once again, Equation (4) is estimated, the short-run effects inferred by the estimates of coefficients related to first-differenced variables, and long-run effects are accompanied by the estimates of σ'_1 and σ'_2 normalized on σ'_0.

The ML condition will be satisfied if the both conditions are satisfied which are normalized relative price elasticities, σ_2 and σ'_2 are (i) negative and significant respectively in both model

(2) and (4), and (ii) the summation of absolute values is more than one. The data, variables and traded AFF commodities are noted in Appendices A and B, respectively.

4 | RESULTS, DISCUSSION AND RESULTS SUMMARY

Now we can discuss the results of the estimated ECMs (2) and (4) for each of the five countries for individual AFF products that have been traded between Australia and five individual countries for the quarterly data over the period of 1988Q1–2020Q4. For this purpose we rely on the model of Bahmani-Oskooee and Hosny (2013) to estimate export and import demand elasticities, enforcing a maximum of four lags for each individual model for each first-differenced variable using the latest version of E-views. In this case, we have used the Akaike information criterion to define the optimum number of lags. Thus, every reported result is considered an optimum model. For our purpose, to infer the validity of MLC we need only long-run elasticities of the ECM model (2) and (4). So, we only report the estimated long-run coefficients of export and import demand functions. Since the short-run coefficients, are not related to our present concern; they are presentable on request. As estimated models are the same for each pair of countries, here we briefly point out the inference techniques.

Since the model is an ARDL type of ECM, we first have to confirm a significant *F*-statistic about the co-integration among dependent (export or imports) and independent variables (income and relative price of exports and imports). This *F*-test statistic distribution table is tabulated by Pesaran et al. (2001) where a significance of calculated *F*-statistic indicates that relationship among the dependent and independent variables are meaningful (Table 2). In our estimations *F*-statistic shows significance overwhelmingly except one commodity (Z) and exports of three commodities (N, T and P1) by Australia to South Korea and Thailand, respectively, in case of imports of two commodities (T and U) from Thailand only. After achieving a confirmed co-integrated relationship we can set out for other diagnostic tests. We report here five other relevant diagnostic tests. We estimated the error component term (ECT) widely known as ECM_{t-1}[1] with imposing optimum lags. It is known as speed of convergence to the long-run equilibrium where higher value of significant negative ECM confirms higher speed towards convergence. We have asterisked the commodity names mentioned in the first column of Tables D1–D5 in Appendix D when estimated ECM_{t-1} is found significant. The Lagrange multiplier (LM) test result is used for testing the presence of serial correlation. Since our quarterly data size is 132 and Breush–Godfrey serial correlation LM test statistic is distributed as χ^2 with 2 (two) degrees of freedom with a critical value of 5.99. The RESET test developed by

TABLE 2 Bound of the ARDL *F*-test when sample size is 130 and degrees of freedom is 2

ARDL bounds test for the sample period 1988Q3–2020Q4 (observation = 132) ***F*-statistic with degrees of freedom $k = 2$ for each model of each country fair** **Critical value bounds tabulated by Peseran**		
Significance	**I(0) bound**	**I(1) bound**
10%	2.63	2.35
5%	3.10	3.87
1%	4.13	5.00

Ramsey is also reported to infer the functional specification of the model. This statistic is also distributed as χ^2 with degrees of freedom 1 (one) for each model. We have also applied the CUSUM and CUSUMSQ tests to determine stability of the short-run and long-run coefficient estimates where stable coefficients are denoted by "S" and the unstable ones by "US." Finally, we also tested the goodness of fit of the every model. To test this, instead of R^2, we have reported the numerical value of the adjusted R^2. Since adding the unnecessary variable also increases R^2, we believe that adjusted R^2 gives the true picture of goodness of fit of a model. The discussion of the results of the application of this econometric techniques for the five major AFF trading partner countries of Australia is noted below.

To this end, Table D1 of Appendix D reports the results of the imports and exports demand models of Australia and US bilateral commodity level AFF trade. It is notable that as our sample size is 132, *t*-statistic at least 1.646 (10% degrees of freedom) is considered as significant. By inspecting Table D1, it can be seen that the relative price of import coefficients has a negative and significant coefficient for 59.76% of AFF products imported to Australia from the USA, while in 56% of AFF products the income elasticity is positive, and the remaining 44% of them is negative. The negative elasticities imply that as the Australian economy grows, she produces very close substitute goods those belong to these 46% AFF products, which helps the country to lessen imports. However, net imports of Australian AFF trade will be increased as income increases since positive income elasticities are higher than negative ones. Lower part of the Table D1 presents the estimates of the demand by the US economy for Australian exports. It seems that as one of the major AFF trade partners of Australia, US income as a main long-run determinant of Australian exports in most of the AFF products, since 82% of total AFF trade carries a positive and significant coefficient. From Table D1 it is observed that 59.76% and 61.63% of Australian AFF imports and exports with the USA satisfy the MLC, that is, the sum of the absolute values of import and export price elasticities are greater than one, and relative price elasticities are individually negative and significant for both export and import demand functions.

Australian imports and exports with Japan are reported in Table D2 of Appendix D. The relative price of import coefficients has negative and significant coefficient for 17 products amounting to 62.77% of AFF products imports of Australia from Japan. Eleven of these products, amounting to 47% of products, have price elasticity with more than one meaning that they are relatively price elastic. Totally 91% AFF products imports have the income elasticity positive meaning that Australia has no substitute for those Japanese AFF products. That is, Australia has sufficient scope to focus on AFF trade to reduce imports from Japan to improve the TB. Now, lower part of Table D2 for the estimates of the Australian exports demand by Japanese economy can be considered. It seems that as one of the Australian major partners, Japanese income is a main long-run determinant of Australian exports in most the AFF products, since they carry positive and significant coefficients. Negative relative exports price elasticity with significant *t*-statistics are revealed by about 54% AFF exports by Australia to Japan. From Table D2 it is observed that about 62.77% and 53.82% of Australian AFF imports and exports, respectively, satisfy the MLC.

Table D3 of Appendix D reports the results of the fitted imports and exports demand models for Australian AFF products with China. By the visual inspection of import panel Table D3 it is clear that the relative price of import coefficients are negative and significant for 74.05% of AFF products imports of Australia from China. Income elasticity is positive, and significant for 100% AFF imports meaning that imports are increased as income increases of Australia as she has no substitutable capacity for these AFF products. In addition, the results of the bound tests confirm

that Australian imports are co-integrated with Australian income or relative import prices or both for 100% of Australian AFF imports from China. Next, lower panel of Table D3 describes the AFF exports functions to China. Our estimation shows that for 88.99% AFF exports of Australia, Chinese income is a long-run determinant of Australian AFF products exports, since it carries a positive and significant coefficient. However, our main concern is regarding coefficients of relative exports price. It is significant and negative for more than 96% of exports to China which means that Australian AFF exports to China is highly price elastic. Finally, from Table D3 it is observed that for AFF 74% imports and 69% exports of Australia with China and Australia tends to satisfy the MLC.

Our next focus is on Table D4 of Appendix D to understand the status of Australian bilateral trade of AFF products with South Korea. Import panel of Table D4 shows that the relative price of import coefficients are negative and significant for about 53% of AFF products. While in 81% AFF products, the income elasticity is positive, meaning that Australian imports from South Korea increases as the Australian income increases. Positive and significant elasticities imply that the Australian economy has no direct or indirect substitutability for 81% imported products from South Korea. Next, the lower part of Table D4 review the Australian AFF products demanded by the South Korean economy. The relative price term carries a negative and significant coefficients for about 65% of total Australian AFF exports to South Korea which are also passed by the bound tests. From Table D4 it is observed that about 53% of Australian AFF imports and 65% Australian AFF exports satisfy the MLC.

Finally, we look at the Table D5 which does the same work for the AFF commodity level imports and exports demand models of Australia with Thailand. It is observed that the relative price of import coefficients have negative and significant coefficients for 52.29% of AFF products are imported to Australia from Thailand. For 82% AFF products the income elasticity is positive. The positive elasticities imply that as the Australian economy grows, the country needs to import more goods from Thailand as she is unable to produce substitutes for those AFF products, which would worsen her TB. To analyse AFF exports to Thailand, we look at the export related panel in lower area of Table D5. Like the above four countries Thai income is also a dominant long-run determinant of Australian exports for most of the AFF products, since it carries a positive and significant coefficient. In addition, 78.26% of AFF trade carries negative and significant relative export price elasticity, implying that Australian AFF exports to Thailand are highly price elastic. Among them, 78.12% of exports satisfy almost all econometric tests, indicating that the estimated coefficients of those functions are reliable. From Table D5, it is observed that for 52.29% and 78.12% Australian AFF imports and exports, respectively, with Thailand satisfying the MLC.

TABLE 3 Percentage of AFF imports and exports of Australia endorsing MLC

Name of Australian trading partner	Percentage share of imports endorses ML condition	Percentage share of exports endorses ML condition
1. United States	60	62
2. Japan	63	54
3. China	74	69
4. Korea	53	65
5. Thailand	52	79

Abbreviations: AFF, agro-forest and fish; MLC, Marshall–Lerner condition.

The summary of the above discussed results is presented in Table 3 below so that decision on MLC can be done easily.

Table 3 shows what percentage of Australian AFF trade with her major five partners satisfy the MLC condition. It is clear that the majority of the AFF trade share confirms the efficacy of this condition so it can be claimed that the depreciation of the AUD either by market forces or by any other means would improve the Australian AFF TB in the long-run. This finding has important implications for policy makers of Australia. Moreover, the results suggest that some relevant policies, like export promotion for raising the return on exports and imports substitution measures to lower the import expenditure, must be taken into consideration to improve the AFF TB, and also ER depreciation through monetary and fiscal policy can be an easy way in this regard.

5 | CONCLUSION AND POLICY IMPLICATIONS

Economists have been discussing the issue of ER impact on TB at least for the last five decades. Hence, there is a great deal of research on this topic. One of the branches of this topic is investigation of Validity of MLC. MLC states that if the sum of the price elasticities of import and export demands of a country adds up to more than one, currency depreciation is expected to improve the country's TB in the long-run. The findings of this research state that this condition is valid for the majority portions of imports and exports by Australian AFF goods for each of her major five partners. It can be now concluded that depreciation of the AUD either due to market forces or for anything else that may improve the AFF TB of Australia with the major trading partners.

To avoid aggregation bias we estimated our proposed model by commodity-wise data. Furthermore, since the data used in this paper is time series in nature we have conducted unit root test to select the right model for estimation. Accordingly, we adopted the ARDL technique for the purpose of estimation. The results of our model indicate that the MLC phenomenon works for the fitted data and model; that is after passing through of depreciated RER, TB will ameliorated. This happens, perhaps, due to the increase and decrease of the profit margin of Australian AFF exporters and importers, respectively. Our estimation technique and results are reliable. Therefore, we believe any policy based on findings of this paper will bring good fortune for the Australian AFF TB. Furthermore, besides ER, income also plays an important role in determining the Australian AFF TB with the major five AFF trade partners.

Australia follows a principle of free market and liberalized borders in trade policy. The country also follows a market based flexible ER policy. Therefore, the country does not have any option to manipulate its ER for the improvement of trading account (TB), CA, foreign exchange reserve and so forth. In this backdrop, the country can use monetary and fiscal policy to convey the ER to its intended direction. In this way, Australian central bank has the scope to depreciate ER. Our findings suggest if the Australian central bank and government initiate proper monetary and fiscal measures, respectively, the AFF TB of Australia will be improved.

Last but not least, our findings oppose the proposition of Burda and Gerlach (1992) that durable products should be relatively more sensitive to the changes of ER than nondurable products. Since AFF products are mostly nondurable in nature and MLC is confirmed by major parts of exports and imports for each of the five largest AFF trade partners of Australia, it is clear that this proposition is not supported by our current study.

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ENDNOTE

[1] Short run parameters are estimated using the regular ECM as depicted is equation below

$$\Delta \ln \mathrm{IM}_t^{\mathrm{i}} = \alpha + \sum_{j=0}^{n} \beta_j \Delta \ln \mathrm{Y}_{\mathrm{AUS},I-J} + \sum\nolimits_{j-0}^{n} \gamma_j \Delta \ln \left(\frac{\mathrm{PIMi}}{\mathrm{PD}_{\mathrm{AUS}}} \right)_{t-j} + \sum_{j=1}^{n} \lambda_j \Delta \ln \mathrm{IM}_{t-j}^{\mathrm{i}} + \alpha \mathrm{ECM}_{t-1} + \varepsilon_t$$

The error correction model results indicate the speed of adjustment back to long run equilibria after a short run shock. The ECM integrates the short-run coefficient with the long-run coefficient without losing long-run information. Under ECM technique, the long run causality is depicted by the negative and significant value of the ECT coefficient α and the short run causality is shown by the significant value of other regressor variables. A same method is applied for export models too.

DATA AVAILABILITY STATEMENT

All data used in this paper are collected from International Financial Statistics (IFS) and Australian government websites, which are publicly and freely available at Bilateral Imports and exports values are collected from the Department of Foreign Affairs and Trade of Australian Government (Data period 1988-2020).

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APPENDIX A: DATA AND VARIABLES USED IN THE MODEL

DATA AND INFORMATION AND THEIR SOURCES

Quarterly data over the 1988Q1–2020Q4 period are used to carry out the empirical analysis. The data categories and source are as follows.

LIST OF VARIABLES

IMi = For each commodity i, IM is the volume of Australia imports from the trading partner country X. It is defined as the ratio of the value of Australian imports from the trading partner X over the respective import price index of commodity i.

EXi = For each commodity i, EX is the volume of Australian exports to the trading partner country X. It is defined as the ratio of Australian exports to the trading partner country X over the respective exports price index of commodity i.

Bilateral imports and exports values are collected from the Department of Foreign Affairs and Trade of Australian Government. (Data period 1988Q1–2020Q4).

Y_{AUS} = Australian real GDP. The data come from International Financial Statistics (IFS), published by IMF.

Y_X = Real GDP of Australian trading partner country X (= US, Japan, China, South Korea, and Thailand). Data source: IFS.

PMi = For each commodity i, PM is import price index of Australia, collected from IFS.

PD = Domestic price level in Australia, CPI data is used as proxy data for PD collected from IFS.

PXi = For each commodity i, PX is defined as export price index of Australia, collected from IFS.

P_{AUS} = The price level in the US. CPI data used as proxy for P^{AUS} collected from IFS.

Individual commodity price = This data is collected from Australian agriculture, water and the environment monthly publications. The supplied data are monthly. However, since these are flow data we take the quarter-end data only for our model.

APPENDIX B: LIST OF AFF COMMODITIES TRADED BY AUSTRALIA CONSIDERED IN THIS RESEARCH

A = Live animals
B = Meat and edible meat offal
C = Fish and crustaceans, molluscs, and other aquatic, invertebrates
D = Diary produce
E = Animal originated products
F = Trees and other plants, live
G = Fresh vegetables and certain roots and tubers
H = Fruit and nuts, edible
I = coffee, tea, mate, and spices
J = Cereals
K = Products of milling Industry
L = Oil seeds and oleaginous fruits
M = Lac; gums, resins and other vegetable saps and extracts
N = Vegetable plaiting materials
O = Animal or vegetable fats and oils and their cleavage products
P = Cocoa and cocoa preparations
Q = Preparations of cereals, flour, starch or milk
R = Preparations of vegetables, fruit, nuts, or other parts of plants
S = Miscellaneous edible preparations
T = Beverages, spirits and vinegars
U = Food industries, residuals, and wastes thereof
V = Tobacco and manufactured tobacco substitutes
W = Salt
X = Milk, milk powder, butter, cheese etc.
Y = Root crops and plants
Z = Dry edible nuts and vegetables
A1 = Round wood, swan wood, timber etc.
B1 = Aquaculture, hatcheries and nurseries products
C1 = Fertilizers originated from natural products
D1 = Tanned, processed and raw hides
E1 = Non-fish sea extracts
F1 = Organic fertilizer and active agents
G1 = Residues and waste from the food industries; prepared animal fodder
I1 = Products of animal origin, not elsewhere specified or included
J1 = Wool, fine or coarse animal hair, and animal hair yarn
L1 = Fur skins, leather etc.
M1 = Feathers and downs prepared
N1 = Furniture
O1 = Miscellaneous edible products
P1 = Sugars and sugar confectionary

APPENDIX C: LITERATURE ON NEXUS BETWEEN EXCHANGE RATE AND TRADE BALANCE OF AUSTRALIA

Author (publishing year)	Data type & period	Australian trading partner name	Methodology used	Dependent variable	Explanatory variable(s)	Result of ex. rate sensitivity, or ML condition
Arndt and Dorrance (1987)	Yearly, 1955–1985	Rest of the world	Tabular form	Exports–imports	Number of macroeconomic variables like elasticities of exports and imports, international competitiveness, terms of trade and national spending	Elasticities of supply and demand for imports and exports; competitiveness of trading goods; changes in the terms of trade; and domestic spending
Felmingham (1988)	Yearly, 1958–1986	Rest of the world	OLS	Ratio of imports and exports	Different macroeconomic variables	No evidence of the Australian J-curve
Karunaratne (1988)	Yearly, 1960–1986	Rest of the world	Haynes and Stone (1983)	Exports and imports	REER, money supply, economic growth	REER has no significant impact on Australia's CAB
Bahmani-Oskooee and Pourheydarian (1991)	Quarterly, 1977–1988	11 OECD Countries	OLS	Exports–imports	Domestic RGDP, world RGDP, domestic money supply, world money supply, domestic price level and world price level	J-curve is valid in the long-run for Australia
Bahmani-Oskooee and Niroomand (1998)	Annual, aggregated, 1960–1992	30 OECD countries	Johansen co-integration technique	Export, import	Ratio of domestic import price and domestic price level, importer GDP, world GDP	MLC is satisfied for all 30 countries
Mahmud et al. (2004)	Quarterly, aggregated, 1957–2000	Australia, Germany, Japan, Norway, the UK and the USA	Nonparametric	Export, import	Ratio of domestic import price and domestic price level, importer GDP, world GDP	MLC is satisfied only in case of fixed exchange rate regime

(Continues)

Author (publishing year)	Data type & period	Australian trading partner name	Methodology used	Dependent variable	Explanatory variable(s)	Result of ex. rate sensitivity, or ML condition
Bahmani-Oskooee et al. (2005)	Quarterly, aggregated, 1973–2001	23 Trading partners	ARDL, ECM	TB = Import export ratio	Exporter income, importer income, real ex. rate	Very limited support for J-curve phenomenon
Bahmani-Oskooee and Wang (2007a, 2007b)	Annual, 108 commodities, 1962–2003	The USA	ARDL, ECM	TB = Import export ratio	Exporter income, importer income, real ex. rate	64 Commodities have short-run, and 35 commodities have long-run impact by REX depreciation
Bahmani-Oskooee and Wang (2008)	Annual, 107 commodities, 1962–2003	The USA	ARDL, ECM	Exports, imports	Exporter income for export model, importer income for import model, real ex. rate, variance of 12 month REX	60% commodities have short-run impact. But very few commodities have long-run impacts. Number of commodities having impact for imports are double than exports
Bahmani-Oskooee and Wang (2009)	Annual, 108 commodities, 1962–2005	The USA	ARDL, ECM	Exports, imports	Exporter income, importer income, real Ex. rate	Exports of 41 and imports of 70 commodities are REX sensitive
Bahmani-Oskooee et al. (2017)	Quarterly, aggregated, 1971–2015	23 Countries	ARDL, ECM	TB = Import export ratio	Exporter income, importer income, real Ex. rate	J-curve notion valid only for five countries
Bahmani-Oskooee and Harvey (2019)	Monthly, 123 Commodities, 2002–2018	The USA	ARDL, ECM	TB = Import export ratio	Exporter income, importer income, real Ex. rate	23 industries support J-curve notion only in the short-run

APPENDIX D: DETERMINING MARSHALL-LERNER CONDITION

TABLE D1 The results of the fitted model to Australian imports and exports with the USA

Item	Contribution in total imports or exports	Contribution by significant items	Import from the USA										Import elasticity	Export elasticity	Summation of absolute values of elasticities
			ln(RGDP)	ln(REX)	Constant	*F*-test	ECM $(t-1)$	LM	RESET	CUSUM	CUSUMSQ	Adj R^2			
A*	3.3601	3.3601	−0.9598	−0.6298	10.1266	16.3757	−0.1228	0.5818	1.9164	S	S	0.21	−0.6298	−0.7389	1.37
			(−3.7259)	−2.0719	−3.8258		−1.7329								
B*	3.3011	3.3011	−1.2029	−0.4130	−14.0342	35.2595	−0.1831	0.5643	16.3728	S	S	0.10	−0.4130	−0.9215	1.33
			(−2.5346)	−1.8165	−2.6957		−1.7344								
C	3.3612		−0.1497	0.0888	−1.2969	42.3983	−0.0409	2.6418	0.4206	S	US	0.13	0.0888	0.0876	
			(−1.2702)	0.5650	−1.1349		−0.4445								
D*	3.4002	3.4002	−0.2688	−0.6658	−4.0967	43.4960	−0.5183	0.0746	14.0175	S	S	0.11	−0.6658	−0.7415	1.41
			(−1.599)	−2.4289	−2.1726		−1.7714								
E	3.5731		−0.1079	−0.0008	−0.9562	28.6470	−0.6597	2.9437	2.0795	US	S	0.18	−0.0008	−0.0737	
			(−1.0897)	−0.0067	−1.0493		−0.9852								
F*	1.8703	1.8703	−0.4593	−0.6119	−3.6103	42.3843	−0.2014	0.9555	0.9555	US	S	0.22	−0.6119	−0.5866	1.20
			(−3.0044)	−2.2632	−2.4769		2.4617								
G*	3.7213	3.7213	−0.1320	−0.3172	−0.7719	27.6913	−0.1208	0.9397	19.1127	S	S	0.13	−0.3172	−0.8691	1.19
			(−2.2184)	−2.8010	−1.6154		−1.6779								
H*	2.5701	2.5701	−0.7315	−0.7868	−8.5003	43.6697	−0.2418	0.9703	10.4699	US	S	0.14	−0.7868	−0.2934	1.08
			(−4.556)	−4.4631	−4.6852		−1.8156								
I	2.8741		−0.0331	−0.1561	−0.4221	34.4620	0.0551	24.5170	10.3569	S	US	0.20	−0.1561	−0.4981	
			(−0.3863)	−1.2591	−0.5745		0.4896								
J*	3.1015	3.1015	−0.3927	−0.1605	−3.7040	31.9244	−0.2113	0.2079	0.1428	S	S	0.28	−0.1605	−1.1702	1.33
			(−2.1958)	−1.6520	−2.0107		−1.9439								
K	3.1545		−0.3895	−0.0736	−4.1238	43.0849	−0.0169	2.3318	2.0304	US	US	0.09	−0.0736	−0.2286	
			(−2.6764)	−0.5410	−2.7783		−0.1870								
L	3.9321		0.0538	0.1162	0.3394	33.0474	−0.0028	1.1287	2.1017	S	US	0.11	0.1162	−0.1688	
			0.7353	0.6523	0.4627		−0.0312								

(Continues)

TABLE D1 (Continued)

Item	Contribution in total imports or exports	Contribution by significant items	Import from the USA										Import elasticity	Export elasticity	Summation of absolute values of elasticities
			ln(RGDP)	ln(REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2			
M*	3.3201	3.3201	0.1247	−0.7749	−1.1889	32.6245	−0.1133	1.0919	0.7999	US	S	0.18	−0.7749	−0.3707	1.15
			1.0309	−1.7648	−1.1005		−1.7455								
N*	2.8713	2.8713	−0.1069	−0.5454	0.4761	30.1601	−0.2202	3.2678	17.2678	S	S	0.10	−0.5454	−1.0501	1.60
			−0.8896	(−1.8649)	0.4096		−1.7424								
O	3.4919		0.3466	−0.2696	−3.8898	44.0286	−0.1247	5.0593	0.4015	US	S	0.08	−0.2696	−0.2072	
			2.7567	−1.5255	−2.7651		−0.9786								
O1*	3.8809	3.8809	0.4165	−0.2345	−3.8532	44.0922	−0.1477	0.9183	21.4847	S	S	0.09	−0.2345	−1.2101	1.44
			3.8457	−2.2381	−4.0163		−1.6858								
P1*	3.5808	3.5808	0.1948	−0.2442	−2.2161	28.4390	−0.2294	0.7013	12.2248	US	S	0.08	−0.2442	−0.8264	1.07
			1.7053	−1.8962	−1.9518		−1.6916								
P	3.3645		−0.0686	−0.4826	−0.0658	39.1044	−0.0112	3.8966	16.7922	S	US	0.10	−0.4826	0.4897	
			−0.4786	−2.7339	−0.0473		−0.1228								
Q	3.6963		0.0366	−0.3221	−0.8932	33.1720	0.0502	7.0807	8.5126	S	S	0.23	−0.3221		
			0.2668	−2.7351	−0.6947		0.4796								
R*	3.9911	3.9911	0.3393	−0.2034	−3.7084	42.4244	−0.1653	0.7463	1.0365	S	S	0.31	−0.2034	−0.8737	1.08
			2.4649	−1.7415	−2.7036		−1.7079								
S*	4.2602	4.2602	0.4080	−0.8743	−4.1218	33.8331	−0.2227	0.1211	29.2505	US	S	0.07	−0.8743	−0.2065	1.08
			1.7790	−1.9211	−1.9150		−2.2743								
T	4.3443		0.4075	−0.1671	−4.4058	44.5184	0.1531	36.1372	10.4831	S	US	0.24	−0.1671	0.4278	
			2.3996	−1.3113	−2.3510		1.1178								
U*	4.5714	4.5714	0.5973	−0.4906	−5.0289	9.0765	−0.4368	0.8389	0.0151	S	S	0.22	−0.4906	−1.1233	1.61
			2.3873	−2.1268	−2.2699		−1.8395								
V*	3.4305	3.4305	−0.3344	−0.3761	4.9232	40.8721	−0.6628	1.2509	0.8123	US	S	0.16	−0.3761	−1.9925	2.37
			−1.8934	−1.7655	2.4145		−2.8306								
W	3.7423		0.0528	0.0682	−0.0156	20.9924	−0.0421	8.2262	5.9769	S	S	0.17	0.0682	−0.2044	
			0.9024	0.4662	−0.0239		−0.3925								

TABLE D1 (Continued)

Item	Contribution in total imports or exports	Contribution by significant items	Import from the USA										Import elasticity	Export elasticity	Summation of absolute values of elasticities
			ln(RGDP)	ln(REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2			
X*	3.7701	3.7701	0.7708	−0.4738	−8.9554	35.9753	−0.2663	0.2525	1.7614	S	S	0.18	−0.4738	−0.6305	1.10
			3.2306	−1.7855	−3.4547		−1.7014								
Y	4.7422		0.1608	−0.1050	−1.5274	24.9533	−0.0799	6.0589	7.1748	S	S	0.17	−0.1050	0.2129	
			1.7217	−0.7295	−1.7712		−0.0825								
Z*	4.7703	4.7703	0.1482	−0.8384	−1.3945	35.6958	−0.5633	0.3287	0.3287	US	S	0.27	−0.8384	−0.1932	1.03
			1.6988	−2.2237	−1.8194		−2.3367								
A1	0	0	...	...	...	...	...	...	...	...	...	...	0.00	−1.2142	1.21
Total	**100.00**	**59.7625**	...	...	...	...	...	...	...	...	...	...	...	...	...
Item	**Contribution in total imports or exports**	**Contribution by significant items**	**Export to the USA**										**Import elasticity**	**Export elasticity**	**Summation of absolute values of elasticities**
			ln (RGDP)	**ln(REX)**	**Constant**	***F*-test**	**ECM ($t-1$)**	**LM**	**RESET**	**CUSUM**	**CUSUMSQ**	**Adj R^2**			
A*	2.9804	2.9804	0.3384	−0.7389	−2.6258	30.8554	−0.1090	0.0252	0.5573	US	S	0.09	−0.6298	−0.7389	1.37
			1.6678	−2.0013	−1.1221		−2.0103								
B*	5.7701	5.7701	0.2209	−0.9215	−2.5654	30.1012	−0.7739	2.3643	1.1756	S	S	0.19	−0.4130	−0.9215	1.33
			2.2964	−1.9915	−2.3967		−1.8619								
C	4.4255		0.0273	0.0876	0.0038	30.3521	−0.2152	15.4144	30.2153	S	S	0.20	0.0888	0.0876	
			0.2883	0.6001	0.2229		1.7464								
D*	4.0902	4.0902	0.1451	−0.7415	−1.0980	20.5996	−0.4216	1.2999	3.5320	S	S	0.13	−0.6658	−0.7415	1.41
			1.7421	−1.8409	−0.9212		−2.2228								
E	3.6325		0.3184	0.0737	−3.7884	34.5164	−0.0014	0.2273	0.3868	US	US	0.06	−0.0008	−0.0737	
			1.6026	0.3887	−1.6545		−0.0158								
F*	3.0222	3.0222	−0.1792	−0.5866	2.8984	35.3663	−0.6504	1.3702	13.2954	S	S	0.27	−0.6119	−0.5866	1.20
			−2.4325	−1.9421	2.8702		−1.8418								
G*	3.1001	3.1001	0.8723	−0.2691	−1.4559	39.5417	−0.0868	1.9711	1.8856	US	S	0.12	−0.3172	−0.8691	1.19
			2.6668	−1.6619	−0.9678		−1.9521								

(Continues)

TABLE D1 (Continued)

Item	Contribution in total imports or exports	Contribution by significant items	Export to the USA										Import elasticity	Export elasticity	Summation of absolute values of elasticities
			ln (RGDP)	ln(REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2			
H*	4.2102	4.2102	0.4148	−0.2934	−4.2835	24.7941	−0.4417	1.7409	14.1675	US	S	0.18	−0.7868	−0.2934	1.08
			2.5373	−1.7183	−2.4819		−1.7721								
I*	2.3355		1.3001	0.4981	−15.4957	39.0607	−0.0129	1.3715	4.1437	S	S	0.15	−0.1561	−0.4981	
			4.1713	1.9634	−4.0954		−1.9812								
J*	2.0211	2.0211	0.4942	−1.1702	−8.4605	29.1891	−0.8839	0.9066	0.6012	S	US	0.11	−0.1605	−1.1702	1.33
			1.8809	−1.8820	−1.2713		−3.0434								
K	4.4050		0.2012	−0.2286	−2.7746	25.4669	0.0469	5.3218	4.5849	S	S	0.10	−0.0736	−0.2286	
			1.7673	−1.5231	−1.9435		0.4808								
L	3.9208		0.1474	−0.1688	−1.9018	35.9269	−0.0061	0.5510	1.3612	S	S	0.06	0.1162	−0.1688	
			0.8637	−0.7795	−0.9957		−0.0676								
M*	3.3908	3.3908	0.3503	−0.3707	−3.4754	36.4711	−0.3262	0.6276	10.8550	US	S	0.20	−0.7749	−0.3707	1.15
			1.9127	−1.9596	−1.1737		−2.2868								
N*	0.7114	0.7114	−0.5583	−1.0501	5.4103	27.7169	−0.4162	1.3287	0.4353	S	S	0.15	−0.5454	−1.0501	1.60
			−1.3398	−1.7319	1.0922		−1.6766								
O	3.4356		1.3067	−0.2072	−16.5179	23.2931	0.0174	12.5075	27.3799	S	US	0.25	−0.2696	−0.2072	
			4.4223	−1.0660	−4.5397		0.1800								
O1*	3.3501	3.3501	0.3715	−1.2101	−4.7417	44.2206	−0.2074	3.1144	0.6557	S	S	0.15	−0.2345	−1.2101	1.44
			3.2504	−1.8251	−3.3176		2.1802								
P1*	4.3013	4.3013	−0.1693	−0.8264	2.3057	36.2424	−0.2608	1.7994	0.0486	S	S	0.14	−0.2442	−0.8264	1.07
			−1.2923	−1.9195	1.4986		−2.1583								
P	2.3554		1.1775	0.4897	−13.6656	19.8659	−0.0229	4.8770	13.8689	S	US	0.28	−0.4826	0.4897	
			4.6412	1.6423	−4.6247		−0.2498								
Q	0												−0.3221		
R*	3.7911	3.7911	0.5828	−0.8737	−7.1413	41.8912	−0.0914	2.6071	7.0169	S	S	0.19	−0.2034	−0.8737	1.08
			3.6292	−1.8631	−3.6803		−2.3198								

TABLE D1 (Continued)

Item	Contribution in total imports or exports	Contribution by significant items	Export to the USA										Import elasticity	Export elasticity	Summation of absolute values of elasticities
			ln (RGDP)	ln(REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2			
S*	3.6602	3.6602	0.4174	−0.2065	−5.4825	37.1193	−0.1433	0.5593	2.5051	US	S	0.09	−0.8743	−0.2065	1.08
			2.2747	−1.9660	−2.3899		−3.0366								
T	5.0688		0.1391	0.4278	−0.9236	36.9875	−0.1769	30.5338	9.5261	S	S	0.18	−0.1671	0.4278	
			1.1980	3.7524	−0.6643		−1.2308								
U*	3.5703	3.5703	1.3675	−1.1233	−17.0383	35.4665	−0.2532	1.8719	2.3262	S	US	0.13	−0.4906	−1.1233	1.61
			3.3582	−2.3747	−3.3938		−2.2348								
V*	1.3401	1.3401	2.2320	−1.9925	−24.9899	16.3557	−0.3787	1.0362	1.0362	S	S	0.19	−0.3761	−1.9925	2.37
			4.0998	−3.8156	−4.0270		−1.9950								
W	3.8454		0.1559	−0.2044	−2.0280	40.3070	−0.0124	1.5231	13.4631	S	S	0.15	0.0682	−0.2044	
			1.0775	−1.2395	−1.2234		−0.1360								
X*	4.9011	4.9011	0.6394	−0.6305	−1.1321	33.8081	−0.9185	0.4345	−0.7714	S	S	0.11	−0.4738	−0.6305	1.10
			1.8513	−1.7618	−0.8107		−3.2017								
Y	4.9913		−0.0686	0.2129	1.7030	37.3599	−0.0099	0.8612	14.3713	S	US	0.17	−0.1050	0.2129	
			−0.4095	0.7526	0.7934		−0.1080								
Z*	5.0405	5.0405	−0.2553	−0.1932	3.6176	34.8952	−0.3843	0.2584	33.5122	US	S	0.13	−0.8384	−0.1932	1.03
			−1.0244	−1.7234	1.2992		−2.1445								
A1*	2.3902	2.3902	1.3706	−1.2142	−17.5252	8.8040	−0.1256	0.7844	0.7844	US	S	0.21	0.00	−1.2142	1.21
			4.1268	−2.5406	−4.2449		−2.3545								
Total	**100.00**	**61.6314**	....	....	....	....	....	....	....	....	....	....	...	...	...

TABLE D2 The results of the fitted model to Australian imports and exports with Japan

			Imports from Japan											
Item	Contribution in total imports	Contribution by significant items	ln (RGDP)	ln(REX)	Constant	*F*-test	ECM $(t-1)$	LM	RESET	CUSUM	CUSUMSQ	Adj R^2	Import elasticity	Export elasticity	Summation of elasticities
A*	4.4212	4.4212	1.9678	−2.2048	−20.8539	7.4503	−0.5028	1.4751	0.7576	S	S	0.31	2.2048	−1.0922	3.30
			2.4513	−2.5579	0.0239		−6.4138								
B*	2.2803	2.2803	−1.4534	−2.2440	17.1473	25.5439	−0.1795	0.2979	2.3185	S	S	0.24	−2.2440	−0.1585	2.40
			−1.4912	−2.0851	1.5211		−1.8167								
C*	3.7756		0.0873	−4.9365	−0.0781	30.6034	−0.3975	0.5348	10.6198	S	US	0.34	−0.9365	0.0129	
			0.7496	−2.9300	−0.0593		−3.6973								
D*	2.1406	2.1406	0.1041	−11.4100	0.9321	5.9842	−0.2343	1.4280	9.3766	S	US	0.18	−11.4100	−1.0157	12.43
			0.1720	−5.4849	0.1441		−2.4672								
E*	3.6208	3.6208	0.5304	0.8776	−4.8789	7.1713	−0.1661	1.2771	0.4824	S	S	0.22	0.8776	−1.1095	1.99
			1.7441	2.3039	−1.3377		−1.7347								
F*	3.5313	3.5313	1.8136	−2.7158	−19.8350	10.6951	−0.1911	1.8047	2.9997	US	s	0.20	−2.7158	−0.5523	3.27
			2.8799	−1.8475	−2.7636		−2.0985								
G*	2.1481		0.5593	−2.1710	−12.4954	26.4032	−0.0845	2.1625	10.6539	S	S	0.16	−2.1710	0.1488	
			0.2234	−1.9845	−0.9628		−1.8843								
H	2.4155		0.7627	−0.4118	9.0352	26.2828	−0.2547	0.0552	1.0604	US	US	0.23	−0.4118	0.0522	
			0.6347	−0.3205	0.5158		−0.6268								
I*	4.1701	4.1701	7.2575	−1.2008	2.2619	18.4778	−0.5757	2.1097	4.1369	S	S	0.38	−1.2008	−0.1753	1.38
			4.2908	−1.8850	3.5126		−3.0663								
J*	4.6302		2.4159	−1.2708	3.0943	8.6600	−0.4008	2.6982	5.4635	S	S	0.22	−1.2708	−0.1561	
			1.7056	−2.4631	2.3601		−5.5307								
K*	1.8602	1.8602	0.6634	−0.1279	−7.4202	19.0565	−0.0915	0.2605	0.8498	US	S	0.48	−0.1279	−1.1169	1.24
			0.7643	−2.2078	1.6070		−1.9856								
L	1.0611		0.3082	−0.2986	−3.4694	12.4412	−0.0256	3.4236	1.0030	S	US	0.14	−0.2986	−0.1992	
			0.5277	−0.4797	−0.5159		−1.1832								

TABLE D2 (Continued)

Item	Contribution in total imports	Contribution by significant items	Imports from Japan										Import elasticity	Export elasticity	Summation of elasticities
			ln (RGDP)	ln(REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2			
M*	3.5603		4.2918	−1.2905	6.5225	20.3703	−0.3537	45.9569	21.2147	US	S	0.26	−1.2905	0.3302	
			2.4408	−1.8724	2.8251		−3.3188								
N*	3.8904	3.8904	3.9160	−2.2443	0.7448	25.2034	−0.0645	0.9852	0.3371	US	S	0.25	−2.2443	−0.3194	2.56
			0.9311	−2.5057	3.3667		−3.5220								
O*	4.4702	4.4702	2.2385	−2.2517	0.1583	28.9018	−0.1261	0.7492	1.2139	S	S	0.18	−2.2517	−0.8489	3.10
			0.4934	−2.4482	0.3195		−2.4017								
O1*	3.7388		0.6859	−1.6860	−10.4509	42.3114	−0.2424	12.1326	37.8437	S	S	0.33	−1.6860	0.0801	
			4.4773	−3.8974	−4.3470		−2.5702								
S1*	3.7502		0.4848	−1.5472	−4.4333	33.7588	−0.3429	11.8650	62.7327	US	S	0.29	−1.5472	−1.5163	
			3.0943	−3.2489	−2.7116		−3.9148								
P*	3.8466		0.2529	−1.2906	−2.1754	28.2358	−0.2086	44.6287	9.7795	US	US	0.24	−1.2906	0.3937	
			1.8471	−1.8607	−1.3114		−2.1454								
Q*	3.8601	3.8601	0.3937	−0.7232	−4.0485	46.0537	−0.1278	2.2258	0.5617	S	S	0.29	−0.7232	−0.3309	1.05
			2.0741	−1.9709	−1.9577		−2.9658								
R*	3.8722		0.9202	−1.5289	−8.9915	42.9599	−0.4638	18.8002	60.3773	S	US	0.32	−1.5289	−0.8244	
			4.4193	−3.5513	−4.2562		−4.5357								
S*	3.8801	3.8801	−0.3421	−0.8538	−0.6545	33.6052	−0.3348	1.8046	11.2913	US	S	0.32	−0.8538	−0.7637	1.62
			−4.0356	−2.1309	−0.6413		−2.0150								
T	0.1877		1.0935	−2.3262	−3.9129	17.0799	−0.2614	5.1948	0.5917	S	US	0.28	−2.3262	−1.1959	
			0.7937	−1.7688	−0.7431		−0.2851								
U*	4.4602	4.4602	6.1498	−3.1826	−7.2730	32.7137	−0.0697	0.8698	1.7416	US	S	0.41	−3.1826	−1.1926	4.38
			3.2772	−2.0734	−2.0754		−1.9970								
V*	4.5603	4.5603	0.9887	−1.3127	11.8014	24.0815	−0.1841	0.5392	0.3199	S	S	0.24	−1.3127	0.0888	1.40
			0.9141	−2.0112	2.9229		−1.9251								
W*	6.6512	6.6512	2.3525	−3.1818	4.1057	10.6890	−0.5492	0.8129	0.6445	S	S	0.12	−3.1818	−1.2531	4.43

(Continues)

TABLE D2 (Continued)

Item	Contribution in total imports	Contribution by significant items	Imports from Japan ln (RGDP)	ln(REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2	Import elasticity	Export elasticity	Summation of elasticities
			1.9215	−2.2888	3.7047		−2.8294								
X*	4.2955		0.7141	−0.5894	−6.5678	33.4556	−0.2205	28.9055	17.3177	US	US	0.35	−0.5894	−0.0276	
			3.4533	−1.7408	−3.1389		−2.4736								
Y*	2.5501	2.5501	−0.0006	−0.9183	0.7074	7.0238	−0.3271	0.0214	0.8629	S	S	0.16	−0.9183	−0.1922	1.11
			−0.0198	−2.0547	0.1888		−2.1949								
C1*	6.4302	6.4302	0.6888	−1.5291	6.3566	7.5316	−0.2464	2.0514	0.4029	S	S	0.25	−1.5291	0	1.53
			3.7780	−1.8046	8.6623		−5.3472								
A1	0														
Total	**100**	**62.7718**	...	...	...	...	...	...	...	...	...	...	...		
Item	**Contribution in total imports**	**Contribution by significant items**	**Exports to Japan** **ln (RGDP)**	**ln (REX)**	**Constant**	***F*-test**	**ECM ($t-1$)**	**LM**	**RESET**	**CUSUM**	**CUSUMSQ**	**Adj R^2**	**Import elasticity**	**Export elasticity**	**Summation of elasticities**
A*	3.2706	3.2706	1.7619	−1.0922	−1.3259	8.4507	−0.4037	1.5086	2.1042	S	US	0.12	−2.2048	−1.0922	3.30
			1.7589	−1.8725	−0.9308		−2.1611								
B*	4.8802	4.8802	0.3318	−0.1585	0.2046	24.6493	−0.2404	0.7019	2.0698	S	S	0.17	−2.2440	−0.1585	2.40
			1.8518	−2.3992	0.5321		−2.7484								
C*	4.2413		0.1836	0.3129	0.9034	33.9940	−0.2651	47.5613	13.1573	S	US	0.16	−4.9365	0.3129	
			0.9032	3.2884	1.8736		−3.6117								
D*	4.2501	4.2502	0.0044	−1.0157	−0.8682	33.8377	−0.2449	0.4326	1.0297	S	S	0.19	−11.4100	−1.0157	12.43
			0.0773	−2.6420	−1.7335		−3.6639								
E*	3.4112	3.4112	0.0772	−1.1095	0.2087	30.6027	−0.1156	0.1748	0.5504	S	S	0.16	0.8776	−1.1095	1.99
			0.3865	−1.7627	0.4832		−1.7064								
F*	2.1704	2.1704	0.1682	−0.5523	0.7244	26.5986	−0.1306	1.5897	6.1883	US	S	0.13	−2.7158	−0.5523	3.27
			1.4192	−2.3397	1.3912		−2.3095								

TABLE D2 (Continued)

Item	Contribution in total imports	Contribution by significant items	Exports to Japan												
			ln (RGDP)	ln (REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2	Import elasticity	Export elasticity	Summation of elasticities
G	3.1588		−0.1525	0.1488	0.4177	25.0838	0.1315	15.2052	8.8079	S	S	0.22	−2.1710	0.1488	
			−0.3169	1.3868	1.2244		0.9158								
H	3.4791		0.6456	0.0522	−1.0049	39.3930	−0.1545	0.3948	0.0004	US	US	0.18	−0.4118	0.0522	
			1.3874	0.7410	−1.3228		−0.1982								
I*	2.1603	2.1603	−0.0108	−2.1753	0.1771	32.9180	−0.0838	1.3716	2.5599	S	S	0.15	−1.2008	−0.1753	1.38
			−0.0214	−1.8892	0.1832		−2.2456								
J*	4.2814		0.4253	−0.1561	0.6227	39.2799	−0.1613	0.3048	0.9242	S	US	0.19	−1.2708	−0.1561	
			0.1588	−1.9843	1.9441		−3.0548								
K*	3.7211	3.7211	0.2953	−1.1169	0.7340	31.9187	−0.3206	0.8875	0.3762	S	S	0.14	−0.1279	−1.1169	1.24
			2.6212	−1.7880	1.5931		−2.2454								
L*	4.1581		0.6403	−0.1992	−0.7266	28.0172	−0.4442	0.0595	0.0595	S	US	0.09	−0.2986	−0.1992	
			1.7245	−2.4411	−1.2007		−2.0541								
M	1.4871		1.8445	0.3302	−3.3999	35.5841	0.0085	0.1764	0.0145	S	S	0.21	−1.2905	0.3302	
			1.8780	1.4909	−1.7982		0.0881								
N*	0.7705	0.7705	0.4300	−0.3194	−0.5176	7.5338	−0.0957	0.1563	0.1563	S	S	0.26	−2.2443	−0.3194	2.56
			0.4909	−4.1385	−0.3137		−2.6091								
O*	3.2507	3.2507	0.4883	−0.8489	−0.3669	22.4790	−0.1518	0.9923	1.2234	S	US	0.16	−2.2517	−0.8489	3.10
			1.7712	−2.6387	−0.7796		−2.2479								
O1	3.5185		0.6164	0.0801	1.2576	28.9947	0.0773	16.5642	6.9837	US	US	0.16	−1.6860	0.0801	
			0.8982	1.0102	0.9795		0.6974								
S1*	3.9565		1.6651	−1.5163	−0.0004	39.4935	−0.6346	0.3827	0.0920	S	S	0.08	−1.5472	−1.5163	
			2.6870	−1.7483	−0.0005		−1.8897								
P*	3.3835		2.3866	0.3937	−3.0762	60.7339	−0.4207	1.0399	14.2889	S	S	0.03	−1.2906	0.3937	
			5.3851	4.6829	−4.7762		−5.6440								

(Continues)

TABLE D2 (Continued)

			Exports to Japan											
Item	**Contribution in total imports**	**Contribution by significant items**	**ln (RGDP)**	**ln (REX)**	**Constant**	***F*-test**	**ECM ($t-1$)**	**LM**	**RESET**	**CUSUM**	**CUSUMSQ**	**Adj R^2**	**Import elasticity**	**Export elasticity**	**Summation of elasticities**
Q*	3.4202	3.4202	0.8817	−0.3309	−0.8469	35.4040	−0.1294	0.5463	0.4335	S	S	0.12	−0.7232	−0.3309	1.05
			2.8635	−3.6635	−1.8285		−1.9764								
R*	3.4704		0.5755	−0.8244	−0.5173	23.0125	−0.4705	3.3521	0.3436	US	S	0.13	−1.5289	−0.8244	
			1.7452	−2.3177	−0.9486		−1.9181								
S*	3.4711	3.4711	0.8864	−0.7637	−0.5979	30.4517	−0.3168	0.8964	0.7081	S	S	0.17	−0.8538	−0.7637	1.62
			2.0833	−2.4112	−0.7748		−1.7247								
T*	3.4901		1.2636	−1.1959	−1.6531	32.6484	−0.3135	0.2271	0.3662	US	S	0.16	−2.3262	−1.1959	
			3.4832	−2.8509	−3.0968		−1.9246								
U*	3.8903	3.8903	0.1963	−1.1926	0.0975	33.3367	−0.1129	0.8457	0.8315	S	S	0.17	−3.1826	−1.1926	4.38
			0.8009	−2.0648	0.2316		−2.4508								
V*	1.8705	1.8705	−0.3117	−0.1888	0.7664	29.3337	−0.1106	0.1553	0.1731	US	US	0.15	−1.3127	0.0888	1.40
			−0.3916	−2.2353	0.4869		−2.1163								
W*	3.9407	3.9407	−0.4938	−1.2531	2.1103	27.5939	−0.1247	0.7821	0.9715	S	S	0.15	−3.1818	−1.2531	4.43
			−1.8405	−3.3366	2.7678		−2.0626								
X	5.2465		0.2409	−0.0276	−0.1887	25.4089	−0.0329	30.9115	14.0887	S	S	0.15	−0.5894	−0.0276	
			0.9988	−0.2819	−0.4418		−0.2780								
Y*	5.6112	5.6112	0.2977	−0.1922	−0.0787	25.3944	−0.1467	1.7989	2.0832	S	S	0.14	−0.9183	−0.1922	1.11
			1.0310	−2.1189	−0.1771		−2.4397								
Z*	3.7406	3.7406	1.6196	−0.6196	−0.5156	40.5473	−0.2122	0.6656	0.6247	US	S	0.16	−1.5291	0	1.53
			1.8065	−1.7065	−0.9286		−2.2531								
A1*	2.3706		−0.7029	−0.7029	2.1572	33.1666	−0.1756	0.7293	0.7293	S	US	0.17			
			−1.0306	−1.0306	1.8455		−1.8450								
Total	**100.00**	**53.8216**											...		

TABLE D3 The results of the fitted model to Australian imports and exports with China

			Imports from China												
Item	**Contribution in total imports**	**Contribution by significant items**	**ln (RGDP)**	**ln (REX)**	**Constant**	***F*-test**	**ECM ($t-1$)**	**LM**	**RESET**	**CUSUM**	**CUSUMSQ**	**Adj R^2**	**Import elasticity**	**Export elasticity**	**Summation of elasticities**
C*	11.3705	11.3705	0.4883	−2.2366	−5.1835	36.9799	−0.1100	0.3893	1.6240	S	S	0.43	−2.2366	0.0184	2.2550
			2.1544	−2.4291	−2.1402		−2.0234								
D*	7.5311	7.5311	0.6786	−0.1157	−7.4684	35.5378	−0.4600	0.1482	0.4481	S	S	0.27	−0.1157	1.0501	1.1658
			2.4897	−2.9737	−2.4709		−2.4512								
H*	10.8002	10.8002	0.2307	−2.2707	−0.1419	45.3968	−0.0893	2.0285	2.5589	US	S	0.36	−2.2707	0.1852	2.4559
			1.7521	−1.6835	−1.5645		−2.0897								
U*	6.8715	6.8715	1.1095	−0.8357	−5.7143	34.0100	−0.0677	0.8909	10.9702	S	S	0.11	−0.8357	0.1841	1.0198
			2.7131	−2.9637	−0.7223		−1.9842								
LL															
MM															
NN															
O*	8.8977		0.3578	−0.0530	0.1236	47.3080	−0.1040	0.0016	1.5483	S	US	0.14	−0.0530	0	
			2.4124	−1.1850	1.3585		−2.3022								
E*	8.8402	8.8402	0.2423	−2.3527	2.4541	42.5149	−0.1771	0.0305	0.7115	S	S	0.16	−2.3527	0	2.3527
			2.9144	−2.6705	0.9818		−3.1160								
J*	6.2566		0.4212	−0.5695	6.0260	36.0855	−0.0950	8.7967	0.1289	S	S	0.28	−0.5695	0	
			2.3699	−1.3746	1.4550		−2.3645								
P*	8.0207	8.0207	1.1854	−1.3257	−12.9627	38.2603	−0.2620	−0.2451	4.3985	US	S	0.18	−1.3257	0	1.3257
			3.8692	−1.8449	−3.8086		−2.8603								
I*	9.8918	9.8918	0.1746	−1.0232	−1.8509	44.8170	−0.0492	−0.2765	0.0074	S	S	0.19	−1.0232	0	1.0232
			2.4105	−2.2605	−2.3647		−1.6674								
B*	10.7315	10.7315	1.1207	−1.1832	−11.9245	47.0207	−0.2451	−0.1522	1.0349	US	S	0.21	−1.1832	0	1.1832

(Continues)

TABLE D3 (Continued)

Item	Contribution in total imports	Contribution by significant items	Imports from China: ln (RGDP)	ln (REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2	Import elasticity	Export elasticity	Summation of elasticities
			4.4089	−4.3187	−4.3604		−2.8963								
L*	10.8166		0.2972	−0.1548	−2.8268	47.2021	−0.2765	−0.1805	1.6918	US	US	0.25	−0.1548	0	
			2.5784	−1.0115	−2.4639		−2.4512								
Total	**100.00**	**74.0526**	...	...	...	...	...	...	...	...	...	...	...	...	...
Item	**Contribution in total imports**	**Contribution by significant items**	**Exports to China: ln (RGDP)**	**ln (REX)**	**Constant**	***F*-test**	**ECM ($t-1$)**	**LM**	**RESET**	**CUSUM**	**CUSUMSQ**	**Adj R^2**	**Import elasticity**	**Export elasticity**	**Summation of elasticities**
C	19.1408	19.1408	0.0058	−0.0184	0.1489	33.5983	−0.1791	0.0007	0.0138	S	S	0.43	−2.2366	−0.0184	2.2550
			1.7616	−1.8459	0.2189		−1.9751								
D	19.1515	19.1515	0.0065	−1.0501	0.1619	33.8938	−0.4386	2.1969	2.1351	US	S	0.27	−0.1157	−1.0501	1.1658
			1.7047	−1.7216	1.4367		2.0106								
H	15.0101	15.0101	0.0068	−0.1852	1.1565	34.0162	−0.0398	0.2060	0.0950	S	S	0.36	−2.2707	−0.1852	2.4559
			1.5550	−2.5357	0.3521		−1.7556								
U*	16.1608	16.1608	0.0099	−0.1841	0.4506	36.5127	−0.1135	0.0061	0.3345	US	S	0.11	−0.8357	−0.1841	1.0198
			2.4163	−1.8072	2.9499		−3.0862								
LL*	11.0185	...	−0.0029	−0.9368	1.0334	32.4109	−0.1462	1.0151	0.0021	S	US	0.12		...	...
		...	−0.5794	−2.8769	0.3794		−3.3396							...	...
MM*	3.9365	...	0.0005	0.1632	−0.0975	27.4214	−0.1924	4.1701	1.1294	US	US	0.17		...	...
		...	0.0698	0.8453	−0.4221		−1.5736							...	...
NN*	15.6045	...	0.1749	−0.3667	4.2006	41.6608	−0.1257	0.4778	9.9281	S	S	0.19		...	...
	...	...	2.6774	−3.1381	5.1274		−3.0392								
O	...	...	...	...	...	...	...	...	...	...	...	...	−0.0530	0	
	...	...	...	...	...	...	...	...	...	...	...	...			
E	...	...	...	...	...	...	...	...	...	...	...	...	−2.3527	0	2.3527
	...	...	...	...	...	...	...	...	...	...	...	...			

TABLE D3 (Continued)

			Exports to China												
Item	**Contribution in total imports**	**Contribution by significant items**	**ln (RGDP)**	**ln (REX)**	**Constant**	***F*-test**	**ECM ($t-1$)**	**LM**	**RESET**	**CUSUM**	**CUSUMSQ**	**Adj R^2**	**Import elasticity**	**Export elasticity**	**Summation of elasticities**
J	...	...	...	...	...	...	...	...	...	...	...	...	−0.5695	0	
	...	...	...	...	...	...	...	...	...	...	...	...			
P	...	...	...	...	...	...	...	...	...	...	...	...	−1.3257	0	1.3257
	...	...	...	...	...	...	...	...	...	...	...	...			
I	...	...	...	...	...	...	...	...	...	...	...	...	−1.0232	0	1.0232
	...	...	...	...	...	...	...	...	...	...	...	...			
B	...	...	...	...	...	...	...	...	...	...	...	...	−1.1832	0	1.1832
	...	...	...	...	...	...	...	...	...	...	...	...			
L	...	...	...	...	...	...	...	...	...	...	...	...	−0.1548	0	
	...	...	...	...	...	...	...	...	...	...	...	...			
Total	**100**	**69.4647**	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE D4 The results of the fitted model to Australian imports and exports with South Korea

			Imports from South Korea												
Item	Contribution in total imports	Contribution by significant items	ln (RGDP)	ln (REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2	Import elasticity	Export elasticity	Summation of elasticities
A*	3.0301	3.0301	−0.0458	−1.3206	0.4496	39.9886	−0.0443	1.1759	1.6844	S	S	0.28	−1.3206	−1.0025	2.32
			−0.6600	−1.7761	2.4802		−2.1520								
C*	3.0405	3.0405	0.1327	−1.2545	−0.0109	33.7398	−0.0480	0.6129	0.2937	S	S	0.39	−1.2545	−1.1021	2.36
			2.3482	−1.7501	−0.0791		−1.6517								
D	4.2878		0.1996	0.0017	0.0251	35.6039	−0.0667	1.0401	0.2932	US	US	0.24			
			1.2988	0.6012	0.2998		−0.7216								
E*	3.4106	3.4106	−0.0069	−0.2771	−0.0002	38.6873	−0.1062	0.3938	0.8011	US	S	0.27	−0.2771	−0.9121	1.19
			−2.4501	−3.1859	−0.0026		−2.0673								
F*	1.8314	1.8314	0.1362	−1.1106	−0.2559	32.4852	−0.0369	1.1231	0.7759	S	S	0.18	−1.1106	−0.3240	1.43
			1.9835	−1.9844	−2.5980		−2.3996								
G	2.8975		0.4215	0.0121	−0.6206	32.9891	−0.0115	0.7423	0.3016	US	S	0.26		0	
			2.1329	1.6648	−1.9357		−0.1258								
H*	2.9021	2.9021	0.3549	−0.9019	−0.3271	37.0692	−0.1315	1.2156	0.4245	S	S	0.15	−0.9019	−0.7768	1.68
			2.3385	−2.4104	−1.7564		−1.7150								
I*	1.6208	1.6208	0.6395	−0.5576	−0.8090	35.9004	−0.1217	0.8044	0.6070	S	S	0.24	−0.5576	−0.7823	1.34
			2.7528	−1.8647	−2.4856		−2.1335								
J*	5.1445		0.1615	−0.0038	0.4587	43.3468	−0.1846	0.0318	0.1955	S	US	0.17		0	
			2.5685	−1.4025	0.1433		−2.0509								
K*	4.1204	4.1204	0.4412	−0.8539	−0.0182	31.3594	−0.1178	1.3594	0.9565	S	S	0.21	−0.8539	−0.4917	1.35
			3.1847	−1.9033	−0.1556		−2.1845								
L*	4.4807	4.4807	0.4889	−0.7505	0.3213	59.6947	−0.2918	0.6549	0.8021	S	S	0.48	−0.7505	−0.6229	1.37
			4.0316	−2.1072	1.9356		−8.8365								
M	1.7695		0.7877	−0.0139	−0.9239	36.0634	−0.0170	1.8434	21.3971	S	US	0.25			
			3.3526	−1.5966	−2.7232		−0.1852								
N*	0.4015	0.4015	−0.0759	−0.6257	−0.1311	35.7451	−0.3215	0.6193	0.1026	S	S	0.24	−0.6257	−0.8103	1.44
			−0.7405	−2.9555	−0.6817		−1.6881								
O	4.0469		0.2051	−0.0054	0.1433	43.9012	−0.0113	0.0065	9.2659	US	US	0.26		0	
			2.9743	−0.6458	1.5779		−0.1238								

TABLE D4 (Continued)

Item	Contribution in total imports	Contribution by significant items	Imports from South Korea												
			ln (RGDP)	ln (REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2	Import elasticity	Export elasticity	Summation of elasticities
P*	2.8801	2.8801	0.1509	−0.4581	0.1159	37.3926	−0.4416	1.2512	10.8888	S	S	0.18	−0.4581	1.0009	1.46
			2.0019	−2.3784	1.1947		−2.0173								
Q	5.2187		0.2802	−0.0084	0.4225	40.3038	−0.0325	0.2538	7.4846	S	S	0.24			
			3.5089	−2.2208	2.6044		−0.3536								
R*	2.9612	2.9612	−0.1812	−0.7126	0.4303	38.1612	−0.2513	0.1722	2.3532	US	S	0.17	−0.7126	−0.5224	1.24
			−2.2609	−2.2139	2.4955		−2.0007								
S	3.2266		0.3080	−0.7111	−0.0459	37.3707	−0.0469	0.1509	4.6568	US	US	0.20			
			2.9893	−2.8982	−0.4897		−0.1509								
T	2.9690		0.3815	−0.0053	−0.0878	39.1550	−0.0284	0.8540	18.8474	S	S	0.30			
			4.0032	−1.9843	−1.2090		−0.3098								
U	3.7175		0.1882	0.6608	−0.1002	88.9481	−0.0199	0.0046	5.1376	S	US	0.17			
			1.7384	0.2445	−0.8432		−0.2172								
V*	3.4401	3.4401	0.4865	−1.0021	−0.3718	35.3032	−0.5633	0.4332	2.5989	S	S	0.21	−1.0021	−0.5120	1.51
			2.6447	−2.9482	−1.8175		−3.0357								
W	3.5555		0.3476	0.0091	−0.4187	40.0209	−0.0225	0.2433	19.0698	US	US	0.17			
			2.6604	2.3213	−2.5013		−0.2468								
X	1.0865		0.1307	0.0202	−0.3667	28.7519	−0.0016	0.1559	2.4411	S	S	0.16			
			0.4268	1.0620	−0.6992		−0.0182								
Y*	4.4902	4.4902	0.0554	−1.2018	0.2251	80.8107	−0.1043	1.0388	4.9966	S	S	0.61	−1.2018	−0.6079	1.81
			1.9702	−1.7313	1.7039		−1.9981								
Z	6.1868		0.2578	−0.0057	0.1399	57.7310	−0.0162	0.0051	3.5425	S	US	0.18			
			3.1976	−2.6203	1.8452		−0.1764								
A1*	6.4302	6.4302	0.3044	−1.0030	0.1472	37.1646	−0.5113	2.4243	3.6482	US	S	0.43	−1.0030	−0.7145	1.72
			3.0958	−1.8432	1.9522		−2.0039								
B1*	4.4308	4.4308	0.5729	−0.7143	−0.0932	29.6492	−0.4101	1.1656	16.4831	S	S	0.21	−0.7143	−1.0364	1.75
			3.6113	−2.3030	1.8405		−2.1103								
C1*	3.5005	3.5005	0.1562	−1.0088	0.2723	39.2642	−0.2051	0.4664	23.9893	S	S	0.23	−1.0088	0.3237	1.33
			2.1899	−1.7429	1.4427		−2.0556								

(Continues)

TABLE D4 (Continued)

Item	Contribution in total imports	Contribution by significant items	Imports from South Korea: ln (RGDP)	ln (REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2	Import elasticity	Export elasticity	Summation of elasticities
D1	3.0257		0.1655	−0.0003	−0.1421	31.7107	−0.1161	0.0482	7.1575	S	US	0.16			
			1.2630	−0.5682	−0.7634		−0.8834								
F1														−2.0032	2.00
G1														−1.0091	1.01
H1														−2.0041	2.00
I1															
J1														1.2125	1.21
K1															
Total	**100.00**	**52.9608**	....	....	....	....	....	....	....	....	....	....	....	....	....

Item	Contribution in total imports	Contribution by significant items	Exports to South Korea: ln (RGDP)	ln (REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2	Import elasticity	Export elasticity	Summation of elasticities
A*	1.2201	1.2201	0.4859	−1.0025	−5.4264	35.4580	−0.1999	0.4759	0.0479	US	S	0.22	−1.3206	−1.0025	2.32
			3.6648	−1.6501	−3.6126		−1.8296								
B	0.5277		0.6331	−0.0063	−7.0124	8.6200	−0.0452	0.5679	3.5488	S	S	0.18	0	0	
			2.3504	−0.5947	−0.4433		−0.4533								
C*	3.2508	3.2508	0.3855	−1.1021	−3.9839	44.0865	−0.4465	2.3358	0.6157	S	S	0.16	−1.2545	−1.1021	2.36
			3.4294	−6.6083	−3.3728		−2.1978								
D	2.6575		0.1856	−0.0099	−2.0624	35.8597	−0.0392	1.8075	28.3927	S	US	0.13	0	−0.0099	
			0.7541	−1.9568	−0.7435		−0.4273								

TABLE D4 (Continued)

			Exports to South Korea												
Item	Contribution in total imports	Contribution by significant items	ln (RGDP)	ln (REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2	Import elasticity	Export elasticity	Summation of elasticities
E*	2.9718	2.9718	0.1658	−0.9121	−1.9520	34.2265	−0.8092	0.0289	11.4550	S	S	0.11	−0.2771	−0.9121	1.19
			0.7257	−1.8323	−0.7507		−3.1009								
F*	2.6704	2.6704	0.0772	−0.3240	−0.6097	33.7949	−0.2157	0.1243	0.1087	S	S	0.11	−1.1106	−0.3240	1.43
			0.9909	−1.8211	−0.7060		−2.0625								
G*	2.4705		1.0447	−0.0153	−11.5140	43.2194	−0.1945	1.0533	4.7350	US	S	0.19		0	
			4.7049	−3.3668	−4.7015		−2.2105								
H*	0.4011	0.4011	2.5085	−0.7768	−28.3604	25.8113	−0.1080	2.0097	0.0367	US	S	0.30	−0.9019	−0.7768	1.68
			5.6242	−1.9385	−5.6378		−2.1048								
I*	2.2802	2.2802	1.0608	−0.7823	−11.4468	47.3843	−0.0424	1.6660	2.0952	S	S	0.21	−0.5576	−0.7823	1.34
			4.7613	−1.9567	−4.7426		−2.0020								
J*	1.5414		0.8278	0.0051	−9.3454	34.0293	−0.0152	0.3052	0.0161	S	US	0.27		0	
			2.2383	0.6670	−2.2412		−1.8821								
K*	2.0206	2.0206	0.3748	−0.4917	−4.1416	38.6766	−0.0585	0.0585	1.0507	S	S	0.11	−0.8539	−0.4917	1.35
			2.5984	−2.5643	−2.2346		−2.0014								
L*	2.7505	2.7505	0.4875	−0.6229	−5.1309	33.8613	−0.0542	0.5675	2.0518	S	S	0.12	−0.7505	−0.6229	1.37
			2.7489	−1.6656	−2.6696		−1.9054								
M*	1.5988		0.5903	−0.0208	−6.2672	36.0546	−0.2106	1.7804	1.7804	US	US	0.16			
			3.7223	−3.1429	−3.6379		−3.1112								
N*	0.2806	0.2806	0.0585	−0.8103	−0.5173	27.2432	−0.1503	1.8496	1.8496	S	S	0.10	−0.6257	−0.8103	1.44
			0.4600	−1.6891	−0.3576		−2.8852								
O*	2.2875		0.4227	−0.1277	−4.4259	32.8658	−0.2215	0.1867	0.3722	S	S	0.14		0	
			1.4659	−2.2038	−1.4437		−1.9654								
P*	3.8507	3.8507	−0.0002	1.0009	0.2549	27.0211	−0.0403	1.4489	13.9916	US	S	0.12	−0.4581	1.0009	1.46
			−0.0026	0.3371	0.2622		−2.3849								
Q	3.3085		0.2175	−0.0012	−2.1341	37.1129	−0.0053	0.0104	0.8042	S	S	0.14			
			2.2107	−0.4307	−2.0519		−0.0588								
R*	2.3115	2.3115	1.6097	−0.5224	−18.2079	18.6597	−0.1069	2.3484	0.2318	S	S	0.17	−0.7126	−0.5224	1.24
			3.8688	−2.5732	−3.8745		−1.8362								

(Continues)

TABLE D4 (Continued)

			Exports to South Korea												
Item	**Contribution in total imports**	**Contribution by significant items**	**ln (RGDP)**	**ln (REX)**	**Constant**	***F*-test**	**ECM ($t-1$)**	**LM**	**RESET**	**CUSUM**	**CUSUMSQ**	**Adj R^2**	**Import elasticity**	**Export elasticity**	**Summation of elasticities**
S	0														
T*	3.0978		1.4321	−0.6264	−15.3008	6.2247	−0.4774	1.7359	7.5961	S	US	0.23			
			4.0351	−3.4801	−4.0337		−2.0114								
U*	3.6895		0.9116	−0.0045	−9.8089	34.2484	−0.2039	7.9136	7.4286	US	US	0.24			
			3.5768	−2.4368	−3.5794		−2.2021								
V*	3.3013	3.3013	1.5136	−0.5120	−16.4736	45.5124	−0.0694	1.9612	11.9385	S	S	0.21	−1.0021	−0.5120	1.51
			4.5262	−3.0034	−4.5129		−1.8475								
W*	1.8785		0.4221	0.2127	−4.7020	30.1462	−0.1124	1.2932	2.3510	S	S	0.26			
			1.9812	1.5105	−1.9503		−1.8426								
X	2.8465		0.1786	−0.0015	−1.9908	11.0647	−0.8369	1.0532	0.6523	S	US	0.27			
			0.1408	−0.0821	−0.1488		−0.4885								
Y	3.5101	3.5101	0.2870	−0.6079	−2.7914	29.7614	−0.0233	0.0959	0.4773	US	S	0.29	−1.2018	−0.6079	1.81
			1.8671	−1.7257	−1.6462		−1.7201								
Z	1.4065		−0.1878	−0.6315	2.8331	3.7023	0.1497	3.2946	0.0465	S	S	0.31			
			−0.4535	−1.3356	0.5966		0.6572								
A1*	5.8802	5.8802	2.0520	−0.7145	−21.9524	48.0603	−0.0579	1.4882	0.5283	S	S	0.24	−1.0030	−0.7145	1.72
			5.3427	−3.7196	−5.3018		−1.7859								
B1*	4.7105	4.7105	0.5959	−1.0364	−6.2613	40.3326	−0.5473	3.0747	1.1997	S	S	0.30	−0.7143	−1.0364	1.75
			2.8321	−1.8155	−2.7899		−2.2888								
C1*	4.9902	4.9902	0.0037	0.3237	−0.6031	25.1795	−0.3449	0.5199	1.9167	S	S	0.21	−1.0088	0.3237	1.33
			1.5525	1.8825	−0.8342		−3.0018								
D1*	3.3155		−0.0171	−0.0171	−4.0596	34.7677	−0.0319	0.5833	1.4879	US	US	0.16			
			−2.2078	−2.2078	−2.3402		−2.3484								
E1*	3.5405	3.5405	−0.0139	−2.0139	−0.6186	37.1582	−0.1973	0.0169	0.0899	S	S	0.11			
			−2.8113	−2.8113	−2.5377		−2.0810								
F1*	4.0216	4.0216	−0.0032	−2.0032	−2.5451	8.0528	−0.4990	2.8939	2.1003	US	S	0.28	0	−2.0032	2.00
			−1.6991	−1.6991	−1.7681		−2.4137								

TABLE D4 (Continued)

			Exports to South Korea												
Item	**Contribution in total imports**	**Contribution by significant items**	**ln (RGDP)**	**ln (REX)**	**Constant**	***F*-test**	**ECM ($t-1$)**	**LM**	**RESET**	**CUSUM**	**CUSUMSQ**	**Adj R^2**	**Import elasticity**	**Export elasticity**	**Summation of elasticities**
G1*	3.4807	3.4807	−0.0011	−1.0011	−10.2171	41.0281	−1.7642	1.3251	0.3350	S	S	0.18	0	−1.0091	1.01
			−0.3827	−2.2227	−2.7312		−1.6582								
H1*	3.2808	3.2808	−0.0041	−2.0041	−5.1564	40.2091	−0.7981	0.8965	2.3341	S	S	0.24	0	−2.0041	2.00
			−1.2881	−1.8881	−2.9258		−3.0897								
I1*	3.6185		−0.0088	−0.0088	−16.0478	5.5998	−0.6103	19.8714	1.5912	S	US	0.36			
			−2.6805	−2.6805	−4.3333		−1.8428								
J1*	3.9019	3.9019	0.0125	1.2125	−6.9143	13.3909	−0.3639	2.0184	2.6824	S	S	0.15	0	1.2125	1.21
			1.5071	1.6571	−2.6757		−4.1337								
K1	1.2444		0.0105	0.0105	2.2036	30.6007	−0.0106	0.0007	3.3325	S	S	0.19			
			1.1215	1.1215	0.9191		−0.1111								
Total	**100.00**	**64.6115**	....	....	....	....	....	....	....	....	....	....	....	....	....

TABLE D5 The results of the fitted model to Australian imports and exports with Thailand

Item	Contribution in total imports	Contribution by significant items	Imports from Thailand										Import elasticity	Export elasticity	Summation of elasticities
			ln (RGDP)	ln (REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2			
A*	1.1201	1.1201	0.0435	−0.8852	−0.4638	5.6986	−0.9192	3.2383	1.3883	S	S	0.20	−0.8852	−0.2448	1.13
			0.3278	−2.0329	−0.3022		−2.6413								
B*	0.3554		−0.1990	−0.0118	2.4377	7.8625	−0.1630	8.8384	10.8836	US	US	0.23	−0.0118	0.0046	
			−1.2412	−0.0565	1.3196		−1.5889								
C*	4.6302	4.6302	−0.1990	−0.9118	2.4377	90.7871	−0.0585	2.9073	1.0664	S	S	0.26	−0.9118	−0.1354	1.05
			−1.2412	−1.7565	1.3196		−2.0855								
D*	2.0403	2.0403	0.4789	−0.1872	−5.1870	45.2212	−0.0546	3.2833	0.0574	US	S	0.21	−0.1872	−0.9182	1.11
			3.3024	−1.8767	−3.2251		−2.5880								
E*	3.0405	3.0405	−0.0860	−0.9788	1.5503	35.5627	−0.5110	0.1751	2.2956	S	S	0.17	−0.9788	−0.0571	1.04
			−1.1935	−1.8723	1.7398		−4.1209								
F	2.4465		0.6196	−0.3484	−6.7956	42.9134	−0.0400	0.0298	2.1019	US	US	0.18	−0.3484	0.093	
			2.9935	−2.2310	−2.9329		−0.4279								
G*	3.1203	3.1203	0.0375	−0.6592	−0.1398	25.2924	−0.2882	2.5314	1.2119	S	S	0.12	−0.6592	−0.5486	1.21
			0.5123	−1.9006	−0.1812		−2.2812								
H	3.5177		0.5745	−0.1298	−5.8325	41.1615	0.0037	4.1061	18.6018	US	S	0.26	−0.1298	0.0937	
			3.4184	−2.4629	−3.3561		0.0353								
I	2.912		0.0222	−0.0382	0.3943	34.5376	−0.0139	0.6630	17.2871	S	US	0.18	−0.0382	−0.1408	
			0.3179	−0.4317	0.4669		−0.1519								
J*	4.3515	4.3515	0.1338	−1.2035	−1.2842	32.6225	−0.2555	2.8303	1.7140	S	S	0.21	−1.2035	−0.0049	1.21
			1.1165	−2.1439	−1.0451		−1.9864								
K	0												0	−1.4496	1.45
L*	3.5304	3.5304	0.6254	−0.1294	−6.3089	53.7148	−0.1042	0.4197	0.9572	S	S	0.23	−0.1294	−0.8778	1.01
			3.8557	−1.8045	−3.7658		−3.1032								
M	2.1755		0.4631	0.1616	−4.7494	37.3170	−0.0281	0.3767	0.9559	US	US	0.17	0.1616	0.1571	
			3.4172	1.5963	−3.2835		−0.3079								

TABLE D5 (Continued)

Item	Contribution in total imports	Contribution by significant items	Imports from Thailand										Import elasticity	Export elasticity	Summation of elasticities
			ln (RGDP)	ln (REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2			
N	1.5306		0.2210	−0.1190	−2.4783	38.9038	−0.0034	2.6741	8.4691	US	US	0.11	−0.119	0.7295	
			2.5840	−1.5662	−2.6081		−0.0371								
O*	3.2414	3.2414	0.8149	−0.4177	−8.9277	45.2202	−0.3352	0.0104	2.2289	S	S	0.19	−0.4177	−0.7217	1.14
			3.5578	−3.1458	−3.5364		−2.0574								
O1*	3.3209	3.3209	0.4616	−0.0406	−4.4283	48.3853	−0.1506	1.2955	1.2501	S	S	0.34	−0.0406	−1.0242	1.06
			2.6331	−1.9192	−2.5663		−1.9362								
P1	3.3286		0.4810	−0.3418	−5.3035	36.5473	−0.0139	0.0155	6.6063	US	US	0.10	−0.3418	0.0121	
			2.5414	−2.4632	−2.5255		−0.1526								
P	2.7665		−0.3235	0.1273	3.9644	20.2139	−0.0529	2.7665	26.6404	S	US	0.14	0.1273	0.044	
			−1.9255	0.6690	2.0975		−0.5062								
Q	4.0755		0.1243	−0.0735	−1.3296	32.6433	−0.1097	19.4388	1.7926	S	S	0.19	−0.0735	0.2597	
			0.6668	−1.8264	−0.6751		−0.9216								
R	4.3785		0.4765	−0.2642	−4.6263	42.1265	−0.1059	19.5595	10.8457	S	S	0.25	−0.2642	0.3065	
			4.1558	−4.3806	−4.0909		−0.9174								
S*	4.3011	4.311	1.6327	−0.1389	−16.7282	85.3486	−0.7082	0.3348	1.1858	US	S	0.64	−0.1389	−0.1758	0.31
			11.0010	−1.9972	−10.7066		−7.4909								
T*	2.8355		0.0992	0.0558	−1.0419	1.7564	−0.4526	1.8144	10.2682	S	S	0.11	0.0558	3.2217	
			0.4926	0.8291	−0.4686		−1.2772								
U*	4.4306	4.4306	−0.8302	−0.3974	7.5931	0.0244	−2.4675	0.8966	1.6164	S	S	0.39	−0.3974	−0.2175	0.61
			−2.7112	−2.6367	2.7037		−5.1279								
V*	2.4508	2.4508	−0.5849	0.3970	6.9816	35.6602	−0.0174	0.5919	1.5660	S	S	0.11	0.3970	−0.7391	1.14
			−2.1324	1.7907	2.1567		−2.1886								
W	3.4175		0.6725	0.0383	−7.0409	39.0609	−0.0147	0.0134	2.2596	S	US	0.15	0.0383	0.2858	
			3.4537	0.3478	−3.3511		−0.1609								

(Continues)

TABLE D5 (Continued)

Item	Contribution in total imports	Contribution by significant items	Imports from Thailand										Import elasticity	Export elasticity	Summation of elasticities
			ln (RGDP)	ln (REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2			
X*	1.6314	1.6314	0.2189	−1.6920	−2.8002	8.1912	−0.1093	0.4501	2.0524	S	S	0.20	−1.6920	−0.2145	1.91
			0.6539	−3.3967	−0.7281		−2.1976								
Y	4.663		0.4107	−0.0057	−4.3001	34.7107	−0.0199	1.2826	5.9305	US	S	0.12	−0.0057	0.0595	
			1.6333	−0.0255	−1.5726		−0.2088								
Z*	3.5104	3.5104	0.4228	−0.0093	−4.4750	43.1206	−0.5102	2.1817	0.8155	S	S	0.11	−0.0093	−1.3589	1.37
			2.3466	−1.1868	−2.3238		−5.1125								
A1	3.7655		0.3372	−0.0142	−3.6599	35.4780	0.0040	0.1414	0.0012	US	US	0.17	−0.0142		
			1.6494	−0.1656	−1.6304		0.0436								
B1*	3.7605	3.7605	0.9776	−1.4990	−9.3892	119.5820	−0.8464	1.1283	2.1892	S	S	0.13	−1.4990	0	1.50
			7.7893	−3.9929	−6.8704		−9.3472								
C1	2.1388		1.3785	0.3714	−15.3493	32.1708	−0.0020	0.8280	2.3951	S	S	0.15	0.3714		
			2.6931	1.0078	−2.7047		−0.0217								
D1	3.4064		0.3212	−0.0616	−3.3836	43.7092	−0.0575	0.8798	8.3463	US	US	0.22	−0.0616		
			2.1195	−0.8142	−2.0559		−0.6118								
E1*	3.8201	3.8201	1.4276	−1.1113	−15.6945	44.5996	−0.1436	2.9602	1.8274	S	S	0.26	−1.1113		1.11
			4.0312	−2.0835	−4.0180		−1.7901								
Total	**100**	**52.2904**	....	....	....	....	....	....	....	....	....	....	....		
Item	**Contribution in total imports**	**Contribution by significant items**	**Exports to Thailand**										**Import elasticity**	**Export elasticity**	**Summation of elasticities**
			ln (RGDP)	**ln (REX)**	**Constant**	***F*-test**	**ECM ($t-1$)**	**LM**	**RESET**	**CUSUM**	**CUSUMSQ**	**Adj R^2**			
A*	0.7102	0.7102	0.0032	−0.2448	0.1004	28.2285	−0.0629	0.4712	0.3773	S	S	0.12	−0.8852	−0.2448	1.13
			0.0215	−1.8636	0.3608		−1.7742								
B	5.7965		0.1323	0.0046	−0.1461	36.2566	−0.0060	0.1556	11.7337	S	US	0.17	−0.0118	0.0046	
			0.6090	0.0641	−0.4644		−0.0656								

TABLE D5 (Continued)

Item	Contribution in total imports	Contribution by significant items	Exports to Thailand										Import elasticity	Export elasticity	Summation of elasticities
			ln (RGDP)	ln (REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2			
C*	2.3806	2.3806	0.0382	−0.1354	0.5355	33.6171	−0.0603	0.1458	0.3127	S	S	0.16	−0.9118	−0.1354	1.05
			0.3494	−1.8456	2.4884		−1.9934								
D*	18.9601	18.9601	0.0589	−0.9182	0.2658	28.1765	−0.4498	1.5139	16.2026	S	S	0.19	−0.1872	−0.9182	1.11
			0.5916	−2.2552	1.9062		−1.7349								
E*	0.3802	0.3802	0.3637	−0.0571	−0.5407	9.7775	−0.1333	0.3101	1.5881	S	S	0.16	−0.9788	−0.0571	1.04
			1.4231	−2.5455	−1.4268		−3.0366								
F	0.0255		0.0242	0.0930	0.1063	28.0461	−0.0033	0.0195	0.5562	S	US	0.13	−0.3484	0.093	
			0.1047	0.4247	0.2706		−0.0366								
G*	1.3005	1.3005	1.2418	−0.5486	−1.6272	38.8773	−0.2454	0.1132	2.0622	S	S	0.22	−0.6592	−0.5486	1.21
			3.3168	−2.5898	−3.1483		−2.4811								
H	4.3077		0.5067	0.0937	−0.6729	39.1680	−0.0321	0.0373	29.9194	S	US	0.18	−0.1298	0.0937	
			1.5160	0.7522	−1.3855		−0.3434								
I	0.1485		0.4439	−0.1408	−0.4686	32.2838	−0.0055	0.5943	0.9399	US	US	0.15	−0.0382	−0.1408	
			2.7002	−1.7447	−2.0586		−0.0607								
J*	20.2811	20.2811	1.6217	−0.1049	−1.7730	39.4709	−0.1071	0.4648	0.0297	S	S	0.19	−1.2035	−0.0049	1.21
			4.7591	−1.7495	−4.3605		−2.0785								
K	9.8902	9.8902	0.8469	−1.4496	−0.9723	34.0444	−0.0145	0.8676	0.8546	S	S	0.14	0	−1.4496	1.45
			3.3092	−3.3498	−2.9461		−0.1599								
L*	0.5305	0.5305	−0.0542	−0.8778	0.6388	29.7793	−0.1114	0.0578	2.2534	US	S	0.09	−0.1294	−0.8778	1.01
			−0.3576	−1.9922	2.0211		−2.1253								
M	0.1075		0.3637	0.1571	−0.2366	38.1427	−0.0569	0.5336	2.2663	US	S	0.21	0.1616	0.1571	
			1.5062	0.8773	−0.6437		−0.6054								
N	0.0188		−0.2390	0.7295	0.8137	4.4461	0.0461	20.1106	0.0044	S	US	0.26	−0.119	0.7295	
			−0.6834	2.3231	1.2773		0.4143								
O*	1.2313	1.2313	0.5118	−0.7217	−0.5553	33.7955	−0.2471	0.5404	1.1799	S	US	0.16	−0.4177	−0.7217	1.14
			3.1943	−1.9632	−2.5526		−2.5001								

(Continues)

TABLE D5 (Continued)

Item	Contribution in total imports	Contribution by significant items	Exports to Thailand										Import elasticity	Export elasticity	Summation of elasticities
			ln (RGDP)	ln (REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2			
O1*	0.4001	0.4001	0.8214	−1.0242	−1.3223	32.4290	−0.3145	0.4993	2.1817	S	S	0.16	−0.0406	−1.0242	1.06
			2.3027	−2.1329	−2.2666		−3.0491								
P1	0.3366		0.3212	0.0121	−0.4658	0.0149	−0.0123	0.1623	0.0603	S	US	0.08	−0.3418	0.0121	
			1.2291	0.0895	−1.1233		−0.1354								
P	0.8265		0.1811	0.0440	−0.0149	33.4248	−0.0860	0.4242	2.5320	US	S	0.03	0.1273	0.044	
			1.3944	0.5537	−0.0942		−0.9206								
Q	4.6548		1.0339	0.2597	−1.3898	33.0092	−0.0011	0.0237	0.8162	US	US	0.12	−0.0735	0.2597	
			2.7218	1.4526	−2.5451		−0.0114								
R*	0.7952		0.7481	0.3065	−0.9529	32.3759	−0.0771	0.7710	1.0628	US	S	0.13	−0.2642	0.3065	
			2.2739	1.5453	−2.1011		−1.9812								
S*	1.2206	1.2206	0.5043	−0.1758	−0.6085	36.4883	−0.1416	1.0192	0.4438	US	S	0.17	−0.1389	−0.1758	0.31
			2.0600	−1.8634	−1.8521		−3.1271								
T*	2.7678		0.5929	3.2217	−0.7424	4.1478	−0.3996	5.9117	1.5412	S	US	0.16	0.0558	3.2217	
			1.8849	1.6500	−1.7515		−1.6694								
U*	2.4603	2.4603	0.3723	−0.2175	−0.3299	38.0127	−0.1392	0.1633	3.8884	S	S	0.17	−0.3974	−0.2175	0.61
			1.4921	−1.7735	−1.0178		−1.6504								
V	0.4105	0.4105	0.1452	−0.7391	0.0757	26.2144	−0.0007	0.7293	2.3553	S	S	0.15	0.3970	−0.7391	1.14
			0.4571	−2.6207	0.1312		0.0182								
W	0.8789		0.3981	0.2858	−0.1523	28.7263	−0.0103	0.5771	0.1910	S	US	0.15	0.0383	0.2858	
			2.6637	2.4025	−0.7847		−0.1136								
X*	13.0102	13.0102	0.2783	−0.2145	−0.0216	35.8874	−0.1248	0.4472	1.6653	S	S	0.15	−1.6920	−0.2145	1.91
			1.3532	−1.9372	−0.0915		−2.2718								
Y	0		0.3966	0.0595	−0.4487	34.0808	−0.0054	0.2299	23.6485	US	S	0.14	−0.0057	0.0595	
			2.1752	0.7557	−1.9287		−0.0588								

TABLE D5 (Continued)

Item	Contribution in total imports	Contribution by significant items	Exports to Thailand										Import elasticity	Export elasticity	Summation of elasticities
			ln (RGDP)	ln (REX)	Constant	*F*-test	ECM ($t-1$)	LM	RESET	CUSUM	CUSUMSQ	Adj R^2			
Z*	6.2512	6.2512	−0.3655	−1.3589	0.9061	34.0105	−0.6265	2.1768	0.2891	S	US	0.16	−0.0093	−1.3589	1.37
			−1.3599	−1.9527	1.6815		−3.2809								
AA	...	...	...	...	...	...	...	...	...	...	...	...	−0.0142		
	...	...	...	...	...	...	...	...	...	...	...	...			
BB	...	...	...	...	...	...	...	...	...	...	...	...	−1.4990	0	1.50
	...	...	...	...	...	...	...	...	...	...	...	...			
CC	...	...	...	...	...	...	...	...	...	...	...	...	0.3714		
	...	...	...	...	...	...	...	...	...	...	...	...			
DD	...	...	...	...	...	...	...	...	...	...	...	...	−0.0616		
	...	...	...	...	...	...	...	...	...	...	...	...			
EE	...	...	...	...	...	...	...	...	...	...	...	...	−1.1113	0	1.11
	...	...	....	....	....	....	....	....	....	....	....	....			
Total	**99.29**	**79.4101**	....	....	....	....	....	....	....	....	....	....	....		

Note: *indicates ECM_{t-1} is significant with negative sign.