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Exchange Rate and the Trade Balance: Is the Link Symmetric or Asymmetric

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EXCHANGE RATE CHANGES AND THE TRADE BALANCE: IS THE LINK SYMMETRIC OR ASYMETRIC?

by

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ABSTRACT

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This dissertation consists of three essays in international trade. The J-Curve theory suggests that after currency depreciation, the trade balance continues to deterioration till some lags emerge, and then starts to improve. My contribution is in using a non-linear Autoregressive Distributed Lag model to examine if the effects of depreciation are different than the effects of appreciation of exchange rate on the trade balance. Using the sample data from thirteen developed and developing countries I show that when aggregate trade data are used, the effects of those two are asymmetric. In response to changes in the real exchange rate, a country's trade balance could improve with respect to one trade partner and could deteriorate with respect to another trade partner. Testing the J-Curve using aggregate trade data might not capture both effects at the same time. Thus in section two of chapter four, using the non-linear ARDL model, the bilateral J-Curve phenomenon between two specific trade partners is tested. I use the bilateral trade data between the United States and its sixteen major trade partners and I find support for my claim that the effects of exchange rate changes are asymmetric. Section three of chapter four takes it one step further in a way that employs the trade data of 162 trading industries between the United States and Canada to investigate the asymmetric claim. By further disaggregating bilateral trade data my results show that in majority of the cases in my sample, the effects of depreciation are significantly different than the effects of appreciation. Due to the possible positive response of one bilateral commodity flow to the exchange rate changes and possible negative response of another flow at the same time, the commodity level trade data is considered to be able to solve any possible aggregation bias of the other types of data sets.

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Chapter 1: Introduction

The effect of real exchange change on the trade balance is one of the most debated issues in the trade policy literature. The long-run effects of the exchange rate on the trade balance is explained by the Marshal-Lerner (ML) condition, while the short-run and long-run effects together are explained by the J-curve phenomenon. The ML condition states that the favorable impact of the exchange rate change on the trade balance depends on the size of import and export price elasticities. If the sum of those price elasticities is bigger than unity, the depreciation (or devaluation) of the exchange rate would improve the trade balance in long run. This condition seems to be able to predict favorable effects on the trade balance of currency depreciation. However, when it comes to testing it, many old studies verified that the ML condition was binding for many countries, but the exchange rate did not have favorable effects on the trade balance.

For example, although the condition was satisfied for the United States, its trade balance did not improve despite the devaluation of the dollar in 1971. Among numerous studies that have estimated the ML condition, the following ones could be mentioned: Houthakker and Magee (1969), Khan (1974), Haynes and Stone (1982), Bahmani-Oskooee (1986), and Bahmani-Oskooee and Niroomand (1998). One possible problem with those old studies was the aggregation bias that more recent studies tried to solve by using bilateral trade data. Examples include Marquez (1990), Hynes et al. (1996), Bahmani-Oskooee and Brooks (1999), Nadenichek (2000), and Irandoust et al. (2006). This group of studies used bilateral trade data for many developed and developing countries to verify the ML condition, but, similar to the first group, the results were not conclusive.

Commodity level trade data are also used by many studies to test this condition. Examples are Uz (2010), Bahmani-Oskooee and Wang (2007), and Bahmani-Oskooee and Hosny (2013).

Another set of theories suggests that depreciation does not affect the trade balance immediately. In another words, due to the lag structures in suppliers' and demanders' behavior, the favorable effects on the trade balance take place in the long run; in the short run, the trade balance gets worse. Therefore, if the trade balance is deteriorating while currency is devalued, it continues to deteriorate until the favorable effects of depreciation (the lags) emerge. This pattern is known as the J-curve pattern and was introduced by Magee 1973. The deterioration of the trade balance after currency depreciation is due to several factors: the adjustment period in consumers' and producers' behavior in response to price changes; currency-contracts signed prior to devaluation; the quantity fixed pass-through period; and the quantity adjustment period (delivery and inventory replacement, time for producer's decision-making, etc.).

A method of testing this pattern of movements in the trade balance, the J-curve phenomenon, was introduced originally by Bahmani-Oskooee (1985). He specified a trade balance model and imposed a lag structure on the exchange rate as one of the determinants of trade balance. Using aggregated data, he tested the J-curve for four countries with different exchange rate regimes, and he found evidence of the J-curve in three countries in his sample. Among other studies that have tested the J-curve using aggregate trade data, we can mention Rose (1991), Bahmani-Oskooee (1994), Boyd et al. (2001), Onafowora (2003), Narayan and Narayan (2005), and Hsing (2005).

Rose and Yellen (1998) criticize the previous studies on the ground that they suffer from aggregation bias and argue for using bilateral data between two trade partners. They investigated the bilateral trade data of the United States and its trade partners but did not find a significant exchange rate effect on the trade balance at any level. Other studies using bilateral trade data are Bahmani-Oskooee and Ratha (2004), Bahmani-Oskooee and Kutan (2009), Halicioglu (2007), Baek (2009), and Cao-Alvira (2014).

Due to ambiguous results in the studies using bilateral trade data, the existing literature took it one step further by disaggregating trade data at the commodity level. The reason is that among many traded commodities between two trading partners, one might respond positively to the changes in the real exchange rate while another one might respond negatively to the same change. Studies using commodity trade data are Doroodian, Jung and Boyd (1999), Bahmani-Oskooee and Bolhasani (2008), Wang, Lin, and Yang (2012), and Bahmani-Oskooee and Zhang (2013). The findings of the above studies are also mixed and not conclusive. In this thesis, I look for reasons of the failure to find support for the J-curve phenomenon. Two recent literature reviews by Bahmani-Oskooee and Ratha (2004) and Bahmani-Oskooee and Hegerty (2010) critically review the models and the findings of the literature in details. To be able to distinguish and highlight the contribution of this study relative to previous ones in the literature, I provide a brief literature review in chapter 2.

One common feature of all those previous studies is that they have assumed that exchange rate changes have a symmetric effect on the trade balance. This means that if depreciation improves the trade balance, appreciation should worsen it. But because of sticky prices, we know that response to the increase in price could be different than to decrease in price. Based on this idea, I test whether the effects of appreciations are different from the effects of depreciations on the trade balance. For the first time in the literature, I investigate if the relationship between the trade balance and the real exchange rate is nonlinear or not. If this is the case, the failure by previous researchers to find support for the J-curve phenomenon could be due to the assumption of the linear adjustment process.

To be able to demonstrate my claim and to detect a full comparison between the two models, I use three different types of trade data, and I run both linear and nonlinear models for all of them. In the first model, using the aggregate trade flows of thirteen different countries, I test the J-curve between each of them and rest of the world. The second model employs bilateral trade data for the United States and its sixteen largest trade partners. For the last model, I use trade data at the industry level between the United States and Canada. The plan of this dissertation is as follows: chapter 2 reviews the literature. Chapter 3 introduces the models and methods. Chapter 4 presents the results. And the last chapter, Chapter 5, concludes. A detailed list of the variables and sources of data are described in the Appendix that follows a list of the references. All of the tables are presented at the end of this dissertation.

Chapter 2: Literature Review

As mentioned in chapter 1, past attempts at testing the J-curve phenomenon were not completely successful in supporting the favorable effects of exchange rate changes on the trade balance. One may classify those earlier studies into three groups. The first group includes the studies that use aggregate trade data between one specific country and rest of the world. The second group includes the studies that employ bilateral trade data between one specific country and its trade partner. Finally, the last group consists of the studies that disaggregate data even further at the industry level. Since Bahmani-Oskooee and Hegerty (2010) have reviewed the literature until 2009, I concentrate on recent studies since 2009.

The J-curve was originally tested by Bahmani-Oskooee (1985), who defined the trade balance as the excess of exports over imports. He tested the relationship between the trade balance and the real exchange rate using aggregate level data for four different countries (Greece, India, Korea, and Thailand). After a correction in his real exchange rate definition Bahmani-Oskooee (1989), finds evidence of an inverse J-curve for three out of four countries in his sample.

Some other aggregate studies include Arora et al. (2003), Bahmani-Oskooee et al. (2005), and Duasa (2007), who were able to find evidence for the J-curve only for some of the countries in their sample. However, Rose and Yellen (1989) argue that previous studies of the J-curve phenomenon suffer from aggregate bias, and, thus, those results are not reliable. They define the United States import demand function from its trade partner as well as its supply function to its trade partner, and they use bilateral quarterly data to test their claim. For the first time in the literature, they used Engle and Granger's (1989) co-integration method beside the error-correction modeling technique to test for the J-curve of the United States and its six major trade partners. However, they find no evidence of the J-curve for the United States. Rose and Yellen (1989) is the first study that criticized earlier attempts to investigate the J-curve using aggregate trade data.

Among bilateral trade studies, we can mention Wilson (2001), who found evidence for the J-curve in only one of the countries in his sample. Narayan (2006) tested bilateral trade between China and the United States, but both of his short-run and long-run coefficients were positive, rejecting the J-curve phenomenon. Most of the other studies that have used bilateral trade data to investigate the effectiveness of the real depreciation of a country's currency on its trade balance did not find support for the J-curve either. For instance, Bahmani-Oskooee and Brooks (1999a) and Marwah and Klein (1996), who investigate the phenomenon for the United States, and Bahmani-Oskooee and Kutan (2009), who used the bilateral data for eleven transition economies, found support for only some of the cases in their sample.

Celik and Kaya (2009) focused on bilateral trade between Turkey and its seven major trade partners—France, Germany, Italy, Japan, the Netherlands, the UK, and the United States—to test the J-curve phenomenon. They used bilateral quarterly data from 1985 to 2006 to apply panel co-integration and impulse response function techniques to test the J-curve. The long-run relationship between trade balance and bilateral exchange rate was found in five cases, but no evidence of the J-curve was detected in this study.

Tiwari (2012) used bilateral trade data between the United States and India to evaluate the bilateral J-curve over the 1960 to 2007 period. In this study, the dynamic Granger causality analysis was employed. The result showed that the bilateral exchange rate significantly improved Indian exports to the United States. However, this effect was not significant for its imports from the United States.

Quarterly bilateral data from 1973 to 2009 was used by Bahmani-Oskooee and Harvey (2013) to investigate the effects of exchange rate changes on the trade balance of Singapore with its thirteen most important trade partners. The bound-testing and error-correction modeling approach was used in their study. They supported short-run deterioration along with long-run improvements in the trade balance as result of depreciation of the exchange rate, however in only four out of thirteen cases.

This brief summary shows that disaggregating trade data would reveal better support for the phenomenon, but the results are still mixed. This gives rise to suggestions for disaggregating the data even further at the industry level, because one bilateral flow might show a positive response to devaluation, while another might show a negative one. These types of studies include Beak (2007), who used industry-level data for five industries between Canada and the United States and found no evidence of the J-curve. However, Ardalani and Bahmani-Oskooee (2007), Bahmani-Oskooee and Wang (2007), Bahmani-Oskooee and Bolhasani (2008), and Bahmani-Oskooee and Hegerty (2009a) found some evidence for the J-curve in some industries in each of their samples.

Baek and Koo (2011) used quarterly data over the period 1989 to 2007 to estimate the agricultural bilateral J-curve between the United States and its ten most important trade partners. They disaggregated the commodity data to total export and import of bulk, intermediate, and consumer-oriented products. Using the Auto Regressive Distributed Lags approach, the results of their study were mixed and not conclusive, in that they found a different type of behavior for each different group of commodities in their sample.

Among recent studies, Bahmani-Oskooee and Hegerty (2011) investigated the relationship between trade balance and exchange rate for the case of bilateral trade between the United States and Mexico. Using annual commodity level trade data for 102 industries from 1962 to 2004, they employed the bound-testing and error-correction modeling approach. The result of the study suggests that for the twenty-four industries in their sample, depreciation in the bilateral exchange rate was able to improve the trade balance in the long run. However, the study found little evidence of the J-curve phenomenon for the bilateral trade at the commodity level between the two partners.

In a more detailed study, Huchet-Bourdon and Korinek (2011) used bilateral trade data for China, the Euro area, and the United States. They disaggregated the data in two broadly defined sectors: agriculture and manufacturing. Also, they used three different methods to detect volatilities in the exchange rate. They used the ARDL approach to investigate the effects of exchange rate changes on the trade balance. The result of this study confirms that exports are more sensitive than imports to changes in the exchange rate, and the effects on exports in agricultural products are bigger than on manufacture products. Although they found favorable short-term effects of the exchange rate on the trade balance, no support for the J-curve phenomenon was detected.

Another commodity-level J-curve was estimated for sixty-seven industries between Malaysia and Japan by Soleymani and Saboori (2012). Using annual data sets from 1974 to 2009, they employed bound-testing and error correction modeling and showed that in the short run, Malaysian currency has desirable effect on its trade balance for forty-six industries in their sample. However, in the long run, the effect of depreciation on the trade balance was favorable in only twenty-four industries. A negative short-run effect combined with positive long-run effects, the definition of the J-curve, was shown in only twenty-two industries out of sixty-seven in their sample.

Bahmani-Oskooee and Hajilee (2012) tested the J-curve for trade between the United States and Germany. By disaggregating bilateral trade data by commodity, they focused on 131 industries that trade between the two countries. The results of the study supported the definition of the J-curve in only thirty-one industries in their sample. In other words, after a devaluation of the euro, in only thirty-one cases out of 131 industries did the short-run deterioration of the trade balance come with long-run improvements in it.

Using the disaggregated seven trading industries data between Korea and Japan, Baek (2013) used the method of Pesaran et al. (2001) method to investigate the J-curve. Although they found Korea’s exports and imports to be relatively more responsive to changes in the bilateral exchange rate in the short run relative to the long run, no support for the J-curve was presented.

Bahmani-Oskooee and Zheng (2013) applied the bound-testing and error-correction modeling approach to test the J-curve for the trade between the UK and China at the commodity level. They used annual bilateral data for the period from 1978 to 2010 for forty-seven industries that traded between two the countries. In this study, they were able to provide evidence for the J-curve in twelve industries out of forty-seven.

By concentrating on annual commodity trade between the United States and Singapore from 1974 to 2011, Bahmani-Oskooee and Harvey (2014) found evidence for favorable effects of the exchange rate on the trade balance in forty-eight industries out of sixty-five. However, these favorable effects lasted in the long run in only twenty-four cases, implying that they only found evidence of the J-curve in twenty-four cases out of sixty-five.

This not-very-successful path of finding conclusive results for the effects of the real exchange rate on the trade balance motivated me to take it one step further and investigate the effects with the help of a nonlinear ARDL model. I investigate whether the main reason for this failure in the J-curve literature is the assumption of symmetric effects of the exchange rate on the trade balance. To be able to get into very comprehensive results, I use three different data types that I have explained previously, and I run both linear and nonlinear ARDL methods for all of those cases. Both of these methods are outlined in the next chapter.

Chapter 3: The Model and Methodology

Consistent with the literature, I assume that the trade balance of a country is a function of the real effective exchange rate, income level of the home country, and income level of the rest of the world. Note that here I only represent a reduced-form trade model between one country and rest of the world; for other types of data, the same logic is followed to construct the bilateral models.

Thus, the following reduced-form equation (1) from the literature represents a long-run relationship between the variables

$$LnTB_t = a + b\ Ln\ Y_t + c\ Ln\ YW_t + d\ Ln\ REFX_t\ +\ \varepsilon_t \quad (1)$$

where TB_t is a measure of the trade balance of the home country and rest of the world. This is defined as the ratio of the country's total amount of imports over its total exports to rest of the world. This measure was introduced by Bahmani-Oskooee (1991) and is said to be a unit-free measure. Also, this measure is able to reflect movements of the trade balance both in real and nominal terms. Other main determinants of the trade balance in the model are level of the economic activities (income) both in the home country, Y, and rest of the world, Y_W. Since an increase in income level in the home country is assumed to increase imports from rest of the world, a positive estimate of b is expected. When an increase in economic activity of the rest of the world is expected to increase exports of the country, a negative estimate for c is expected. The last variable, $REFX_i$ represents the real effective exchange rate, which is a measure of the value of a currency against a weighted average of many foreign currencies. By way of constructing this measure, since a decrease in $REFX_t$ reflects currency depreciation, if the trade balance is to improve in the long run, an estimate of d is expected to be positive.

The estimates in the above equation represent the long-run effects of exogenous variables on the trade balance. However, to be able to detect the J-curve phenomenon, one needs to construct a model that enables one to evaluate the size and magnitude of the coefficients in the short run as well as their convergence toward their equilibrium levels in the long run. I use the following error correction specification, which incorporates the short-run dynamics:

$$\Delta \log TB_t = \alpha + \sum_{k=1}^{n} \beta_k \, \Delta Log\, TB_{t-k} \; \sum_{k=0}^{n} \gamma_k \, \Delta Log\, Y_{t-k} \; + \sum_{k=0}^{n} \delta_k \, \Delta Log\, YW_{t-k}$$

$$+ \; \sum_{k=0}^{n} \theta_k \, \Delta Log\, REFX_{t-k} \; + \; \sigma_1 Log\, TB_{t-1} + \; \sigma_2 Log\, Y_{t-1} + \sigma_3 Log\, YW_{t-1}$$

$$+ \sigma_4 Log\, REFX_{t-1} + \; \mu_t \qquad (2)$$

To estimate this error correction equation, I employ Pesaran et al.'s (2001) ARDL approach. Their bound-testing approach has two advantages over previous methods of testing the co-integration in a way that we do not need to conduct a pre-unit root testing for each variable. Other old studies used in the literature, for instance Engle and Granger (1987), require a pre-unit root testing to specify the order of integration among variables. However, in this ARDL approach, the variables could be integrated of order zero *I(0)* or one *I(1)* and even a combination of the two.[1] The model overcomes the problem of the other studies in that the order of integration does not have to be same across different variables.

The second advantage is that short-run estimates are obtained in the same equation with long-run estimates in just one step. The model effectively prevails the multiple steps required to estimate those short-run and long-run coefficients in a single model. More specifically, in the equation (2), short-run estimates are judged by the estimated coefficients of the first differenced variables. For instance, γ_k reflects the short-run effects of economic activity of the home country

[1] The mean and standard deviation of a stationary variable do not change over time and also do not follow any trend. By taking minimum numbers of the differences required, in time series analysis, the raw data is often transformed to become stationary.

on the trade balance, whereas δ_k represents the short-run effects of economic activity of the rest of the world. Finally, θ_k shows the short-run effects of the real effective exchange rate on the trade balance of the home country. Note that negative values of θ_k followed by positive values supports the J-curve. At the same time, the long-run effects of each of the variables are obtained from estimated coefficients σ_2, σ_3 , σ_4 normalized on σ_1. The normalization process involves setting the error-correction components of the model equal to zero:

$$\widehat{\sigma_1} Log\, TB_{t-1} + \hat{\sigma}_2 Log\, Y_{t-1} + \hat{\sigma}_3 Log\, YW_{t-1} + \hat{\sigma}_4 Log\, REFX_{t-1} = 0 \qquad (3)$$

then solving the equation (3) for the dependent variable $Log\, TB_{t-1}$ as in (4)

$$Log\, TB_{t-1} = -\frac{\hat{\sigma}_2}{\hat{\sigma}_1} Log\, Y_{t-1} - \frac{\hat{\sigma}_3}{\hat{\sigma}_1} Log\, YW_{t-1} - \frac{\hat{\sigma}_4}{\hat{\sigma}_1} Log\, REFX_{t-1} \qquad (4)$$

These normalized coefficients are then judged based on the standard errors and the t statistics calculated in the Microfit statistical package using the nonlinear least square technique and the Delta method.

Pesaran et al. (2001) proposed establishing the joint significance of lagged level variables as a test of long-run relationship among the variables. To do so, they used the *F test* with new tabulated critical values. While an upper bound critical value is used when all variables are assumed to be integrated of order one, a lower bound critical value is used when all variables are assumed to be integrated of order zero. If the calculated F test statistic is bigger than the upper bound value, there is co-integration among the variables.

However, the previous studies were not successful in finding a conclusive result that supports the J-curve. The question I want to answer in this dissertation is: why does the literature fail to find a support for the J-curve pattern of the exchange rate on the trade balance? In this study, I investigate whether one possible reason for those failures is the implicit assumption of symmetric effects of exchange rate change on the trade balance. The reasons for this claim are the nonlinearity of the J-curve path itself, and also price rigidities and differences in the responses of rising prices relative to declining prices. To be able to verify my claim, I separate depreciations from appreciations and test whether the effects of the former are different that of the latter on the trade balance. Following the literature, I use the partial sum process to decompose the movements of the real exchange rate into appreciations (POS) and depreciations (NEG)[2]:

$$POS_t = \sum_{j=1}^{t} \Delta Log\ REFX_j^+ = \sum_{j=1}^{t} \max(\Delta Log\ REFX_j\ , 0) \qquad (5)$$

$$NEG_t = \sum_{j=1}^{t} \Delta Log\ REFX_j^- = \sum_{j=1}^{t} \min(\Delta Log\ REFX_j\ , 0) \qquad (6)$$

Then the *Log REFX* variable in the error correction equation (2) is replaced with these two new partial sum variables, *POS* and *NEG*, following Shin et al. (2014). The way of constructing those two variables makes the equation a nonlinear ARDL model:

$$\begin{aligned}\Delta \log TB_t = \alpha + &\sum_{k=1}^{n} \beta_k\, \Delta Log\ TB_{t-k} \\ &+ \sum_{k=0}^{n} \gamma_k\, \Delta Log\ Y_{t-k} + \sum_{k=0}^{n} \delta_k\, \Delta Log\ YW_{t-k} + \sum_{k=0}^{n} \theta_k\, POS_{t-k} \\ &+ \sum_{k=0}^{n} \partial_k NEG_{t-k} + \sigma_1 Log\ TB_{t-1} + \sigma_2 Log\ Y_{t-1} + \sigma_3 Log\ YW_{t-1} \\ &+ \sigma_4 POS_{t-1} + \sigma_5 NEG_{t-1} + \mu_t \qquad (7)\end{aligned}$$

As Shin et al. (2014) stated in their paper, they "developed a simple and flexible nonlinear dynamic framework capable of simultaneously and coherently modeling asymmetries both in the

[2] For other applications, see Deltte and Lopez-Villavicencio (2012), Verheyen (2013), Bahmani-Oskooee ad Fariditavana (2014), and Bahmani-Oskooee and Bahmani (2015).

underlying long run relationship and in the patterns of dynamic adjustments." They employ the same technique as was introduced by Pesaran et al (2001) to estimate equation like (7).

Once the size and magnitude of the estimated coefficients in the above non-inear ARDL model are obtained, I can judge whether exchange rate changes have symmetric or asymmetric effects. If size and sign of those two partial sum estimated coefficients, POS and NEG, were same we could say that the exchange rate changes have symmetric effect on the trade balance. Opposite is the case when size and sign of them were not same, means that the effects of exchange rate depreciations are different from exchange rate appreciation on the trade balance. The estimations of both linear and nonlinear ARDL models are reported in the next chapter.

Chapter 4: The Empirical Results

In this chapter, both linear and nonlinear ARDL models using three different data sets are estimated. The first sets of results are obtained from aggregate trade data of thirteen different developing and developed countries with respect to rest of the world. The second section reports on the bilateral trade model between the United States and its sixteen major trade partners. In the last section, trade data from 162 trading industries between the United States and Canada is used. For each estimated model, I explain the tables and the data separately in each section. Consistent with the literature, the Akaike's Information Criterion (AIC) is employed in all of the models and all of the cases to choose the optimum lags for each model.

4.1. Empirical Results of the Aggregate Model

In this first section, I start with the first part of the estimations that represent the empirical results for the linear and nonlinear models of the aggregated model. The countries used for this part of the estimations are: Australia, Austria, China, Canada, France, Germany, Japan, Korea, Norway, South Africa, Sweden, the United Kingdom, and the United States. A maximum of eight lags are used for both models. The data covers the period from 1973-Q1 to 2014-Q3. A detailed description of the data sources is provided in the Appendix of this dissertation.

Tables 1 to 26 report the results of the aggregate cases. There are two tables for each country that report the results for the linear and nonlinear models, respectively. Each table has three panels, panel A, B and C, that represent the short-run and long-run estimates and diagnostic statistics for each model, respectively. From panel A of the linear models, I gather that the estimated short-run coefficient of the real effective exchange rate has a favorable effect on the trade balance in five cases: Australia, Canada, Korea, Sweden, and the UK. This is concluded due to the fact that the real exchange rate has at least one short-run positive coefficient at least at the

10% significance level. The estimated long-run coefficient from same panel A is significant at the 10% level of significance for these countries: Canada, Germany, Korea, South Africa, and U.S. It is concluded that the real effective exchange rate has a significant long-run, favorable effect on the trade balance for those countries in the linear model.

To be able to verify whether these long-run coefficients are meaningful, I have to check for co-integration. I ran two types of statistics diagnostics to check for it— the F test and the *ECM* test—and report the results in panel C of each table. I used the F-test proposed by Pesaran et al. (2001) to check for joint significance of the variables. They tabulated upper bound and lower bound critical values for testing the co-integration of order one or zero, respectively. If the calculated F statistics were bigger than the upper bound critical value, it is concluded that the variables are co-integrated; the reverse is the case if the calculated F statistic were smaller than the lower bound critical value. As the reported F-statistics in panel C of the first set of tables is smaller than its lower-bound critical value of 3.23 for three cases in the sample, the co-integration among variables in the linear model is rejected in those cases:[3] Canada, China, and Sweden.

As it was explained previously, the long-run relationship among the variables is double-checked with another method, named the ECM_{t-1} test. Following the literature, this statistic is calculated using the long-run normalized estimates in each linear and nonlinear model, and then is lagged by one period and is called ECM_{t-1}.[4] The combination of lagged level variables in both the linear and nonlinear models are then replaced by ECM_{t-1} in equations (2) and (7). These two models are then estimated after imposing the optimum lags. If the error correction term carried a significantly negative coefficient, it is concluded that the variables move toward their long-run

[3] Note that from Pesaran et al. (2001, table CI-Case III, p. 300), with three exogenous variables in the model, the lower and upper bound critical values of the F Statistics at 5% level of significance are 3.23 and 4.35, respectively.

[4] The normalization process of the variables is explained in detail on page 8 of this dissertation.

equilibrium value and there is co-integration among them. From Banerji et al. (1998), the 10% critical value of this ECM_{t-1} method is -3.47. This estimated coefficient shows the speed of adjustment of the short-run dynamics toward the long-run equilibriums. From the first set of the tables for the linear model, the calculated statistic is significantly negative for all of the cases but France and Japan. The co-integration is rejected for those two countries in the linear model.

So far from first set of the tables, I showed that the favorable short-run effects of the real exchange rate last into the long run only for two countries in our sample: Canada and Korea. In another words, there is support for the J-curve pattern only in those two cases. This result is consistent with the findings of the literature. As explained previously, one suggested reason for this failure to find a support for the J-curve pattern could be the assumption of the symmetric effects of the exchange rate on the trade balance. It has been implicitly assumed in the literature that exchange rate changes have symmetric effects on the trade balance.

The second part of the tables for each country reports the estimated results of the nonlinear model. From part A, the short-run estimations of depreciation (NEG) and appreciation (POS) have significantly dissimilar effects on the trade balance for ten countries in our sample: Australia, Austria, Canada, China, France, Germany, Japan, Korea, Sweden, and the UK. This implies that exchange rate changes have asymmetric effects on the trade balance of these countries. This is due to the fact that the estimated short-run coefficients of the variables *POS* and *NEG* carry significantly different size and sign in those cases.[5] From part B of the second set of the tables for each country, I gather that the long-run estimates of depreciation are significantly different than those for appreciation in the following countries in our sample: Australia, Canada, China, Korea,

[5] Two variables are considered asymmetric even for the case that one of them carries a significant estimated coefficient and the other one does not.

South Africa, Sweden, and the US. This proves the main contribution of this study in the short run and also in the long run that the effects of depreciation could be different than the appreciation.

However, to be able to verify the long-run estimates, one has to prove that there is a long-run relationship among the variables. The F test and *ECM* statistic were run in the nonlinear model for all of the cases as well. The estimated F statistics in panel C of the tables is smaller than the lower bound critical value (2.86) in three cases: Canada, China, and France. There is co-integration among the variables in the nonlinear model for all of the countries in my sample except for these three cases.[6] The variables move toward their long-run equilibrium values as the estimated by ECM except for China, France, and Japan. Note that the estimated test statistics in those values are negative but not that big. This shows that the variables in these three cases do move toward their long-run values but with a slower speed.

How about other variables in the models? Trade balance is defined as the country's imports divided by its exports to the rest of the world. Therefore, a positive sign is expected for the estimated coefficient of the income level of the country. By the same token, a negative sign for the estimated coefficient of the income level for the rest of the world is expected. Section A of the first set of tables shows that in the short run the other two variables in the linear model—income levels of the country and rest of the world—carry a desirable significant coefficient in twelve and nine cases, respectively. In the long run, those estimated coefficients have significant desirable coefficients in seven and six cases. When it comes to the nonlinear model, the number of significant coefficients is twelve and ten for short-run estimates, and seven and six for long-run estimates of the income levels. As predicted, there is not a dramatic change for these income variables when we switch from the linear to the nonlinear model.

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[6] Note that for the nonlinear model, there are four exogenous variables in the model and from Pesaran et al. (2001, table CI-Case III, p 300), the lower bound critical value of the F Statistics at 5% level of significance is 2.86 and the upper bound is 4.01.

Several diagnostic statistics are reported in panel C of each table. The Lagrange Multiplier (LM) statistic is used to test the serial correlation among the residuals and allows testing for *p* orders of autocorrelation.[7] This LM statistic is distributed as χ^2, and as the data is quarterly for the aggregate model, here I set four degrees of freedom (*p*=4). Given the critical value of 9.48 of the LM test, the residuals for all of the cases do not suffer from serial correlation in both the linear and nonlinear models. Another test statistic reported in panel C of the tables is the Ramsey's Regression Specification Error Test (RESET) test. It is a test to check the specification of the models, that is, whether there are any irrelevant variables in the model or not. The test is distributed as χ^2 with one degree of freedom. The estimated RESET statistic is less than the critical values of 3.84 at a 5% significance level for all of the countries except Japan and Norway in the linear model, indicating that our models are well specified. Interestingly, when I switched to the nonlinear model, the models are well specified for those cases as well. This means that the variables are more relevant when I separate the depreciations from the appreciations.

The stability of all the short-run and long-run coefficients was checked by Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Recursive Residuals of Square (CUSUMSQ) tests. Following the Brown et al. (1975) method, CUSUM and CUSUMSQ were calculated to test the stability of the residuals for each optimum model. Then the results of the tests were plotted against the break points. If the plotted estimates lay within the 5% critical bounds, it was concluded that the residuals are stable. There is no need for any advance knowledge of the exact dates of structural beaks peaks of the data. As panel C of both sets of tables shows,

[7] The LM test is similar to Durbin-Watson test in that both test serial correlation. However, the former allows for *p* orders of autocorrelation compared to the latter, which tests for first order autocorrelation. (In this dissertation, we use quarterly data, so *p*=4)

all of the residuals are stable for most of the cases.[8] Finally, adjusted R^2reflects a good fit in both models.

In summary, the effects of real exchange rate change on the trade balance of thirteen countries and rest of the world were tested using both linear and nonlinear models. Consistent with the literature, first I used the linear model and found support for the J-curve in only two out of thirteen cases in my sample. For the rest of the cases, the effects of exchange rate change on the trade balance was mixed. These results are consistent with the findings of other studies in the literature. However, when I used the nonlinear model, I found that the effects of currency depreciation were different from currency appreciation in most of the cases in my sample. This was due to the fact that the short-run and long-run estimated coefficients were different from each other in ten and seven cases, respectively. These findings support the main contribution of this study that claims one possible reason for the failure to find support for the J-curve could be the assumption of symmetric effects of exchange rate change on the trade balance.

4.2. Empirical Results for the Bilateral Trade Model

As explained previously, a country's real exchange rate in currency could depreciate with respect to one trading partner and could in currency appreciate against another partner at the same time. As a result, testing the country's trade balance with respect to rest of the world and using the real effective exchange rate and aggregate trade data could get us results that suffer from aggregation biasness. In other words, for more reliable, results the bilateral J-curve pattern should be considered.[9] Among the cases where I did not find a solid support for the asymmetric effects of the exchange rate in the aggregate model, the United States needs further investigations. Firstly,

[8] Note that in the table, "S" identifies stable estimates while non-stable ones are identified by "NS."
[9] Rose and Yellen (1989)

the real exchange rate change does not reveal the asymmetric effect in short run; however, when it comes to the long run, the asymmetric effects are uncovered. Secondly, the U.S. dollar is one of the most important currencies in the world. The United States has a unique position in world financial markets, and its currency is a dominant world currency.[10] That made me curious to examine the bilateral trade balance between the United States and its major trading partners in the second part of the estimations. These sixteen trade partner countries are: Australia, Belgium, Brazil, Canada, China, France, Germany, Israel, Italy, Japan, Korea, Mexico, the Netherlands, Singapore, Switzerland, and the United Kingdom. The bilateral quarterly data covers the trade over the period 1971Q1-2013Q3. The source and also definitions of the variables are provided in the Appendix. Tables 27 to 43 represent the results of testing both models in bilateral case. Keeping the same format of the tables, there are two tables for each bilateral trade that represent the linear and nonlinear results, and every single table includes three panels. Panel A reports the short-run estimates, panel B is a presentation of long-run estimates and panel C is for diagnostic statistics. As with the aggregate model, let us start with the linear model first.

From panel A of table 27, the bilateral trade between the United States and Australia, in the short run, the real exchange rate has no significant effect on bilateral trade between the two. The same is the case in the long run from panel B of the table. However, the real exchange rate has a short-run significant effect on the bilateral trade balance of other ten countries in my sample. These ten bilateral trades are between the United States and Belgium, Brazil, Germany, Israel, Italy, Korea, Mexico, Singapore, Switzerland, and the UK. In the long run, the bilateral real exchange rate has significant effects in the following cases: Canada, China, France, Germany, Israel, Italy, Korea, and the Netherlands. Following the literature, the long-run relationship among

[10] See: Prasad, E (2014), "The Dollar Reigns Supreme, by Default," *Finance and Development*, Vol. 51, No. 1

the variables is checked with the F test and the ECM_{t-1}, statistics that are reported in panel C of the tables; Pesaran *et al.* (2001) proposed to use the F test for joint significance of lagged variables to check for the long-run relationship among them. They arranged new critical values for the test: the upper bound critical value is used when all variables are assumed to be integrated of order one, and the lower bound critical value is used when they are assumed to be integrated of order zero. There is co-integration among variables when the calculated F test statistic is bigger than upper bound critical value.

This is the case for eleven of the bilateral trade cases in my sample. Those countries are: Belgium, Brazil, China, France, Germany, Italy, Japan, Korea, Mexico, the Netherlands, and Singapore. The second test statistics here are the ECM that checks whether the adjustment of variables in each model is toward long-run equilibrium values. I follow Pesaran et al. (2001) and use the long-run normalized coefficient estimates to calculate the error term, named as error-correction term denoted by ECM. Then this new variable is lagged by one period and is replaced by the lagged level variables in the error-correction model (2); then this new specification is tested. A significantly negative coefficient obtained for ECM_{t-1} indicates adjustment toward long-run equilibrium, which is the case in almost all of the linear models in my sample.

Among other diagnostic statistics in panel C of tables, the Lagrange Multiplier tests the serial correlation among residuals. The LM test is distributed as χ^2 and allows for p orders of autocorrelation. Based on the critical value of 9.48 for the LM test with four degrees of freedom in the linear model (p=4), there is serial correlation only in four of the cases: Australia, Canada, Italy, and the UK. The estimated Ramsey's Regression Specification Error Test, RESET, checks the specification of the models. The calculated statistic in the table is smaller than its 3.84 critical value at the 5% significance that supports the correct specification of the bilateral linear models. Following Brown *et al.* (1975), I calculate the Cumulative Sum of Recursive Residuals (CUSUM) and the Cumulative Sum of Recursive Residuals of Square (CUSUMSQ) to test the stabilities of the residuals for each model. The residuals are plotted against break points, and if they were within 5% of the break points, they confirm the stability of the residuals. This is the case for most of the cases in my linear models. The final reported statistic in panel C is the adjusted R^2, which reflects good fitness of the models.

Other variables in the optimum linear model are income level in the United States and income level in the trade partner. As is shown in the panel B of the tables, in the long run, both of them have significant coefficients in most of the cases.

What about the main contribution of my dissertation? Is there any support for the asymmetric effects of the exchange rate on the trade balance in the bilateral trade models as well? To be able to answer this question, let us move to the second part of the tables, starting with table 28. Interestingly, I find that the short-run estimated coefficients for depreciation (NEG) and appreciation (POS) are significantly different from each other in thirteen out of sixteen cases: Belgium, Brazil, China, France, Germany, Israel, Italy, Japan, Korea, Mexico, the Netherland, Singapore, and Switzerland. This result was absent when the U.S. trade balance was estimated using aggregate trade data. The asymmetric effect of the appreciations versus depreciations is confirmed in long run in most of those cases as well: Australia, Belgium, Brazil, Canada, China, France, Germany, Italy, Korea, the Netherlands, Singapore, Switzerland, and the UK.

This means that in both the short run and long run, effects of U.S. dollar appreciation are different from depreciation on the trade with its major trade partners. Note that I considered two estimated coefficients of the variables to be asymmetric if the size or sign, or size and sign, of them were different from one another.

The same sets of diagnostic tests were run for the bilateral nonlinear models and are reported in panel C of the tables. It is gathered that the variables are co-integrated based on the F test in all of the cases except Japan and Mexico. When it comes to the ECM_{t-1} test, Israel, Italy and Korea are added to the list. In most of the cases, there is not any serial correlation between the variables, the residuals are stable, and the models are well specified.

In summary, I picked bilateral trade between the United States and its sixteen major trade partners to investigate whether the effects of currency depreciation on the trade balance are different from currency appreciation. I found that in most of the cases, U.S. dollar depreciation has asymmetric effects on the bilateral trade balance rather than on U.S. dollar appreciation.

4.3. Empirical Results for the Commodity-level Trade Model

Based on the Census Bureau of the United States, Canada is the biggest trade partner of the United States.[11] The asymmetric effect of the U.S. versus Canadian exchange rate change was not obtained in the previous set of estimations. This could be due to the fact that change in the real bilateral exchange rate could cause positive response in some of the traded commodities and at the same time could cause negative response in others. In another words, the most reliable results are the ones that use commodity-level trade data to detect the effects of the changes in the real exchange rate on the trade balance. This is the case for my last set of estimations in this dissertation, where I use data for 162 traded commodities between the United States and Canada over the period 1962-2014. The data is annual and the commodities are listed based on Standard International Trade Classification, SITC. The process is the same as the other two aggregate and bilateral models in that both linear and nonlinear models are used for each single-traded commodity. Since the data is annual, a maximum of four lags is imposed on each first-differenced variable in both models. Consistent with the literature, Akaike's Information Criterion (AIC) is used to select the optimum lags on each single model.

There are two sets of tables reporting the results of the estimated trade balance for each single commodity: tables 59 and 60 reveal the estimated coefficients of the short run and long run and also the diagnostic statistics of the linear model, while tables 61, 62 and 63 report the same results for the nonlinear model for each single commodity. To be able to show my contribution, let us start with the linear model first, then move to the nonlinear case. From table 59, in the linear model, the short-run coefficient estimates of the real exchange rate have significant favorable effects on the trade balance in thirty-five industries. These industries are coded as: (012), (013),

[11] The bilateral goods traded between the two: 632.4 billion dollars, which is 16.4% of the total (December 2013).

(025), (044), (048), (054), (074), (075), (112), (231), (241), (251), (267), (273), (281), (282), (321), (332), (521), (533), (613), (631), (641), (656), (662), (673), (677), (683), (694), (695), (697), (718), (732), (734), (891).

When it comes to long-run effects, from table 59, in the following industries the estimated long-run coefficients have significant favorable effects on the trade balance in the linear model. These industries are coded as: (011), (013), (024), (046), (047), (048), (054), (075), (111), (112), (121), (231), (241), (243), (251), (265), (267), (273), (283), (341), (515), (521), (533), (553), (554), (561), (581), (612), (613), (629), (631), (632), (641), (642), (654), (656), (657), (661), (662), (664), (665), (666), (673), (674), (677), (681), (689), (691), (694), (696), (697), (698), (711), (715), (718), (719), (722), (725), (732), (733), (735), (821), (831), (841), (842), (851), (864), (891), (892), (893), (896), (897).

Clearly, in the linear model, changes in the US dollar against Canadian dollar have more favorable effects in the long run compared to the short run. However, as with the aggregate and bilateral models, the long-run relationship among variables is checked to validate the long-run estimates. For this case, I rely on Pesaran et al. (2001), who used the joint significance of lagged level variables as a test for co-integration among the variables. They used F test and tabulated new critical values, upper bound and lower bound critical values, for the case that variables are integrated of order one versus the case that they are integrated of order zero, respectively. Based on the number of variables in the model, if the calculated F test is bigger than the upper-level critical value, there is a long-run relationship among the variables. From table 60, the calculated F-statistics in the linear model are bigger than its upper bound critical value of 4.35 for eighty cases. This means that in only eighty cases there is co-integration among variables, and the long-run coefficients are meaningful only in these cases.

Following the literature, I used a second method of testing the co-integration that is named the ECM_{t-1} test. This statistic is calculated using the long-run normalized estimates in each linear and nonlinear model, and then is lagged by one period. This newly calculated variable is called ECM_{t-1} and is placed in each linear and nonlinear model instead of the combination of lagged level variables. If the variable carried a significantly negative coefficient, it means that the variables move toward their long-run equilibrium values. The 10% critical value of -3.47 from Banerji et al (1998) was used for the ECM_{t-1}variable. Table 60 shows that in the linear model, the variables move toward long-run equilibrium in 123 trading industries.

There are many other diagnostic statistics reported for each single industry in table 60. Among these diagnostic statistics, the Lagrange Multiplier tests for the serial correlation among variables. The LM test is distributed as χ^2 and allows for p orders of autocorrelation.[12] The critical value of 3.84 in this case shows that the residuals do not suffer from serial correlation in 132 industries in the linear model. The estimated RESET statistics are used to test for the specification of the model. In this linear model, the calculated statistics are less than the critical values of 3.84 at a 5% significance level for 114 industries, indicating that our models are well specified.

The stability of all the short-run and long-run coefficients was checked by CUSUM and CUSUMSQ tests. CUSUM and CUSUMSQ test for the structural break in residuals by plotting those against the break points. There is no need for advance knowledge about the exact dates of the break points in the data. The plotted residuals that lie within 5% of critical bounds are stable. Based on table 60, this is the case for all of the residuals in this industry-level linear model except

[12] The data is annual in this case, and p=1.

for twenty-three cases. The last test statistic is adjusted R^2that tests for a good fit of the model. In most of the cases, the models are well fit.

To be able to prove my claim that the exchange rate effect on the trade balance is asymmetric, I ran the nonlinear model using the same data as for the linear model. The results are reported in table 61, which shows that in the short run, the real exchange rate has an asymmetric effect on the trade balance at least in eighty-nine of the industries. This is due the fact that the size or sign, or both size and sign, of the estimated short-run coefficients for appreciation are significantly different from depreciations in those cases. From table 62, the asymmetric effect is even more pronounced in long run, since in 110 industries, appreciation and depreciation variables carry significantly asymmetric coefficients at least at the 10% level of significance. These short-run and long-run diverse responses in each commodities trade balance after change in real exchange rate proves the differences in the depreciation versus appreciation elasticities of different commodities. This very important contribution of this dissertation is achieved by using the nonlinear model at commodity level trade data.

This means that in those cases, both in short run and the long run, the real depreciation in the US dollar against the Canadian dollar affects industry-level trade between the two significantly different than the appreciation in it. The significant asymmetric effects of the variables both in the long run and the short run are tested with the Wald Test. The tests statistics are reported in table 63 as *Wald-short* and *Wald-long*, and show that the short-run and long-run exchange rate coefficients are significantly different from each other.[13] The estimated coefficient of the test strongly supports the asymmetric effects of the appreciations versus depreciations in

[13] The null hypothesis for the Wald Test asserts that the variables of interest in the model carry same exact estimated coefficients, and they are not significantly different from each other. If the calculated P-value for the null hypothesis was smaller than $\alpha = 0.05$ critical value, the null hypothesis is rejected.

thirty-seven industries in the short run and in sixty-three industries in the long run. In another words, the short-run asymmetric effects of depreciation versus appreciation in the US dollar against the Canadian dollar are significantly detected in the industries coded as:

(055), (061), (081), (122), (231), (263), (273), (281), (291), (321), (421), (431), (515), (521), (541), (551), (571), (611), (629), (657), (663), (665), (667), (676), (677), (683), (684), (686), (689), (694), (696), (731), (732), (734), (862), (863), (931).

The asymmetric effects of depreciation versus appreciation in the US dollar relative to the Canadian dollar are discovered in the long run in the traded industries coded as:

(001), (011), (024), (032), (051), (052), (054), (061), (062), (071), (073), (112), (121), (122), (242), (251), (262), (265), (273), (274), (281), (282), (283), (291), (321), (332), (341), (513), (515), (541), (553), (561), (571), (611), (612), (629), (652), (654), (661), (662), (663), (665), (667), (671), (676), (682), (684), (685), (689), (692), (696), (697), (712), (714), (715), (724), (731), (734), (862), (863), (864), (894), (897).

Those aforementioned industries are marked by stars in table 62.

I check for the co-integration among variables in the nonlinear model again by the F tests and ECM test. From table 63, the estimated F-statistics are bigger than the critical value in 114 industries.[14] This means that in the nonlinear model, co-integration is supported in those trading industries between the United States and Canada. The alternative method of confirming the co-integration, the ECM test from the same table, shows that the co-integration is supported in 136

[14] Note that for the nonlinear model, with 3 exogenous variables and 50 observations from Narayan (2005, p 1988), the critical values at 5% and 10% significance level are 3.97 and 4.70 respectively.

industries. This is because the estimated statistics are negative and significantly bigger than the critical values in those cases.[15]

Based on the critical value of 3.84 for the LM test, the estimated statistic implies that the existence of serial correlation is rejected in 139 cases in the nonlinear model. However, the estimated Ramsey's RESET statistic is smaller than its 3.84 critical value at the 5% significance level for 122 industries, supporting correct specification of the nonlinear model. The CUSUM and CUSUMSQ tests for stability of the residuals show they are stable for most of the cases except for only 29 cases. The last diagnostic statistic, reported in table 5, is the adjusted R^2 that reflects a good fit of the nonlinear model.

The trade balance in my models is defined as the country's imports divided by its exports to the trade partner. So depreciation in the real bilateral exchange rate is expected to improve the trade balance, and a positive sign is expected for the estimated coefficient of the income level of the United States. By the same token, a negative sign for the estimated coefficient of the income level for Canada is expected. Due to the high volume of results here, only the long-run coefficient estimates of income levels are reported in the tables.[16] It is realized that for many of the commodities, in both the linear and nonlinear models between the United States and Canada, the income coefficients carry a significant favorable sign.

[15]The critical value for k=4 with 50 observations from Banerjee et al. (1998, Table 1, p.276) at 5% and 10% significance level are -3.67 and -4.03 respectively.
[16] Those results are available upon request.

5: Conclusion and Summary

Currency depreciation is said to improve a country's trade balance in the long run. However, if a country was experiencing deficits in its trade balance, and policymakers decided to allow their currency to depreciate or devaluate, the trade balance will continue to deteriorate until the adjustment lags are realized. Once the lags are emerged, the trade balance will begin to improve. Short-run deteriorations followed by long-run improvements in the trade balance after currency devaluation have been named as "J-curve" phenomenon. Although in theory the phenomenon seems reasonable, but testing the J-curve and applying the theory to real data has not been successful.

This dissertation tests whether one possible reason for this failure in the literature is the assumption of asymmetric effects of exchange rate change on the trade balance. For the first time in the literature, the nonlinear ARDL approach by Shin et al. (2014) is used to identify whether the effect of appreciation in the exchange rate on the trade balance is different from depreciation. It is a reasonable claim in the sense that, first of all, the J-curve is a nonlinear model, and, second, by the theory of sticky prices, the effects of an increase in prices could be different than the effects of a decrease in prices. To this end, the J-curve phenomenon is examined using three different trade data types. For a better comparison between the results, both linear and nonlinear models are tested for each single case in my samples.

The first data set is the aggregate trade data between one specific country and the rest of the world. The countries in my sample are: Australia, Austria, China, Canada, France, Germany, Japan, Korea, Norway, South Africa, Sweden, the United Kingdom, and the United States. The results of this first part of the estimations is interesting in that they show that the effect of depreciation is different than appreciation on the trade balance both in short run as well long run in many of the countries in the sample. The countries that reveal short-run asymmetric effects are:

Australia, Austria, Canada, China, France, Germany, Japan, Korea, Sweden, and the UK; and in the long run they are: Australia, Canada, China, Korea, South Africa, Sweden, and the US. In another words, depreciation of their real exchange rate against the rest of the world affects their trade balance differently than appreciation in their real exchange rate. This first set of estimations support the main contribution of my dissertation: that exchange rate change could have asymmetric effects on the country's trade balance.

In the first set of estimations, I used the real effective exchange rate of one specific country with respect to rest of the world, and I found evidence for the asymmetric effects. However, as it is clear from the aggregate results, changes in the US dollar against the world's most important currencies did not reveal asymmetric effects on the country's trade balance in the short run. In another words, based on my results so far, the country's currency appreciation affects its trade balance similar to the country's currency depreciation in the short run. This could be due to the fact that after changing in the real exchange rate, it is possible that the US dollar gets cheaper relative to some specific currencies; at the same time it could get more expensive relative to some other currencies, and in general these effects cancel out each other.

To resolve this issue, I concentrate on bilateral trade data between the US and each of its major trade partners and use the bilateral exchange rate of those two trading partners separately. Using both linear and nonlinear models, the trade between the United States and sixteen major trade partners is tested to detect whether the effects of dollar appreciation on its trade balance is different than dollar depreciation.

The results of the second part of the estimations reveal that in short run, dollar depreciation affects US bilateral trade differently than dollar appreciation. This was true for: Belgium, Brazil, China, Germany, Israel, Italy, Japan, Korea, Mexico, the Netherlands, Singapore, and Switzerland. The asymmetric effect of the appreciation versus depreciation is even more confirmed in long run, in: Australia, Belgium, Brazil, Canada, China, France, Germany, Italy, Korea, the Netherlands, Singapore, Switzerland, and UK.

The asymmetric effect of dollar depreciation versus appreciation was confirmed in most of the bilateral trades between the US and its major trade partners, both in the short run and the long run. However, this was not the case for the trade between the United States and its biggest trade partner, Canada. In another words, the asymmetric effects of the US dollar change against Canadian dollar was confirmed only in long-run, and the effects were symmetric in short-run. What could be the reason for only long-run asymmetric effects depreciation versus depreciation? How about short-run? It is possible that some traded commodities respond positively to change in the real bilateral exchange rate between the US dollar against the Canadian dollar: at the same time, some other commodities respond negatively to the same exact change. The last set of estimations uses commodity trade data between the United States and Canada and both linear and nonlinear models, which were run for each of the 162 commodities traded between the two. The asymmetric effect of exchange rate change on the trade balance both in the short run and the long run was confirmed in 89 and 110 industries in my sample. The results are very interesting and show that for a better detection of the effects of exchange rate change on the trade balance, depreciation should be separated from appreciation.

In summary, in this dissertation I investigated weather one possible reason for the failure in the literature to find a solid support for the J-curve theory was the assumption of symmetric effects of the exchange rate on the trade balance. Using three different data types, this claim was tested, and the nonlinear ARDL model was used for the first time in the literature. All three different results support the claim in that the asymmetric effects of exchange rate change on the trade balance was shown in the aggregate level trade between countries, in bilateral trade between two specific trade partners, and also in commodity-level trade between two countries.

Figures:

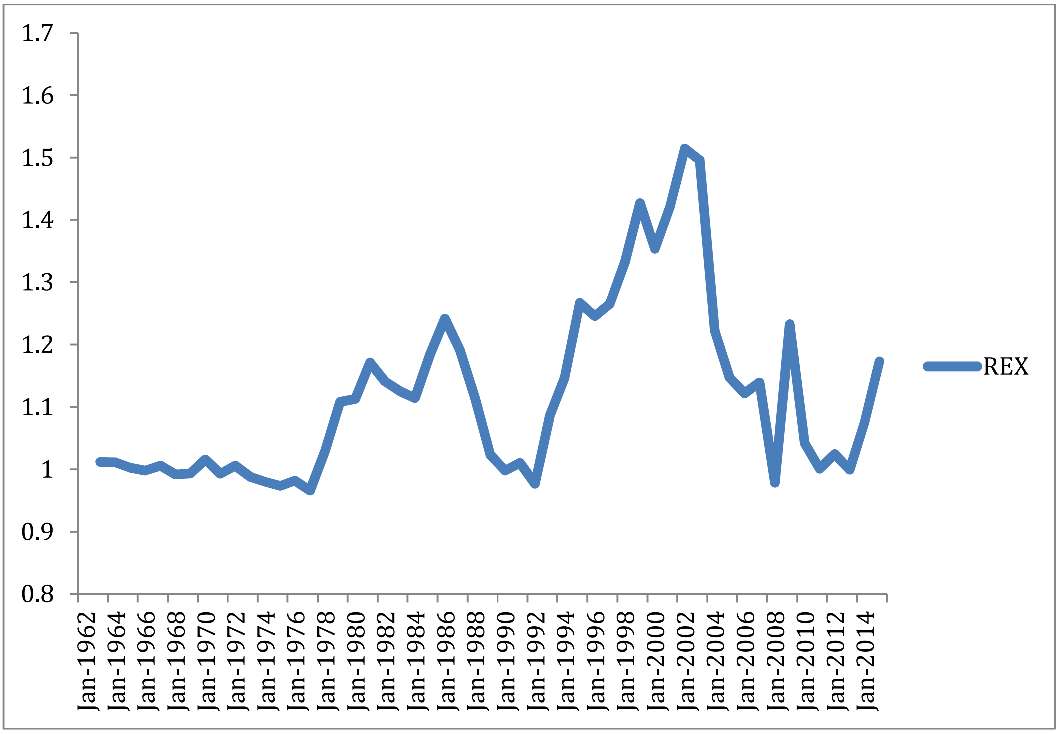

Figure 1, REX

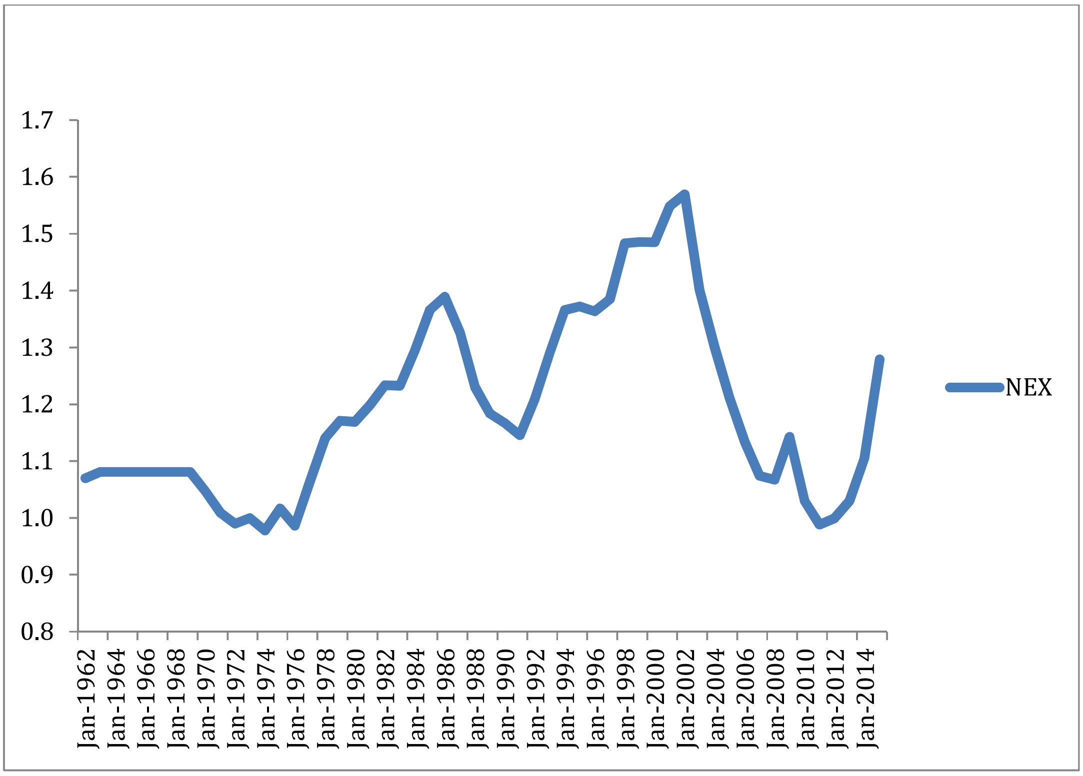

Figure 2, NEX

Tables

Table1: AUSTRALIA

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		0.06 [0.85]						
Δln Y_{AUS}	-0.15 [0.29]	0.61 [1.13]	0.35 [0.65]	1.74 [3.36]				
Δln Y_{WORLD}	0.25 [0.84]	-0.43 [1.40]	0.24 [0.77]	-0.16 [0.66]	-0.26 [0.91]	0.39 [1.35]	-0.53 [1.86]	0.76 [2.83]
Δln REER	0.06 [.56]	0.30 [2.39]						
Panel B: Long-run Estimates								
		Constant	Ln Y_{AUS}	Ln Y_{WORLD}	Ln REER			
		0.32 [0.15]	-0.17 [0.51]	0.25 [0.41]	- 0.16 [0.89]			
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	6.06	-0.23 [4.72]	7.73	0.65	S	S	0.37	

Table2: AUSTRALIA with Appreciation vs. Depreciation

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		0.07 [0.96]						
Δln Y_{AUS}	-0.02 [0.05]	0.45 [0.86]	0.23 [0.45]	1.35 [2.64]				
Δln Y_{WORLD}	0.40 [1.32]	0.09 [0.28]	0.17 [0.56]	-.001 [0.005]	-0.34 [1.15]	-0.34 [0.05]	-0.37 [1.36]	0.67 [2.54]
Δ POS	1.01 [1.66]							
Δ NEG	-0.42 [1.14]	0.51 [1.29]	-0.07 [0.18]	0.39 [1.01]	-0.14 [0.36]	0.17 [0.42]	1.39 [3.62]	
Panel B: Long-run Estimates								
		Constant	Ln Y_{AUS}	Ln Y_{WORLD}	POS	NEG		
		-2.97 [1.66]	1.18 [1.69]	-0.27 [0.45]	-1.57 [2.49]	-0.17 [0.39]		
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	6.21	-0.27 [5.21]	4.68	0.06	S	S	0.43	

Table3: AUSTRIA

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.30 [3.73]	-0.24 [3.15]					
Δln Y_{AUT}	0.63 [3.28]	0.66 [3.53]	0.94 [4.37]	0.84 [4.26]	0.57 [2.94]	0.55 [3.13]	0.19 [1.07]	0.41 [2.37]
Δln Y_{WORLD}	-0.35 [4.87]							
Δln REER	-0.52 [2.01]	0.36 [1.39]						
Panel B: Long-run Estimates								
		Constant	Ln Y_{AUT}	Ln Y_{WORLD}	Ln REER			
		1.99 [2.01]	0.46 [2.69]	-1.01 [4.94]	0.12 [0.52]			
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	7.76	-0.35 [5.09]	2.78	0.01	S	NS	0.45	

Table4: AUSTRIA with Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.29 [3.61]	-0.23 [3.07]					
Δln Y_{AUT}	0.65 [3.38]	0.61 [2.84]	0.87 [3.09]	0.78 [3.86]	0.52 [2.42]	0.51 [2.71]	0.20 [1.04]	0.42 [2.41]
Δln Y_{WORLD}	-0.35 [4.77]							
Δ POS	-0.86 [0.81]	1.75 [1.77]						
Δ NEG	-1.45 [1.26]							
Panel B: Long-run Estimates								
		Constant	Ln Y_{AUT}	Ln Y_{WORLD}	POS	NEG		
		1.66 [1.09]	0.64 [1.63]	-0.97 [4.78]	-0.18 [0.19]	0.47 [0.73]		
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	6.43	-0.36 [5.23]	3.28	0.05	S	S	0.46	

Table5: CANADA

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		0.05 [0.69]						
Δln Y_{CAN}	-0.47 [1.17]	1.47 [3.51]						
ΔlnY_{WORLD}	-0.001 [0.002]	-0.02 [0.24]	-0.15 [1.66]	-0.17 [2.12]				
Δln REER	0.41 [3.97]							
Panel B: Long-run Estimates								
		Constant	Ln Y_{CAN}	Ln Y_{WORLD}	Ln REER			
		-5.24 [2.83]	0.53 [1.37]	-0.17 [0.29]	0.77 [3.23]			
Panel C : Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	2.83	-0.11 [3.29]	4.13	0.17	S	S	0.18	

Table6: CANADA with Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		0.02 [0.28]						
Δln Y_{CAN}	-0.80 [1.88]	1.63 [3.57]	0.58 [1.31]	0.62 [1.37]				
ΔlnY_{WORLD}	0.20 [1.44]	-0.23 [1.98]	-0.31 [3.01]	-0.32 [3.24]	-0.28 [2.09]			
Δ POS	0.41 [3.80]							
Δ NEG	1.44 [3.55]							
Panel B: Long-run Estimates								
		Constant	Ln Y_{CAN}	Ln Y_{WORLD}	POS	NEG		
		0.03 [0.02]	-1.57 [1.70]	1.33 [1.74]	2.71 [5.05]	0.82 [1.25]		
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	4.27	-0.15 [4.01]	0.74	0.02	S	S	0.21	

Table7: CHINA

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.12 [1.24]	-0.23 [2.53]	0.01 [0.17]	0.26 [3.37]			
Δln Y_{CHN}	-0.28 [3.59]	0.09 [1.13]	0.02 [0.34]	0.11 [1.67]	0.25 [3.35]	-0.2 [2.65]		
Δln Y_{WORLD}	0.38 [3.16] [0.002]	-0.03 [0.26]	-0.21 [2.08]	-0.36 [3.56]	0.08 [0.69]	0.18 [1.54]		
Δln REER	0.01 [0.25]							
Panel B: Long-run Estimates								
		Constant	Ln Y_{CHN}	Ln Y_{WORLD}	Ln REER			
		-0.38 [0.28]	0.01 [0.11]	0.06 [0.15]	0.01 [0.28]			
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	1.42	-0.09 [1.73]	2.91	0.03	S	S	0.79	

Table8: CHINA with Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.09 [0.93]	-0.17 [1.7]	-0.004 [0.005]	0.27 [3.61]			
Δln Y_{CHN}	-0.23 [2.65]	0.1 [1.31]	0.08 [0.99]	0.04 [0.56]	0.27 [3.24]	-0.11 [1.34]	0.03 [0.41]	0.16 [2.04]
Δln Y_{WORLD}	0.31 [2.66]	0.04 [0.38]	-0.19 [1.92]	-0.32 [3.23]	0.13 [1.09]	0.18 [1.47]		
Δ POS	0.08 [2.14]							
Δ NEG	0.17 [1.47]							
Panel B: Long-run Estimates								
		Constant	Ln Y_{CHN}	Ln Y_{WORLD}	POS	NEG		
		1.99 [1.94]	-0.15 [1.10]	-0.37 [1.54]	0.47 [2.67]	-0.18 [1.17]		
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	2.35	-0.18 [2.81]	2.33	0.99	S	S	0.81	

Table9: FRANCE

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		-0.28 [3.25]	-0.19 [2.22]	-0.21 [2.61]	-0.11 [1.45]	-0.19 [2.71]	-0.07 [0.92]	-0.17 [2.32]
Δln Y_{FRA}	0.05 [0.12] [1.17]	0.47 [1.14]	1.07 [2.64]	0.97 [2.41]	-0.69 [1.65]			
Δln Y_{WORLD}	-0.02 [0.23]	-0.01 [0.12]	-0.24 [3.34]					
Δln REER	-0.14 [1.01]							
Panel B: Long-run Estimates								
		Constant	Ln Y_{FRA}	Ln Y_{WORLD}	Ln REER			
		7.21 [0.76]	0.77 [0.32]	-2.72 [0.89]	-8.24 [0.75]			
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	4.77	0.02 [0.74]	1.48	3.77	NS	S	0.45	

Table10: FRANCE with Appreciation vs. Depreciation

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		-0.29 [3.49]	-0.15 [1.83]	-0.18 [2.26]				
Δln Y_{FRA}	0.35 [0.83]	0.43 [1.03]	1.03 [2.57]	1.22 [3.02]				
Δln Y_{WORLD}	-0.17 [2.16]	0.07 [0.88]	-0.20 [2.92]					
Δ POS	-0.74 [1.16]	-0.95 [1.47]	-0.63 [0.98]	-0.16 [0.26]	-0.63 [1.06]	0.04 [0.07]	0.97 [1.72]	1.57 [2.81]
Δ NEG	0.33 [0.62]	1.57 [2.87]	-0.003 [0.005]	0.70 [1.30]	0.71 [1.36]	0.34 [0.66]	-1.13 [2.17]	
Panel B: Long-run Estimates								
		Constant	Ln Y_{FRA}	Ln Y_{WORLD}	POS	NEG		
		8.94 [0.36]	4.39 [0.43]	-5.55 [0.46]	1.12 [0.31]	7.39 [0.39]		
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	1.11	-0.01 [0.41]	1.43	0.92	S	S	0.47	

Table11: GERMANY

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.11 [1.37]	0.16 [2.12]					
Δln Y_{GER}	0.002 [0.01]	0.46 [3.19]	0.22 [1.51]					
Δln Y_{WORLD}	-0.03 [0.76]							
Δln REER	-0.29 [2.49]							
Panel B: Long-run Estimates								
		Constant	Ln Y_{GER}	Ln Y_{WORLD}	Ln REER			
		-2.63 [1.30]	0.15 [0.62]	-0.26 [0.84]	0.63 [1.65]			
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	4.21	-0.12 [3.5]	6.34	0.02	S	S	0.19	

Table12: GERMANY with Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.04 [0.63]	0.17 [2.24]					
Δln Y_{GER}	0.04 [0.31]	0.35 [2.29]						
Δln Y_{WORLD}	0.03 [0.82]							
Δ POS	-0.18 [0.90]							
Δ NEG	-1.30 [2.81]							
Panel B: Long-run Estimates								
		Constant	Ln Y_{GER}	Ln Y_{WORLD}	POS	NEG		
		-2.60 [2.43]	0.85 [2.98]	-0.18 [0.89]	-0.91 [1.03]	0.71 [1.28]		
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	3.32	-0.19 [3.96]	4.84	0.06	S	S	0.21	

Table13: JAPAN

	0	1	2	3	4	5	6	7
Panel A: Short-run Estimates								
Lags								
Δln TB		-0.05 [0.62]	0.09 [1.09]	-0.14 [1.72]	0.18 [2.57]	-0.17 [2.30]	-0.16 [2.27]	
Δln Y_{JPN}	-0.16 [2.96]							
Δln Y_{WORLD}	-0.34 [1.55]	0.39 [1.71]	-0.14 [0.71]	-0.25 [1.633]	0.57 [2.96]	-0.27 [1.21]	-0.31 [1.49]	
Δln REER	-0.19 [2.37]	-0.10 [1.17]	-0.22 [2.56]					
Panel B: Long-run Estimates								
		Constant	Ln Y_{JPN}	Ln Y_{WORLD}	Ln REER			
		-3.14 [0.62]	-4.94 [0.71]	5.42 [0.75]	2.35 [0.53]			
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	3.73	-0.03 [0.70]	1.82	3.94	NS	S	0.43	

Table14: JAPAN with Appreciation vs. Depreciation

	0	1	2	3	4	5	6	7
Panel A: Short-run Estimates								
Lags								
Δln TB		0.004 [0.42]	0.11 [1.36]	-0.12 [1.40]	0.23 [2.99]	-0.16 [2.13]	-0.14 [1.88]	
Δln Y_{JPN}	-0.20 [3.19]							
Δln Y_{WORLD}	-0.46 [2.05]	0.68 [3.71]	-0.27 [1.85]	-0.09 [0.65]	0.75 [3.91]	-.38 [1.83]		
Δ POS	-0.46 [1.59]	-0.44 [1.44]						
Δ NEG	-0.59 [1.57]	0.17 [0.47]	-0.99 [2.86]					
Panel B: Long-run Estimates								
		Constant	Ln Y_{JPN}	Ln Y_{WORLD}	POS	NEG		
		6.12 [1.49]	-2.15 [1.3]	0.45 [0.39]	1.81 [0.89]	0.57 [0.35]		
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	3.29	-0.09 [1.48]	2.75	1.69	S	S	0.44	

Table15: KOREA

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.11 [1.53]						
Δln Y_{KOR}	0.18 [1.54]	0.49 [2.14]	0.54 [5.77]					
Δln Y_{WORLD}	-1.43 [4.27]	0.54 [1.72]						
Δln REER	0.31 [2.1]							
Panel B: Long-run Estimates								
		Constant	Ln Y_{KOR}	Ln Y_{WORLD}	Ln REER			
		-2.93 [1.65]	0.12 [0.94]	-0.38 [0.88]	0.87 [4.41]			
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	5.88	-0.24 [4.79]	2.45	0.02	S	NS	0.49	

Table16: KOREA with Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.18 [2.44]						
Δln Y_{KOR}	0.02 [0.29]	0.42 [4.57]	0.51 [5.64]					
Δln Y_{WORLD}	-1.37 [4.19]							
Δ POS	0.94 [1.54]							
Δ NEG	0.64 [1.55]	0.79 [1.83]	0.96 [2.33]					
Panel B: Long-run Estimates								
		Constant	Ln Y_{KOR}	Ln Y_{WORLD}	POS	NEG		
		-0.21 [0.11]	0.06 [0.27]	0.05 [0.11]	1.13 [1.75]	1.38 [2.35]		
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	4.49	-0.23 [4.71]	3.24	0.32	S	NS	0.5	

Table17: NORWAY

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.08 [1.07]						
Δln Y_{NOR}	-0.07 [1.99]	-0.39 [0.99]	0.41 [0.99]	0.54 [1.32]	0.68 [1.69]	0.38 [1.02]	0.72 [2.37]	
Δln Y_{WORLD}	0.16 [0.62]	0.04 [0.16]						
Δln REER	0.07 [0.39]							
Panel B: Long-run Estimates								
		Constant	Ln Y_{NOR}	Ln Y_{WORLD}	Ln REER			
		2.87 [0.61]	0.21 [0.38]	-1.35 [1.47]	0.35 [0.38]			
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	4.44	-0.20 [4.11]	0.88	4.07	S	S	0.21	

Table18: NORWAY with Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.09 [1.19]						
Δln Y_{NOR}	-0.18 [0.55]	-0.36 [0.99]	0.45 [1.20]	0.72 [1.99]	0.84 [2.25]	0.55 [1.52]	0.74 [2.47]	
Δln Y_{WORLD}	0.26 [1.03]							
Δ POS	0.53 [0.31]							
Δ NEG	-2.08 [1.44]							
Panel B: Long-run Estimates								
		Constant	Ln Y_{NOR}	Ln Y_{WORLD}	POS	NEG		
		4.51 [2.08]	0.08 [0.09]	-1.22 [1.28]	1.42 [0.63]	1.24 [0.43]		
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	3.49	-0.18 [4.28]	0.95	3.04	S	S	0.23	

Table19: SOUTH AFRICA

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.16 [2.21]						
Δln Y_{ZAF}	-2.26 [1.69]	3.23 [2.87]						
ΔlnY_{WORLD}	-0.57 [2.53]							
Δln REER	0.16 [1.18]							
Panel B: Long-run Estimates								
		Constant	Ln Y_{ZAF}	Ln Y_{WORLD}	Ln REER			
		8.22 [3.83]	0.56 [2.75]	0.58 [1.50]	0.68 [3.11]			
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	8.06	-0.30 [5.37]	6.54	0.007	s	s	0.37	

Table20: SOUTH AFRICA with Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.19 [2.71]						
Δln Y_{ZAF}	3.66 [3.73]							
ΔlnY_{WORLD}	-0.58 [2.55]							
Δ POS	0.70 [1.14]							
Δ NEG	0.30 0.60]							
Panel B: Long-run Estimates								
		Constant	Ln Y_{ZAF}	Ln Y_{WORLD}	POS	NEG		
		-4.77 [2.59]	0.009 [1.70]	0.99 [2.31]	1.29 [1.90]	1.61 [3.07]		
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	4.02	-0.29 [5.38]	2.86	0.48	NS	S	0.33	

Table21: SWEDEN

	0	1	2	3	4	5	6	7
Panel A: Short-run Estimates								
Lags								
Δln TB		-0.39 [4.66]	-0.16 [1.82]	0.06 [0.72]	-0.11 [1.32]	-0.19 [2.41]	-0.16 [2.14]	-0.19 2.79]
Δln Y_{SWE}	0.07 [0.33]	0.15 [0.95]	0.10 [0.74]	0.46 [3.21]	0.42 [2.49]			
Δln Y_{WORLD}	0.37 [2.18]	0.30 [1.73]						
Δln REER	-0.001 [0.01]	0.06 [0.51]	0.24 [2.08]	-0.20 [1.71]	-0.27 [2.33]			
Panel B: Long-run Estimates								
		Constant	Ln Y_{SWE}	Ln Y_{WORLD}	Ln REER			
		5.96 [1.36]	1.79 [2.40]	-1.67 2.82]	1.16 [1.73]			
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	2.69	-0.12 [3.32]	6.12	0.67	S	S	0.59	

Table22: SWEDEN with Appreciation vs. Depreciation

	0	1	2	3	4	5	6	7
Panel A: Short-run Estimates								
Lags								
Δln TB		-0.41 [4.86]	-0.17 [1.94]	0.06 [0.74]	-0.12 [1.56]	-0.19 [2.52]	-0.19 [2.66]	-0.21 [3.07]
Δln Y_{SWE}	0.007 [0.04]	-0.29 [1.83]	-0.01 [0.09]	0.35 [2.63]	0.31 [1.88]			
Δln Y_{WORLD}	-0.38 [2.35]	0.27 [1.59]						
Δ POS	-0.56 [0.96]							
Δ NEG	0.24 [0.68]	1.19 [3.39]	-0.85 [2.37]	-0.77 [2.14]				
Panel B: Long-run Estimates								
		Constant	Ln Y_{SWE}	Ln Y_{WORLD}	POS	NEG		
		-4.66 [1.41]	2.89 [2.45]	-1.59 [3.30]	-0.17 [0.13]	1.91 [1.63]		
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	2.61	-0.13 [3.66]	6.54	0.37	S	S	0.62	

Table23: UNITED KINGDOM

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		-0.35 [4.51]	-0.40 [5.06]	-0.27 [3.29]	-0.12 [1.47]	-0.23 [2.09]	-0.25 [3.32]	-0.13 [1.86]
Δln Y_{UK}	0.31 [0.74]	1.18 [2.81]	0.32 [0.74]	0.27 [0.67]	0.79 [2.12]	0.75 [2.09]		
ΔlnY_{WORLD}	-0.36 [3.32]	0.28 [2.59]						
Δln REER	-0.20 [2.21]	-0.07 [0.75]	-0.15 [1.59]	-0.02 [0.22]	0.05 [0.54]	0.19 [2.04]	-0.23 [2.58]	
Panel B: Long-run Estimates								
		Constant	Ln Y_{UK}	Ln Y_{WORLD}	Ln REER			
		-3.84 [1.39]	1.98 [2.14	-1.98 [1.78]	0.78 [1.35]			
Panel C : Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	5.51	-0.12 [4.75]	8.12	0.44	S	S	0.51	

Table24: UNITED KINGDOM with Appreciation vs. Depreciation

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		-0.39 [4.98]	-0.39 [4.71]	-0.30 [3.51]	-0.17 [1.92]	-0.29 [3.67]	-0.27 [3.39]	-0.17 [2.25]
Δln Y_{UK}	0.07 [0.17]	1.09 [2.55]	0.65 [1.49]	0.38 [0.88]	1.15 [2.94]	0.88 [2.46]		
ΔlnY_{WORLD}	0.15 [1.13]	0.01 [0.08]	-0.11 [0.94]	-0.38 [2.39]				
Δ POS	0.43 [1.15]							
Δ NEG	-1.04 [3.29]	-0.21 [0.59]	-0.40 [1.18]	-0.04 [0.11]	0.19 [0.60]	0.44 [1.36]	-0.82 [2.65]	
Panel B: Long-run Estimates								
		Constant	Ln Y_{UK}	Ln Y_{WORLD}	POS	NEG		
		-0.51 [0.14]	1.79 [1.38]	-1.72 [0.92]	2.56 [0.83]	2.26 [0.96]		
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	4.81	-0.08 [4.98]	3.32	0.26	S	S	0.51	

Table25: UNITED STATES

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.04 [0.51]						
Δln Y_{US}	-0.05 [0.16]	1.02 [2.64	0.28 [0.71]	-0.64 [1.68]	0.70 [1.94]	-0.46 [1.25]	-0.46 [1.31]	0.90 [2.69]
ΔlnY_{WORLD}	0.11 [1.01]	0.28 [2.65]	0.11 [1.03]	0.24 [2.31]				
Δln REER	0.09 [0.84]							
Panel B: Long-run Estimates								
		Constant	Ln Y_{US}	Ln Y_{WORLD}	Ln REER			
		1.10 [0.85]	1.19 [2.69]	-1.36 [1.92]	1.48 [5.38]			
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	9.57	-0.13 [6.25]	6.94	1.81	S	S	0.33	

Table26: SUNITED STATES with Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.03 [0.50]						
Δln Y_{US}	0.02 [0.05]	0.91 [2.33]	0.22 [0.54]	-0.67 [1.75]	0.68 [1.85]	-0.46 [1.28]	-0.48 [1.35]	0.86 [2.60]
ΔlnY_{WORLD}	0.09 [0.83]	0.32 [3.01]	0.14 [1.32]	0.25 [2.41]				
Δ POS	0.17 [0.36]							
Δ NEG	0.16 [0.35]							
Panel B: Long-run Estimates								
		Constant	Ln Y_{US}	Ln Y_{WORLD}	POS	NEG		
		-0.96 [0.55]	2.24 [2.81]	-1.73 [2.48]	2.31 [2.89]	3.76 [5.83]		
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	CUSM2	R^2	
	8.24	-0.15 [6.51]	7.27	1.17	S	S	0.34	

Table27: US vs. AUSTRALIA

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.19 [2.19]	-0.19 [2.24]	-0.14 [1.72]				
Δln Y_{US}	0.75 [0.50]							
Δln Y_{AUS}	-0.99 [0.79]							
Δln REX	0.72 [0.60]							
Panel B: Long-run Estimates								
Constant	-0.24 [0.18]							
Ln Y_{US}	1.37 [0.86]							
Ln Y_{AUS}	-1.52 [1.11]							
Ln REX	0.14 [0.19]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R2	
	2.86	-0.18 [2.80]	13.59	0.86	NS	S	0.14	

Table28: US vs. AUSTRALIA with Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.04 [0.56]						
Δln Y_{US}	0.82 [0.57]							
Δln Y_{AUS}	-0.74 [0.59]							
Δ POS	1.43 [0.19]							
Δ NEG	0.88 [0.25]							
Panel B: Long-run Estimates								
Constant	-6.61 [2.59]							
Ln Y_{US}	2.14 [2.22]							
Ln Y_{AUS}	-0.39 [0.43]							
POS	-5.82 [2.24]							
NEG	2.26 [2.33]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	5.32	-0.33	4.41	0.07	S	S	0.15	

Table29: US vs. BELGIUM

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		0.01 [0.09]	-0.16 [1.29]	-0.16 [1.38]	-0.44 [3.80]	-0.03 [0.24]	-0.20 [1.89]	
Δln Y_{US}	-3.51 [1.98]	-0.61 [0.31]	-0.54 [0.34]	-1.06 [0.68]	-2.77 [1.85]	-1.57 [0.99]	3.30 [1.98]	-4.43 [2.72]
Δln$Y_{BELGIUM}$	-0.48 [0.18]	6.99 [2.65]						
Δln REX	0.06 [.34]	0.13 [0.74]	0.14 [0.85]	0.52 [3.14]				
Panel B: Long-run Estimates								
Constant	-0.49 [6.67]							
Ln Y_{US}	4.03 [2.73]							
Ln $Y_{BELGIUM}$	-6.66 [3.16]							
Ln REX	0.04 [0.20]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	5.96	-0.60 [5.09]	3.84	5.83	S	S	0.59	

Table30: US vs. BELGIUM. Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.04 [0.23]	-0.33 [1.44]	-0.20 [1.03]	-0.17 [0.86]	-0.14 [0.85]	-0.61 [3.80]	-0.26 [1.84]
Δln Y_{US}	-3.36 [1.42]	1.64 [0.57]	-6.58 [2.24]	-7.42 [2.49]	-1.01 [0.41]	-9.22 [3.51]	-5.56 [1.71]	
Δln$Y_{BELGIUM}$	-6.09 [1.90]	13.68 [3.45]	5.02 [1.30]	7.71 [2.24]	3.99 [0.97]	3.16 [0.98]	11.46 [2.95]	
Δ POS	-2.14 [1.57]	1.06 [0.92]	1.21 [1.04]	0.18 [0.18]	1.97 [1.71]	1.51 [1.48]	-4.89 [4.68]	
Δ NEG	0.28 [0.30]	0.82 [0.91]	-0.61 [0.68]	3.14 [3.11]	-1.13 [1.20]	0.16 [0.17]	3.56 [3.87]	-1.28 [1.77]
Panel B: Long-run Estimates								
Constant	-3.47 [0.42]							
Ln Y_{US}	11.79 [0.64]							
ln $Y_{BELGIUM}$	-3.85 [0.44]							
POS	1.37 [0.29]							
NEG	-4.94 [0.33]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	1.74	-0.25	4.48	0.03	S	S	0.71	

Table31: US vs. BRAZIL

	0	1	2	3	4	5	6	7
Panel A: Short-run Estimates								
Lags								
Δln TB		-0.31 [3.46]	-0.39 [4.30]	-0.16 [1.84]	0.17 [1.91]	0.04 [0.44]	0.24 [2.81]	
Δln Y_{US}	-0.70 [0.45]	4.62 [2.30]	-1.13 [0.54]	0.94 [0.48]	-2.75 [1.92]			
Δln Y_{BRAZIL}	-1.55 [3.72]	-0.94 [2.09]	-0.68 [1.53]					
Δln REX	-0.06 [1.41]	-0.01 [0.03]	0.04 [0.68]	-0.02 [0.33]	0.08 [1.35]	-0.07 [1.27]	0.12 [2.56]	
Panel B: Long-run Estimates								
Constant	19.17 [0.45]							
Ln Y_{US}	4.68 [0.62]							
Ln Y_{BRAZIL}	-9.13 [0.83]							
Ln REX	0.03 [0.41]							
Panel C : Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	4.17	-0.04 [3.15]	0.94	0.27	S	S	0.36	

Table32: US vs. BRAZIL. Appreciation vs. Depreciation

	0	1	2	3	4	5	6	7
Panel A: Short-run Estimates								
Lags								
Δln TB		-0.21 [2.46]	-0.28 [3.49]	-0.11 [1.29]	0.18 [2.11]	0.03 [0.34]	0.21 [2.52]	
Δln Y_{US}	-0.25 [0.16]	4.53 [2.33]	-1.48 [0.76]	2.29 [1.20]	-3.60 [2.61]			
Δln Y_{BRAZIL}	-1.48 [4.15]	-0.70 [1.85]						
Δ POS	2.40 [2.09]	2.34 [2.06]						
Δ NEG	-0.11 [2.01]							
Panel B: Long-run Estimates								
Constant	-6.20 [1.20]							
Ln Y_{US}	4.57 [2.13]							
Ln Y_{BRAZIL}	-2.78 [1.25]							
POS	-0.21 [0.24]							
NEG	0.12 [3.29]							
Panel C : Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	4.45	-0.18	1.52	1.98	S	S	0.36	

Table 33: US vs. CANADA

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
$\Delta \ln TB$		-0.07 [0.08]	-0.22 [2.72]	-0.08 [1.02]	0.28 [3.43]	-0.14 [1.87]	0.11 [1.30]	
$\Delta \ln Y_{US}$	-0.19 [0.35]	1.19 [2.31]						
$\Delta \ln Y_{CANADA}$	-0.01 [0.01]							
$\Delta \ln REX$	0.01 [0.08]							
Panel B: Long-run Estimates								
Constant	-0.68 [1.10]							
$\ln Y_{US}$	-1.82 [1.77]							
$\ln Y_{CANADA}$	2.01 [1.75]							
$\ln REX$	0.49 [1.82]							
Panel C : Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	2.06	-0.12 [2.82]	11.69	0.03	S	S	0.22	

Table34: US vs. CANADA. Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
$\Delta \ln TB$		-0.02 [0.01]	-0.23 [2.78]	-0.08 [0.96]	0.27 [3.17]	-0.14 [1.80]	0.11 [1.27]	
$\Delta \ln Y_{US}$	-0.27 [0.49]	1.05 [2.05]						
$\Delta \ln Y_{CANADA}$	0.13 [0.20]							
Δ POS	-0.45 [0.81]							
Δ NEG	0.48 [0.83]							
Panel B: Long-run Estimates								
Constant	-2.46 [1.59]							
$\ln Y_{US}$	-1.76 [1.88]							
$\ln Y_{CANADA}$	2.42 [2.17]							
POS	0.17 [0.19]							
NEG	0.98 [1.75]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	1.53	-0.12 [2.70]	7.67	0.22	S	S	0.23	

Table35: US vs. CHINA

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.34 [3.82]	-0.23 [2.48]	-0.13 [1.53]				
Δln Y_{US}	1.39 [0.66]							
ΔlnY_{CHINA}	-0.42 [0.79]	1.12 [2.14]	-0.37 [0.72]	0.93 [2.06]	1.61 [3.01]			
Δln REX	-0.31 [1.39]							
Panel B: Long-run Estimates								
Constant	5.16 [4.56]							
Ln Y_{US}	3.52 [5.19]							
Ln Y_{CHINA}	-5.07 [10.77]							
Ln REX	-0.44 [4.71]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	6.04	-0.33 [4.93]	9.22	0.09	S	S	0.63	

Table36: US vs. CHINA. Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.21 [2.63]						
Δln Y_{US}	-0.69 [0.32]							
Δln Y_{CHINA}	0.11 [0.23]	1.16 [2.32]	-0.14 [0.28]	1.03 [2.31]	0.77 [1.57]	1.99 [3.98]		
Δ POS	2.28 [0.62]	1.98 [0.52]	-4.02 [1.17]	5.32 [1.53]	-3.24 [0.86]	-9.87 [2.69]		
Δ NEG	-0.58 [1.08]							
Panel B: Long-run Estimates								
Constant	-2.77 [1.01]							
Ln Y_{US}	4.29 [5.86]							
ln Y_{CHINA}	-3.59 [6.31]							
POS	-3.96 [3.90]							
NEG	-4.94 [1.27]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	7.59	-0.50 [6.23]	1.98	0.43	S	S	0.67	

Table37: US vs. FRANCE

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.34 [4.40]	-0.30 [3.72]	-0.24 [2.98]	0.22 [2.73]	0.14 [1.78]	-0.06 [0.87]	
Δln Y_{US}	2.47 [2.32]	1.55 [1.46]	1.65 [1.59]					
ΔlnY_{FRANCE}	-2.61 [1.67]							
Δln REX	-0.03 [0.21]							
Panel B: Long-run Estimates								
Constant	-3.68 [1.29]							
Ln Y_{US}	-0.49 [0.36]							
Ln Y_{FRANCE}	1.41 [0.72]							
Ln REX	0.87 [3.05]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	6.59	-0.25 [5.17]	7.78	0.72	S	S	0.47	

Table38: US vs. FRANCE. Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.35 [4.61]	-0.31 [4.02]	-0.23 [2.95]	0.24 [3.13]	0.17 [2.32]		
Δln Y_{US}	2.40 [2.26]	1.80 [1.69]	1.49 [1.44]					
ΔlnY_{FRANCE}	-2.63 [1.68]							
Δ POS	-0.66 [1.10]							
Δ NEG	0.59 [0.98]							
Panel B: Long-run Estimates								
Constant	-4.23 [1.02]							
Ln Y_{US}	-0.53 [0.32]							
ln Y_{FRANCE}	1.58 [0.80]							
POS	1.96 [2.35]							
NEG	2.03 [3.06]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	5.78	-0.25	9.03	1.18	S	S	0.47	

Table39: US vs. GERMANY

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.14 [1.87]	-0.13 [1.71]	-0.07 [0.93]	0.32 [4.49]	0.11 [1.35]	-0.10 [1.44]	
Δln Y_{US}	1.01 [1.19]	0.29 [0.33]	1.88 [2.12]	1.46 [1.65]	1.79 [2.03]			
Δln$Y_{GERMANY}$	1.03 [1.41]	-0.96 [1.32]	-1.15 [1.57]	-1.60 [2.22]	-1.39 [1.95]	0.11 [0.15]	0.33 [0.47]	1.56 [2.32]
Δln REX	-0.32 [2.50]							
Panel B: Long-run Estimates								
Constant	-1.44 [0.83]							
Ln Y_{US}	0.50 [0.70]							
Ln $Y_{GERMANY}$	-0.02 [0.02]							
Ln REX	0.82 [3.67]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	10.19	-0.24 [6.45]	4.94	1.63	S	S	0.39	

Table40: US vs. GERMANY. Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.04 [0.61]	-0.22 [3.06]	-0.07 [1.05]	0.29 [4.10]			
Δln Y_{US}	0.54 [0.63]	0.22 [.25]	2.30 [2.59]	1.24 [1.38]	2.38 [2.68]			
Δln$Y_{GERMANY}$	1.23 [1.66]	-1.54 [2.16]	-0.76 [1.06]	-1.73 [2.35]	-1.55 [2.13]	0.47 [0.67]	-0.13 [0.19]	1.50 [2.28]
Δ POS	-0.32 [0.54]	-0.49 [0.88]	-0.69 [1.22]	0.82 [1.48]	0.42 [0.75]	-1.54 [2.77]	1.12 [2.02]	-1.12 [2.04]
Δ NEG	-0.89 [6.32]							
Panel B: Long-run Estimates								
Constant	3.79 [1.12]							
Ln Y_{US}	-0.69 [0.75]							
ln $Y_{GERMANY}$	-0.22 [0.22]							
POS	3.01 [4.15]							
NEG	1.88 [3.08]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	7.75	-0.27 [6.31]	7.45	0.02	S	S	0.42	

Table41: US vs. ISRAEL

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.41 [5.38]	-0.21 [2.62]	-0.27 [3.66]				
Δln Y_{US}	2.26 [1.66]	-0.61 [.31]	-0.54 [0.34]	-1.06 [0.68]	-2.76 [1.85]	-1.56 [0.99]	3.30 [1.98]	-4.43 [2.72]
ΔlnY_{ISRAEL}	-0.34 [2.93]	-0.44 [3.22]	-0.81 [5.19]	-0.64 [3.81]	-0.49 [2.94]	-0.14 [0.90]	0.01 [0.01]	0.28 [2.82]
Δln REX	0.05 [0.01]	-0.53 [1.77]						
Panel B: Long-run Estimates								
Constant	2.68 [0.49]							
Ln Y_{US}	-0.38 [0.19]							
Ln Y_{ISRAEL}	1.18 [0.93]							
Ln REX	1.77 [1.97]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	2.78	-0.16 [3.37]	9.19	0.17	S	S	0.38	

Table42: US vs. ISRAEL. Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.25 [2.70]	-0.09 [0.99]	-0.15 [1.77]	0.11 [1.44]			
Δln Y_{US}	1.20 [1.48]							
ΔlnY_{ISRAEL}	-0.36 [3.21]	-0.09 [0.67]	-0.50 [3.35]	-0.36 [2.19]	-0.23 [1.44]	0.07 [0.51]	0.15 [1.26]	0.35 [3.59]
Δ POS	-0.16 [0.14]							
Δ NEG	0.44 [0.35]	-2.64 [2.36]						
Panel B: Long-run Estimates								
Constant	-3.47 [0.42]							
Ln Y_{US}	11.79 [0.64]							
Ln Y_{SRAEL}	-3.85 [0.44]							
POS	1.37 [.29]							
NEG	-4.94 [0.33]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	3.72	-0.33 [4.34]	9.88	2.06	S	S	0.41	

Table43: US vs. ITALY

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.40 [5.36]	-0.28 [3.60]	-0.24 [3.09]	0.34 [4.98]	-0.02 [0.21]	-0.14 [2.01]	-0.25 [3.53]
Δln Y_{US}	2.78 [4.10]	-0.14 [0.16]	2.93 [3.60]	-1.78 [2.22]	0.83 [1.30]			
ΔlnY_{ITALY}	-0.95 [2.45]	1.25 [3.22]	-0.91 [2.28]					
Δln REX	0.21 [5.18]							
Panel B: Long-run Estimates								
Constant	-7.95 [2.78]							
Ln Y_{US}	-0.31 [0.40]							
Ln Y_{ITALY}	2.26 [1.78]							
Ln REX	2.39 [1.68]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	6.57	-0.24 [6.45]	15.18	2.65	S	S	0.67	

Table44: US vs. ITALY. Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.34 [4.42]	-0.25 [3.24]	-0.22 [2.80]	0.33 [4.79]	-0.03 [0.38]	-0.13 [1.75]	-0.22 [2.98]
Δln Y_{US}	2.77 [4.06]	-0.31 [0.36]	3.17 [3.81]	-1.62 [1.95]	0.87 [1.03]	0.20 [0.24]	-0.89 [1.12]	0.84 [1.36]
Δln Y_{ITALY}	-0.84 [2.11]	-1.32 [3.34]	-1.12 [2.72]					
Δ POS	0.37 [0.61]							
Δ NEG	0.70 [1.01]	-0.02 [0.29]	-0.75 [1.21]	-1.32 [2.20]	0.24 [0.38]	-0.19 [0.30]	1.14 [1.86]	-1.54 [2.55]
Panel B: Long-run Estimates								
Constant	1.12 [0.27]							
Ln Y_{US}	-2.70 [1.56]							
Ln Y_{ITALY}	2.14 [2.26]							
POS	6.40 [2.49]							
NEG	4.78 [2.45]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	7.2	-0.12 [5.15]	11.19	2.56	S	S	0.68	

Table45: US vs. JAPAN

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.13 [1.65]	-0.14 [1.87]					
Δln Y_{US}	-0.07 [0.07]	1.62 [1.61]	1.62 [1.64]					
ΔlnY_{JAPAN}	0.01 [0.03]	-0.74 [1.87]	-1.20 [3.76]	-0.75 [2.45]	-0.97 [2.69]	-0.70 [1.96]		
Δln REX	-0.01 [0.04]							
Panel B: Long-run Estimates								
Constant	-1.89 [1.12]							
Ln Y_{US}	-1.99 [1.60]							
Ln Y_{JAPAN}	2.57 [1.81]							
Ln REX	1.45 [1.60]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	3.93	-0.09 [3.97]	2.52	0.99	S	S	0.17	

Table46: US vs. JAPAN. Appreciation vs. Depreciation

Panel A: Short-run Estimates								
	Lags							
	0	1	2	3	4	5	6	7
Δln TB		-0.09 [1.14]	-0.14 [1.82]	-0.05 [0.61]	0.14 [1.84]			
Δln Y_{US}	-0.93 [0.96]	1.60 [1.58]	2.06 [2.03]					
Δln Y_{JAPAN}	0.14 [0.35]	-0.90 [2.88]	-0.78 [2.54]	-0.49 [1.62]	-0.73 [2.08]			
Δ POS	0.10 [0.29]	-0.64 [2.08]	0.16 [0.51]	0.17 [0.50]	0.18 [0.53]	-0.65 [1.96]	0.77 [2.35]	
Δ NEG	-0.08 [0.32]	0.61 [2.48]	0.59 [2.38]	-0.46 [1.83]	0.22 [0.87]	0.41 [1.68]	-0.41 [1.69]	0.46 [2.07]
Panel B: Long-run Estimates								
Constant	27.98 [0.80]							
Ln Y_{US}	-6.58 [0.91]							
ln Y_{JAPAN}	-0.75 [0.24]							
POS	2.23 [0.94]							
NEG	-0.39 [0.24]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	2.55	-0.06 [3.62]	13.72	0.01	S	S	0.24	

Table47: US vs. KOREA

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
$\Delta \ln TB$		-0.26 [3.53]	-0.39 [5.20]	-0.32 [4.17]	0.04 [0.50]	-0.32 [4.16]	-0.18 [2.45]	-0.21 [2.91]
$\Delta \ln Y_{US}$	-0.76 [1.19]	-0.60 [0.97]	0.17 [0.29]	1.38 [2.40]	-1.17 [2.05]			
$\Delta \ln Y_{KOREA}$	3.21 [2.61]	1.22 [0.94]	1.84 [1.45]					
$\Delta \ln REX$	0.63 [2.95]							
Panel B: Long-run Estimates								
Constant	-24.71 [2.02]							
$\ln Y_{US}$	0.47 [0.46]							
$\ln Y_{KOREA}$	-1.94 [0.72]							
$\ln REX$	4.52 [2.04]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	7.2	-0.10 [5.35]	2.49	0.61	S	S	0.43	

Table48: US vs. KOREA. Appreciation vs. Depreciation

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
$\Delta \ln TB$		-0.15 [1.96]	0.03 [0.37]	0.03 [0.35]	0.32 [4.86]			
$\Delta \ln Y_{US}$	-0.77 [1.36]	0.43 [0.75]	1.09 [1.91]	1.52 [2.74]				
$\Delta \ln Y_{KOREA}$	3.29 [2.97]							
Δ POS	-1.34 [0.86]	6.52 [4.11]	5.66 [3.38]	-5.93 [3.50]	-4.37 [2.63]			
Δ NEG	-4.96 [1.12]							
Panel B: Long-run Estimates								
Constant	-8.38 [2.28]							
$\ln Y_{US}$	-2.59 [3.21]							
$\ln Y_{KOREA}$	3.48 [2.54]							
POS	3.05 [3.26]							
NEG	-7.02 [0.61]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	4.84	-0.19 [4.89]	11.42	3.84	S	S	0.48	

Table49: US vs. Mexico

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		-0.25 [2.83]	-0.07 [0.95]	-0.11 [1.67]				
Δln Y_{US}	1.46 [1.89]							
ΔlnY_{Mexico}	-0.15 [1.27]							
Δln REX	0.27 [3.40]	0.38 [4.51]	0.14 [1.68]	0.17 [2.05]	-0.13 [0.16]	0.20 [2.85]	0.14 [1.76]	
Panel B: Long-run Estimates								
Constant	1.33 [0.50]							
Ln Y_{US}	1.68 [1.45]							
Ln Y_{Mexico}	-1.50 [1.20]							
Ln REX	-0.76 [1.15]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	5.56	-0.10 [4.76]	5.33	0.01	S	S	0.30	

Table50: US vs. Mexico. Appreciation vs. Depreciation

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		-0.02 [0.27]						
Δln Y_{US}	0.72 [0.67]	1.64 [0.57]						
ΔlnY_{Mexico}	-0.16 [0.51]	-0.57 [2.10]	-0.28 [1.15]	-0.34 [1.31]	-0.21 [0.74]			
Δ POS	0.99 [3.20]							
Δ NEG	-2.11 [3.71]	2.22 [4.19]	0.21 [0.38]	0.99 [1.91]	-1.48 [2.84]			
Panel B: Long-run Estimates								
Constant	-8.24 [1.58]							
Ln Y_{US}	2.57 [2.11]							
Ln Y_{Mexico}	-0.42 [0.36]							
POS	0.10 [0.12]							
NEG	1.47 [1.04]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	2.44	-0.07 [2.29]	17.64	3.86	S	S	0.27	

Table51: US vs. NETHERLAND

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		-0.42 [5.13]	-0.49 [5.60]	-0.26 [2.87]	-0.008 [0.09]	0.06 [0.70]	-0.25 [3.33]	
Δln Y_{US}	3.59 [2.52]	3.12 [1.88]						
Δln Y_{NLD}	1.30 [1.03]							
Δln REX	-0.10 [0.64]							
Panel B: Long-run Estimates								
Constant	-10.37 [1.66]							
Ln Y_{US}	-5.27 [1.08]							
Ln Y_{NLD}	7.36 [1.19]							
Ln REX	1.56 [1.85]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	6.51	-0.15 [5.16]	3.13	0.01	S	S	0.54	

Table52: US vs. NETHERLAND. Appreciation vs. Depreciation

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		-0.48 [5.78]	-0.54 [5.94]	-0.32 [3.44]	-0.10 [1.09]	-0.01 [0.02]	-0.28 [3.74]	
Δln Y_{US}	3.43 [2.40]	3.53 [2.02]						
Δln Y_{NLD}	1.78 [1.34]							
Δ POS	-0.38 [0.50]	0.83 [1.26]	0.28 [0.43]	0.10 [0.15]	-1.43 [2.12]	0.94 [1.40]		
Δ NEG	0.11 [0.14]							
Panel B: Long-run Estimates								
Constant	3.82 [0.23]							
Ln Y_{US}	-28.71 [0.70]							
ln Y_{NLD}	25.58 [0.69]							
POS	11.93 [0.82]							
NEG	5.43 [0.87]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	4.09	-0.07 [4.58]	3.62	0.02	S	S	0.56	

Table53: US vs. SINGAPORE

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		-0.17 [2.09]						
Δln Y_{US}	-1.04 [0.70]							
Δln Y_{SGP}	0.94 [3.22]							
Δln REX	-0.28 [0.76]	1.33 [3.50]	1.05 [2.62]					
Panel B: Long-run Estimates								
Constant	3.74 [0.86]							
Ln Y_{US}	-0.56 [0.31]							
Ln Y_{SGP}	-0.28 [0.36]							
Ln REX	-0.33 [0.59]							
Panel C : Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	6.13	-0.32 [5.01]	1.95	1.24	S	S	0.35	

Table54: US vs. SINGAPORE. Appreciation vs. Depreciation

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		-0.22 [2.42]						
Δln Y_{US}	-1.79 [1.14]	4.08 [2.43]	4.03 [2.46]					
Δln Y_{SGP}	0.64 [2.04]	-0.89 [2.65]	-1.14 [3.52]	-0.79 [2.47]				
Δ POS	-0.44 [0.27]							
Δ NEG	-0.36 [0.21]	4.91 [3.15]	3.21 [1.96]	0.07 [0.04]	-2.97 [1.88]	-3.19 [2.07]		
Panel B: Long-run Estimates								
Constant	10.70 [1.81]							
Ln Y_{US}	-3.85 [1.74]							
Ln Y_{SGP}	1.55 [1.63]							
POS	1.41 [0.80]							
NEG	3.02 [1.84]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	4.94	-0.39 [5.06]	1.82	0.61	S	S	0.44	

Table55: US vs. SWITZERLAND

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		-0.27 [2.65]	-0.25 [2.83]	-0.15 [1.95]				
Δln Y_{US}	1.44 [0.70]							
Δln Y_{CHE}	-1.72 [0.99]							
Δln REX	-0.52 [2.08]	-0.34 [1.30]	-0.33 [1.29]	-0.18 [0.68]	0.45 [1.71]	0.55 [2.07]		
Panel B: Long-run Estimates								
Constant	3.14 [1.07]							
Ln Y_{US}	1.35 [1.80]							
Ln Y_{CHE}	-1.99 [1.49]							
Ln REX	0.39 [1.08]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	2.99	-0.34 [4.93]	2.09	0.09	S	S	0.3	

Table56: US vs. SWITZERLAND. Appreciation vs. Depreciation

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		-0.32 [3.10]	-0.36 [3.60]	-0.30 [3.02]	-0.17 [1.74]	-0.14 [1.57]	-0.11 [1.28]	-0.20 [2.60]
Δln Y_{US}	-0.33 [0.15]	3.95 [1.65]	1.72 [0.71]	-0.56 [0.23]	-1.38 [0.58]	1.68 [0.72]	-2.34 [1.01]	3.41 [1.55]
Δln Y_{CHE}	-1.40 [0.72]	-0.29 [0.15]	2.37 [1.24]	1.12 [0.60]				
Δ POS	-1.77 [1.43]							
Δ NEG	-1.04 [0.96]	-2.16 [2.12]	-3.14 [3.07]	-2.14 [2.08]	1.12 [1.13]	1.54 [1.54]	1.33 [1.34]	0.72 [0.74]
Panel B: Long-run Estimates								
Constant	25.39 [2.31]							
Ln Y_{US}	-2.89 [1.47]							
ln Y_{CHE}	-3.66 [2.04]							
POS	4.13 [2.44]							
NEG	0.68 [9.74]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	3.35	-0.38 [4.11]	1.16	0.01	S	S	0.36	

Table57: US vs. UK

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		-0.42 [5.68]	-0.38 [4.68]	-0.15 [1.75]	0.20 [2.32]	0.08 [0.94]	-0.19 [2.30]	-0.14 [1.96]
Δln Y_{US}	1.40 [1.29]							
Δln Y_{UK}	0.90 [0.99]	-0.56 [0.62]	-0.28 [0.32]	0.64 [0.76]	-2.94 [3.48]			
Δln REX	0.05 [0.32]	-0.19 [1.22]	0.09 [0.55]	0.03 [0.17]	-0.28 [1.87]	0.50 [3.35]		
Panel B: Long-run Estimates								
Constant	0.01 [0.35]							
Ln Y_{US}	0.81 [1.41]							
Ln Y_{UK}	-1.38 [1.64]							
Ln REX	0.13 [0.72]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	1.88	-0.08 [2.76]	9.38	0.09	S	S	0.51	

Table58: US vs. UK. Appreciation vs. Depreciation

Panel A: Short-run Estimates								
Lags								
	0	1	2	3	4	5	6	7
Δln TB		-0.37 [4.99]	-0.36 [4.47]	-0.09 [1.07]	0.19 [2.33]	0.06 [0.65]	-0.18 [2.31]	-0.15 [2.14]
Δln Y_{US}	1.24 [1.11]	-0.01 [0.06]	-0.02 [0.01]	-4.33 [3.79]				
Δln Y_{UK}	0.91 [0.99]	0.32 [0.33]	0.63 [0.67]	1.44 [1.60]	-2.41 [2.85]			
Δ POS	0.20 [0.31]							
Δ NEG	-0.08 [0.11]							
Panel B: Long-run Estimates								
Constant	-7.18 [1.83]							
Ln Y_{US}	10.09 [2.23]							
ln Y_{UK}	-7.66 [2.00]							
POS	-0.09 [0.09]							
NEG	2.70 [2.06]							
Panel C: Diagnostic Statics								
	F	ECM_{t-1}	LM	RESET	CUSM	$CUSM^2$	R^2	
	3.43	-0.17 [4.19]	5.58	0.03	S	S	0.52	

Table 59: Short-Run and Long-Run Coefficient Estimates of Linear ARDL Model.

Industries (Trade Shares)	Short-Run Coefficient Estimates				Long-Run Coefficient Estimates			
	$\Delta\ Ln\ REX_t$	$\Delta LnREX_{t-1}$	$\Delta Ln\ REX_{t-2}$	$\Delta Ln\ REX_{t-3}$	Constant	$Ln\ Y_{U.S}$	$Ln\ Y_{CANADA}$	$Ln\ REX$
001-Live animal (0.37%)	0.56 [0.69]				-4.80 [2.81]	-2.29 [0.71]	3.93 [1.14]	0.34 [0.31]
011-Meat, fresh, chilled or frozen (0.64%)	0.34 [0.48]	-0.93 [1.14]			4.94 [2.33]	-0.79 [0.31]	-0.18 [0.06]	4.21 [2.97]**
012-Meat, dried, salted or smoked (0.02%)	-1.09 [1.46]	-1.85 [2.44]**			-24.81[0.83]	6.30 [0.90]	-6.53 [0.91]	11.35 [0.61]
013-Meat in airtight containers n.e.s. (0.17%)	-0.97 [2.2]**	-0.93 [1.69]*			3.48 [4.73]	-6.91 [5.84]**	5.83 [4.68]**	1.69 [3.04]**
022-Milk and cream (0.03%)	-0.87 [0.40]				1.51 [0.62]	0.66 [0.15]	-1.22 [0.27]	-0.42 [0.25]
024-Cheese and curd (0.01%)	-0.39 [0.58]				2.84 [2.12]	-1.78 [0.70]	0.96 [0.36]	2.21 [2.28]**
025-Eggs (0.03%)	-0.27 [0.35]	-2.52 [2.35] **			3.94 [1.22]	-3.09 [0.85]	2.07 [0.54]	2.27 [1.29]
031-Fish, fresh & simply preserved (0.48%)	0.19 [0.62]				6.86 [4.59]	1.70 [0.54]	-3.03 [0.92]	1.18 [0.69]
032-Fish, in airtight containers, n.e.s (0.08%)	0.51 [0.78]				-0.03 [0.02]	-1.80 [0.60]	1.89 [0.61]	2.17 [1.57]
044-Maize corn, unmilled (0.07%)	-0.52 [0.51]	-0.64 [0.61]	2.23 [2.03]**		-6.83 [1.84]	-3.12 [0.77]	4.68 [1.08]	-1.86 [0.91]
045-Cereals, unmilled excl. wheat, rice (0.08%)	-0.09 [0.08]				-6.90 [6.51]	5.24 [2.73]**	-2.96 [1.48]	0.38 [0.53]
046-Meal and flour of wheat (0.03%)	-1.30 [0.84]	-1.12 [0.59]	-0.81 [0.42]		6.08 [2.19]	1.94 [0.53]	-3.09 [0.78]	4.71 [2.81]**
047-Meal & flour of cereals, except wheat (0.02%)	0.61 [1.21]				-2.35 [2.83]	3.86 [2.24]**	1.13 [0.59]	1.56 [2.91]**
048-Cereal preps & preps of flour (0.78%)	-0.04 [0.14]	-1.45 [3.16]**			-6.73 [2.32]	-5.78 [4.08]**	7.36 [3.86]**	2.89 [2.15]**
051-Fruit, fresh, and nuts excl. Oil nuts (0.003%)	-0.27 [0.68]				-2.52 [3.12]	-1.33 [0.93]	1.30 [0.87]	0.62 [1.04]
052-Dried fruit including artificially (0.01%)	-0.14 [0.07]				-15.39 [9.68]	-7.87 [2.34]**	10.31 [2.98]**	0.78 [0.62]
053-Fruit, preserved and fruit preparation (0.27%)	-0.42 [1.08]				-5.37 [5.18]	6.37 [4.71]**	-5.37 [3.63]**	-0.03 [0.06]
054-Vegetables, roots & tubers, fresh (0.68%)	-0.22 [0.63]	-0.94 [2.40]**			-6.65 [5.42]	1.93 [1.23]	-0.52 [0.32]	2.21 [2.75]**
055-Vegetables, roots & tubers preserved (0.98%)	0.34 [0.57]				0.02 [0.01]	-2.82 [0.56]	2.69 [0.46]	3.95 [1.19]
061-Sugar and honey (0.08%)	0.30 [0.41]				1.21 [1.53]	2.68 [1.87]*	-2.86 [1.92]*	-0.02 [0.03]
062-Sugar confectionery, sugar preparation (0.12%)	-0.46 [0.56]				1.97 [0.79]	6.79 [1.71]*	-7.08 [1.67]*	1.97 [1.21]
071-Coffee (0.17%)	-0.88 [0.44]				-10.14 [3.11]	1.95 [0.28]	0.18 [0.02]	0.37 [0.15]
072-Cocoa (0.02%)	0.17 [0.12]				7.60 [2.89]	1.03 [5.24]**	-2.93 [5.16]**	-3.50 [3.08]**
073-Chocolate & other food preparations (0.26%)	0.42 [0.74]				1.09 [1.05]	2.99 [1.39]	-3.10 [1.38]	0.68 [0.75]
074-Tea and mate (0.01%)	0.37 [0.41]	-1.53 [1.69]*			-4.17 [0.41]	-1.18 [2.17]**	2.31 [2.08]**	-6.27 [2.39]**
075-Spices (0.007%)	0.62 [0.76]	-0.72 [0.77]	1.83 [1.99]**		-1.31 [0.35]	4.54 [0.87]	-4.51 [0.77]	4.75 [2.64]**
081- Feed. Stuff for animals' excl. unmilled (0.55%)	-0.22 [0.78]	-0.14 [0.46]	0.52 [1.72]*	0.82 [2.68]**	-0.97 [1.11]	2.67 [2.19]**	-2.51 [1.99]**	-1.06 [1.34]
099-Food preparations, n.e.s. (0.57%)	-0.37 [0.39]				-3.73 [1.81]	2.50 [0.63]	-1.90 [0.46]	2.13 [1.28]
111-Nonalcoholic beverages, n.e.s. (0.13%)	0.17 [0.15]				20.54 [1.80]	-12.89 [1.13]	7.78 [0.66]	3.50 [2.20]**
112-Alcoholic beverages (0.22%)	0.02 [0.05]	-0.81 [1.68]*	-0.002 [0.04]	-0.92 [1.94]*	16.74 [3.51]	-2.37 [1.17]	-1.27 [0.58]	2.01 [1.85]*
121-Tobacco, unmanufactured (0.01%)	1.43 [0.94]				-8.69 [2.22]	-5.46 [0.75]	7.69 [1.01]	6.01 [2.13]**
122-Tobacco manufactures (0.01%)	-1.19 [1.28]				-5.93 [1.48]	-0.28 [0.04]	1.96 [0.32]	-4.79 [1.74]*
211-Hides & skins, exc. fur skins undressed (0.007%)	-0.03 [0.04]				-9.91 [8.41]	2.63 [1.11]	-0.02 [0.008]	-2.73 [2.78]**
212-Fur skins, undressed (0.06%)	-0.62 [1.07]				2.65 [2.66]	12.17 [6.51]**	-12.72 [6.49]**	-2.16 [3.04]**
221-Oil seeds, oil nuts and oil kernels (0.21%)	-0.39 [0.47]	0.70 [0.62]	0.12 [0.12]		-6.62 [7.97]	3.64 [2.24]**	-1.71 [1.02]	-3.14 [4.11]**
231-Crude rubber incl. synthetic (0.08%)	0.83 [3.95]**	-0.22 [0.98]	-0.04 [0.19]	-0.53 [2.38]**	3.91 [3.59]	-4.42 [2.95]**	3.31 [2.19]**	1.89 [2.52] **
241-Fuel wood & charcoal (0.02%)	-0.06 [0.11]	-1.63 [2.89]**			-2.65 [1.07]	-2.04 [0.65]	2.85 [0.88]	4.16 [2.82]**
242-Wood in the rough or roughly squared (0.07%)	0.45 [0.83]				-0.36 [0.13]	0-.29 [0.05]	0.09 [0.01]	3.24 [0.81]
243-Wood, sharped or simply worked (0.92%)	0.63 [1.99]**				5.95 [5.16]	0.11 [0.07]	-0.99 [0.66]	1.62 [3.05]**
251-Pulp & waste paper (0.41%)	-0.73 [1.87]*				6.48 [6.72]	0.21 [0.15]	-1.22 [0.81]	1.81 [3.26]**
262-Wool and other animal hair (0.0004%)	-0.64 [0.57]	2.45 [2.15]**			-4.04 [0.72]	11.56 [1.69]*	-10.65 [1.44]	-2.47[0.83]
263-Cotton (0.001%)	1.20 [1.53]	4.79 [2.90]**	3.49 [2.06]**	3.05 [2.01]**	-11.56 [7.74]	14.22 [5.02]**	-12.49 [4.31]**	-5.5 [3.69]**
265-Vegetable fibers, except cotton (0.001%)	0.76 [0.26]	-0.14 [0.04]	0.65 [0.19]	4.84 [1.54]	-21.47[3.21]	-3.84 [3.53]**	9.17 [3.69]**	8.08 [2.48]**

266-Synthetic and regenerated artificially (0.02%)	-0.48 [0.56]				-7.05 [0.38]	-4.35 [0.74]	5.31 [0.73]	-6.26 [0.43]
267-Waste materials from textile fabric (0.01%)	0.06 [0.14]	-2.13 [3.69]**	-1.91 [3.36]**	-1.92 [3.93]**	-2.1 [2.72]	-0.57 [0.58]	0.59 [0.57]	2.45 [4.72]**
273-Stone, sand and gravel (0.07%)	-0.04 [0.12]	-1.09 [2.48]**	-0.53 [1.32]		5.47 [2.91]	-1.40 [0.71]	0.18 [0.08]	3.78 [3.38]**
274-Sulphur & unroasted iron pyrites (0.01%)	-1.40 [1.36]	-0.65 [0.61]	1.28 [1.19]	-1.98 [1.19]	8.82 [3.05]	-2.97 [6.42]**	1.73 [5.81]**	0.98 [0.49]
275-Natural abrasives incl. industrial (0.002%)	0.67 [0.64]				0.57 [0.51]	9.90 [4.27]**	-10.59 [4.41]**	0.28 [0.32]
276-Other crude minerals (0.16%)	0.02 [0.07]	1.04 [3.18]**			1.02 [0.95]	4.01 [3.02]**	-4.17 [3.13]**	-1.71[2.99]**
281-Iron ore & concentrates (0.22%)	-0.91 [1.66]*				13.23 [5.89]	8.89 [1.62]	-11.8 5[2.04]**	-2.15[1.51]
282-Iron and steel scrap (0.24%)	-0.98 [1.82]*				-5.04 [8.83]	-1.31 [1.11]	2.61 [2.12]**	-0.76[1.71]*
283-Ores & concentrates of non-ferrous (0.16%)	-0.28 [0.31]				7.78 [4.25]	-11.49 [4.93]**	9.38 [3.91]**	2.56 [2.76]**
284-Non-ferrous metal scrap (0.28%)	-0.05 [0.09]				0.12 [0.09]	-3.98 [1.45]	4.04 [1.37]	0.18 [0.26]
291-Crude animal materials, n.e.s. (0.03%)	-0.20 [0.35]				4.99 [2.24]	8.34 [2.06]**	-9.43 [2.23]**	0.13 [0.08]
292-Crude vegetable materials, n.e.s. (0.12%)	-0.25 [0.78]				-0.20 [0.37]	3.77 [3.43]**	-3.69 [3.22]**	0.18 [0.33]
321-Coal, coke & briquettes (0.17%)	-0.62 [1.72]*	0.73 [1.91]*	0.47 [1.16]	1.44 [3.67]**	-8.95 [6.60]	10.31 [7.81]**	-8.41 [7.81]**	-2.01 [3.76]**
332-Petroleum products (4.55%)	-1.01 [2.16]**				16.37 [1.06]	3.82 [0.29]	-7.27 [0.45]	5.85 [1.49]
341-Gas, natural and manufactured (3.08%)	2.05 [1.41]				9.81 [2.19]	-14.46 [2.11]**	12.72 [1.74]*	4.66 [1.74]*
411-Animal oils and fats (0.02%)	0.68 [1.25]	0.92 [1.35]	-0.97 [1.62]		-5.46 [5.40]	-4.93 [3.65]**	6.09 [4.31]**	-1.57[2.43]**
421-Fixed vegetable oils, soft (0.27%)	-0.89 [0.98]	-0.29 [0.32]	-0.09 [0.11]	2.33 [2.57]**	-6.00 [1.08]	-10.47 [0.71]	11.67 [0.74]	-3.72 [0.68]
431-Animal and veg. Oils & fats, processed (0.02%)	0.17 [0.12]				-6.46 [0.96]	-1.41 [0.13]	2.68 [0.23]	2.82 [0.68]
512-Organic chemicals (1.37%)	0.06 [0.18]				-4.18 [3.72]	-5.07 [2.69]**	5.98 [3.02]**	0.18 [0.26]
513-Inorg. Chemical elements, oxides (0.36%)	0.03 [0.12]				1.78 [1.01]	-4.06 [2.19]**	3.82 [1.86]*	0.68 [0.82]
514-Other inorganic chemicals (0.19%)	0.31 [1.28]				1.27 [0.59]	1.26 [0.38]	-1.45 [0.44]	1.20 [0.92]
515-Radioactive and associated material (0.09%)	2.06 [2.18]**				-4.39 [1.92]	-7.29 [4.15]**	8.53 [4.52]**	2.27 [1.97]**
521-Crude chemicals from coal, petroleum (0.04%)	-0.13 [0.14]	-3.06 [2.71]**			-5.20 [1.98]	-6.63 [3.42]**	7.77 [3.53]**	4.22 [2.19]**
531-Synth. Organic dyestuffs, natural (0.02%)	-0.01 [0.20]				-8.01 [1.78]	7.29 [0.83]	-5.71 [0.60]	2.32 [0.87]
532-Dyeing & tanning extracts, synthetic (0.003%)	-1.98 [1.40]				-5.73 [1.53]	7.99 [3.31]**	-7.10 [2.91]**	1.46 [1.14]
533-Pigments, paints, varnishes & relatives (0.39%)	-0.03 [0.09]	-1.05 [2.30]**	-0.41 [0.92]	0.61 [1.52]	-8.62 [7.16]	-3.96 [2.64]**	5.64 [3.54]**	1.48 [1.86]*
541-Medicinal & pharmaceutical products (1.26%)	-0.03[0.006]				-10.55 [9.15]	2.82 [1.19]	-0.53 [0.22]	0.28 [0.31]
551-Essential oils, perfume and flavor (0.08%)	-0.07 [0.15]				-2.25 [1.10]	4.27 [1.53]	-4.12 [4.12]**	-1.16 [1.02]
553-Perfumery, cosmetics, dentifrices (0.46%)	0.24 [0.29]				-6.84 [4.20]	-0.56 [0.19]	1.93 [0.63]	1.86 [1.76]*
554-Soaps, cleansing & polishing preparations (0.36%)	0.35 [1.01]				-2.70 [1.42]	-6.82 [2.24]**	7.15 [2.28]**	2.53 [2.48]**
561-Fertilizers manufactured (0.66%)	2.51 [3.36]**	0.97 [1.19]	1.90 [2.61]**		4.14 [7.54]	-3.71 [5.29]**	3.04 [4.43]**	0.88 [2.28]**
571-Explosives and pyrotechnic products (0.05%)	0.59 [0.52]				8.77 [2.26]	13.49 [1.81]*	-15.41 [1.95]*	1.99 [0.56]
581-Plastic materials, regenerd. Cellulose (2.53%)	0.35 [1.01]				-8.45 [3.77]	-9.88 [1.68]*	11.51 [2.01]**	3.56 [1.96]**
599-Chemical materials and products, n.e.s. (1.04%)	-0.24 [0.76]				-6.63 [2.83]	0.73 [1.17]	0.54 [0.83]	-0.31 [1.29]
611-Leather (0.003%)	1.70 [2.28]**	2.41 [2.88]**	1.91 [2.27]**		5.53 [0.32]	-8.76 [0.53]	6.44 [0.49]	-2.71 [0.10]
612-Manuf. of leather or of artificial (0.01%)	0.59 [1.17]				-1.55 [1.06]	-5.20 [2.48]**	5.43 [2.46]**	2.28 [2.92]**
613-Fur skins, tanned or dressed, including (0.001%)	1.68 [2.42]**	-1.62 [1.83]*	-1.65 [1.97]**		0.37 [0.16]	-1.53 [0.41]	1.22 [1.32]	8.72 [4.13]**
629-Articles of rubber, n.e.s (0.75%)	0.46 [0.87]				-3.43 [4.11]	-8.95 [6.54]**	9.67 [6.86]**	1.25 [2.48]**
631-Veneers, plywood boards & other woods (0.32%)	0.47 [0.89]	-1.09 [1.89]*			2.29 [1.49]	1.55 [0.68]	-1.82 [0.76]	3.52 [3.74]**
632-Wood manufactures, n.e.s. (0.40%)	0.45 [1.45]				4.31 [3.66]	-2.23 [1.13]	1.24 [0.64]	5.03 [5.42]**
633-Cork manufactures (0.001%)	0.59 [0.45]				-2.87 [0.92]	-4.57 [3.23]**	4.50 [3.01]**	2.26 [1.27]
641-Paper and paperboard (1.31%)	0.10 [0.52]	-0.51 [2.39]**			8.06 [9.27]	-3.93 [2.98]**	2.31 [1.67]**	1.87 [3.48]**
642-Articles of paper, pulp, paperboard (0.71%)	0.36 [1.15]				-5.41 [6.27]	-2.01 [1.82]*	3.16 [2.69]**	1.69 [3.27]**
651-Textile yarn and thread (0.10%)	0.14 [0.23]				-5.65 [2.34]	8.44 [2.56]**	-7.03 [2.11]**	1.17 [0.90]
652-Cotton fabrics, woven ex. narrow (0.006%)	0.61 [0.59]				6.09 [0.24]	-4.75 [0.27]	2.57 [0.26]	5.66 [0.32]
653-Text fab woven ex narrow, spec,not cotton(0.08%)	-0.68 [1.09]				-7.98 [3.91]	5.24 [3.29]**	-13.55 [4.39]**	0.57 [0.46]
654- Tulle, lace, embroidery, ribbon, timming(0.009%)	-0.46 [0.89]	-0.92 [1.68]*			-10.24 [5.49]	-4.68 [3.26]**	6.88 [4.57]**	1.87 [2.64]**

655-Special textile fabrics and related (0.18%)	-0.41 [1.14]				-3.52 [3.01]	1.77 [0.64]	-1.10 [0.39]	0.67 [0.44]
656-Made up articles, wholly or chiefly (0.07%)	-0.27 [0.62]	-1.04 [1.99]**	0.81 [1.61]		-5.50 [2.12]	-4.62 [1.32]	5.66 [1.55]	3.71 [2.23]**
657-Floor coverings, tapestries, etc. (0.11%)	0.46 [0.73]				0.01 [0.005]	-2.53 [0.45]	2.06 [0.35]	5.42 [2.36]**
661-Lime, cement & fabr. bldg.mat. Ex g (0.20%)	0.26 [0.60]				5.55 [3.58]	-3.51 [1.66]*	2.37 [1.03]	3.02 [3.37]**
662-Clay and refractory construction ma (0.04%)	0.07 [0.07]	-1.04 [2.63]**			-2.76 [4.01]	1.67 [1.53]	-1.36 [1.19]	1.83 [3.49]**
663-Mineral manufactures, n.e.s. (0.22%)	0.25 [0.71]				1.47 [0.25]	1.06 [0.21]	-1.70 [0.27]	2.53 [1.38]
664-Glass (0.22%)	0.41 [0.72]				1.5 3 [0.15]	1.78 [0.84]	-2.42 [1.04]	1.32 [2.17]**
665-Glassware (0.07%)	1.17 [1.33]				-7.80 [3.55]	-12.0 4 [3.04]**	13.37 [3.24]**	4.03 [2.67]**
666-Pottery (0.007%)	1.53 [1.82]*				5.08 [1.58]	-3.0 5 [0.81]	1.30 [0.32]	4.21 [2.69]**
667-Pearls and precious and semi precious (0.06%)	-0.81 [0.82]				-5.75 [1.32]	-0.98 [0.11]	2.23 [0.24]	1.01 [0.23]
671-Pig iron, spiegeleisen, sponge iron (0.06%)	0.11 [0.30]				-0.78 [1.79]	0.18 [0.29]	0.09 [0.14]	0.04 [0.16]
672-Ingots & other primary forms of iron (0.25%)	0.97 [0.85]				2.59 [0.87]	-13.03 [3.01]**	12.64 [2.77]**	1.33 [0.77]
673-Iron and steel bars, rods, angles (0.41%)	1.15 [2.03]**	-1.61 [2.32]**			3.03 [2.53]	-2.36 [4.27]**	11.62 [7.35]**	3.91 [5.90]**
674-Universals, plates and sheets of iron (0.75%)	1.39 [2.16]**				4.85 [3.06]	-7.60 [3.37]**	6.42 [2.68]**	2.16 [2.65]**
676-Rails,railway track constr materials of iron(0.03%)	0.48 [0.61]				-2.94 [0.85]	-7.26 [1.50]	7.53 [1.46]	7.53 [1.46]
677-Iron and steel wire, excluding wire (0.05%)	0.18 [0.41]	-1.06 [2.28]**			2.97 [1.93]	-12.02 [7.11]**	11.53 [6.24]**	2.06 [2.83]**
678-Tubes, pipes and fittings of iron (0.52%)	-0.41 [0.80]				-1.75 [1.56]	-6.37 [4.12]**	6.66 [4.03]**	0.14 [0.22]
679-Iron steel castings forgings unwork (0.06%)	0.13 [0.21]				-6.06 [4.85]	12.88 [5.57]**	-11.73 [4.84]**	0.92 [1.06]
681-Silver and platinum group metals (0.25%)	0.48 [0.41]				5.56 [1.92]	-1.37 [1.31]	0.34 [0.31]	1.85 [4.35]**
682-Copper (0.51%)	-0.11 [0.19]				3.22 [4.01]	1.11 [0.67]	-1.59 [0.91]	-0.04 [0.06]
683-Nickel (0.16%)	-0.52 [0.93]	-3.05 [5.35]**	-2.51 [3.75]**		4.23 [5.43]	-1.14 [1.11]	0.76 [0.69]	0.27 [0.61]
684-Aluminium (1.25%)	0.33 [0.97]				1.67 [1.36]	0.91 [0.51]	-1.03 [0.54]	0.39 [0.51]
685-Lead (0.09%)	-1.29 [0.89]				-0.17 [0.06]	2.35 [0.41]	-1.47 [0.25]	3.32 [1.52]
686-Zinc (0.16%)	-0.04 [0.09]				-1.01 [1.46]	-12.30 [9.87]**	3.34 [2.24]**	0.13 [0.27]
687-Tin (0.007%)	-0.35 [0.19]				-9.69 [4.94]	14.54 [4.10]**	-12.15 [3.28]**	-4.96 [3.49]**
689-Miscell.non ferrous base metals (0.05%)	0.72 [1.32]				-2.62 [2.45]	0.01 [0.006]	0.44 [0.21]	1.82 [2.34]**
691-Finished structural parts and structures (0.28%)	0.82 [1.39]				-1.93 [0.65]	0.31 [0.08]	0.06 [0.01]	4.82 [2.66]**
692-Metal containers for storage and truck (0.18%)	-0.33 [0.71]				-0.05 [0.32]	4.21 [1.43]	-4.49 [1.44]	0.88 [0.81]
693-Wire products ex electric & fence (0.07%)	0.21 [0.45]				5.88 [2.11]	-3.97 [0.95]	2.49 [0.54]	2.71 [1.61]
694-Nails, screws, nuts, bolts, rivets (0.20%)	0.27 [0.74]	-1.01 [2.47]**			4.92 [2.92]	-10.10 [5.13]**	8.81 [4.22]**	3.01 [3.29]**
695-Tools for use in the hand or in machines (0.21%)	-0.23 [0.88]	-0.27 [0.93]	0.35 [1.22]	-0.68 [2.52]**	-4.57 [5.04]	0.31 [0.22]	0.41 [0.29]	1.15 [1.59]
696-Cutlery (0.02%)	-0.33 [0.24]				0.48 [3.30]	6.73 [1.39]	-7.75 [1.54]	6.84 [3.30]**
697-Household equipment of base metals (0.08%)	0.13 [0.28]	-1.53 [2.69]**			-4.23 [2.54]	-3.34 [1.60]	4.24 [1.92]**	3.56 [3.61]**
698-Manufactures of metal, n.e.s. (0.71%)	-0.05 [0.18]				0.62 [0.57]	-3.74 [2.94]**	3.57 [2.59]**	1.01 [1.84]*
711-Power gen machinery, not electronics (1.98%)	-0.28 [0.80]				-0.76 [1.31]	0.07 [0.11]	0.06 [0.04]	0.88 [2.40]**
712-Agricultural machinery and implements (0.64%)	-0.35 [1.44]				0.62 [1.48]	0.04 [0.49]	-0.33 [0.46]	-0.13 [0.43]
714-Office machines (0.54%)	-0.14 [0.44]				3.83 [0.55]	5.85 [0.65]	-6.91 [0.67]	-0.89 [0.29]
715-Metalworking machinery (0.64%)	0.37 [1.08]				-4.97 [6.04]	1.93 [1.69]*	-0.89 [0.72]	0.77 [1.94]*
717-Textile and leather machinery (0.09%)	-0.61 [1.09]				4.08 [0.34]	5.91 [0.27]	-6.42 [0.34]	8.68 [0.28]
718-Machines for special industries (0.05%)	-0.13 [0.36]	-0.83 [1.94]*			-4.93 [7.33]	-2.94 [3.01]**	3.79 [3.69]**	1.66 [3.88]**
719-Machinery and appliances non electronics (4.33%)	0.05 [0.24]	-0.39 [1.45]			-2.15 [2.08]	-1.36 [1.24]	1.73 [1.45]	1.84 [3.57]**
722-Electric power machinery and switch (1.05%)	-0.12 [0.45]	-0.41 [1.39]			-2.64 [3.85]	-5.77 [6.57]**	6.22 [6.72]	1.16 [2.95]**
723-Equipment for distributing electric (0.33%)	0.16 [0.31]				1.63 [1.16]	1.74 [0.70]	-2.41 [0.92]	1.48 [1.43]
724-Telecommunications apparatus (0.68%)	0.29 [0.73]				-0.05 [0.03]	0.64 [0.22]	-0.70 [0.24]	2.48 [1.25]
725-Domestic electrical equipment (0.21%)	0.46 [1.06]				-4.20 [3.86]	-2.57 [1.32]	3.13 [1.54]	3.83 [4.29]**
726-Elec. apparatus for medical purposes (0.10%)	-0.03 [0.05]				-1.33 [0.24]	5.58 [0.72]	-5.59 [0.64]	4.01 [1.33]
729-Other electrical machinery and apparatus (1.23%)	0.19 [0.62]				-3.21 [3.55]	1.10 [0.87]	-0.52 [0.39]	0.79 [1.52]

731-Railway vehicles (0.19%)	-0.56 [0.78]	2.29 [3.06]**			-12.80 [2.01]	-4.61 [1.78]*	6.90 [1.89]*	-4.22 [0.93]
732-Road motor vehicles (15.06%)	0.10 [0.61]	-0.52 [3.09]**			1.36 [2.97]	1.63 [2.75]**	-1.86 [2.89]**	0.88 [3.58]**
733-Road vehicles other than motor vehicles (0.52%)	0.28 [0.72]	-0.48 [0.93]			-1.25 [3.01]	-1.87 [2.97]**	1.69 [2.54]**	3.13 [3.36]**
734-Aircraft (1.21%)	-4.76 [2.41]**	7.78 [3.77]**			-9.50 [1.38]	2.78 [1.05]	-9.44 [0.74]	-6.23 [1.24]
735-Ships and boats (0.14%)	1.20 [1.89]*				6.07 [3.40]	3.93 [1.47]	-5.42 [1.89]*	3.45 [3.32]**
812-Sanitary, plumbing, heating & light (0.25%)	0.24 [0.55]				-8.72 [3.16]	-2.14 [0.47]	3.75 [0.82]	3.58 [1.52]
821-Furniture (1.01%)	0.29 [0.77]				4.87 [2.73]	-1.15 [0.37]	0.09 [0.02]	2.38 [2.06]**
831-Travel goods, handbags and similar (0.04%)	-0.10 [0.22]				8.88 [2.57]	-3.57 [1.04]	1.48 [0.39]	4.47 [2.29]**
841-Clothing except fur clothing (0.25%)	0.03 [0.09]	-0.55 [1.28]			7.46 [2.96]	7.18 [2.54]**	-8.93 [2.81]**	5.17 [3.88]**
842-Fur clothing and articles of artificial (0.003%)	0.02 [0.10]	-1.12 [1.14]			7.01 [2.63]	7.76 [2.52]**	-8.84 [2.35]**	3.91 [2.84]**
851-Footwear (0.03%)	0.74 [1.26]				18.67 [2.27]	10.30 [1.15]	-14.47 [1.39]	6.24 [1.66]*
861-Scientific, medical, optical, meas. (1.11%)	0.23 [0.24]				-6.91 [6.97]	-3.12 [2.25]**	4.44 [3.01]**	0.52 [0.96]
862-Photographic and cinematographic supply (0.02%)	0.68 [0.99]	1.28 [1.75]*	2.01 [2.72]**		-0.66 [0.22]	-7.20 [1.18]	7.15 [1.14]	-3.33 [0.84]
863-Developed cinematographic film (0.001%)	-0.86 [0.57]	-2.84 [1.64]*	-0.94 [0.54]	2.74 [1.64]*	0.46 [0.02]	6.29 [0.79]	-16.46 [0.74]	5.45 [0.92]
864-Watches and clocks (0.01%)	1.71 [2.46]**				-3.48 [2.17]	3.99 [2.08]**	-3.59 [1.70]*	2.64 [3.33]**
891-Musical instruments, sound recorder (0.22%)	-0.78 [1.45]	-1.51[2.63]**			-4.89 [9.51]	-0.48 [0.61]	1.26 [1.50]	1.45 [4.23]**
892-Printed matter (0.52%)	0.41 [1.48]				-0.73 [0.31]	-1.98 [0.92]	1.92 [0.79]	3.76 [3.07]**
893-Articles of artificial plastic mate (1.11%)	0.03 [0.07]				-2.85 [2.73]	-5.45 [3.06]**	5.96 [3.21]**	2.60 [3.49]**
894-Perambulators, toys, games and sports (0.23%)	0.12 [0.11]				1.39 [0.82]	2.90 [1.38]	-3.35 [1.46]	1.27 [1.52]
895-Office and stationery supplies, n.e.s. (0.02%)	1.04 [2.05]**				-1.87 [0.86]	-5.97 [1.36]	5.69 [1.26]	2.74 [1.61]
896-Works of art, collectors pieces (0.02%)	0.05 [0.15]				4.01 [1.87]	-2.89 [4.02]**	11.95 [3.55]**	4.39 [3.26]**
897-Jewellery and gold/silver smiths (0.20%)	0.85 [1.01]				0.51 [0.11]	3.97 [0.59]	-4.42 [0.61]	5.47 [2.26]**
899-Manufactured articles, n.e.s. (0.18%)	1.21 [1.67]*				-3.41 [1.54]	1.32 [0.39]	-0.81 [0.22]	1.86 [1.51]
931-Special transact not classed accor to kind (4.41%)	2.11 [2.63]**				5.6 2 [2.48]	11.32 [2.81]**	-12.46 [2.95]**	2.39 [1.49]

Notes: Numbers inside the brackets are absolute values of the t-ratios. The critical value of standard t-ratio is 1.64 (1.96) at the 10% (5%) significance level.
* indicates significance at the 10% level and ** at the 5% level. n.e.s. = not elsewhere specified.

Table 60: Diagnostic Statistics Associated with Linear ARDL Model.

Industries (Trade Shares)	Diagnostics						
	F	ECM_{t-1}	*LM*	*RESET*	*CUSUM*	*CUSUMSQ*	Adj. R^2
001-Live animal (0.37%)	5.52**	-0.53 [4.79]**	0.82	0.003	S	S	0.32
011-Meat, fresh, chilled or frozen (0.64%)	5.16**	-0.41 [4.53]**	0.009	0.07	S	S	0.33
012-Meat, dried, salted or smoked (0.02%)	2.44	-0.05 [3.19]	0.03	0.008	S	S	0.18
013-Meat in airtight containers n.e.s. (0.17%)	8.64**	-0.64 [6.11]**	0.38	0.02	S	S	0.52
022-Milk and cream (0.03%)	2.57	-0.43 [2.95]	5.98**	1.87	S	NS	0.19
024-Cheese and curd (0.01%)	2.06	-0.28 [2.77]	0.01	0.98	S	S	0.17
025-Eggs (0.03%)	3.76	-0.48 [4.03]**	0.13	6.11**	S	S	0.43
031-Fish, fresh & simply preserved (0.48%)	1.41	-0.16 [2.42]	0.19	4.66**	S	S	0.09
032-Fish, in airtight containers, n.e.s (0.08%)	2.84	-0.45 [3.50]*	0.11	5.38**	S	S	0.28
044-Maize corn, unmilled (0.07%)	6.82**	-0.43 [5.41]**	4.79**	0.09	S	NS	0.41
045-Cereals, unmilled excl. wheat, rice (0.08%)	6.34**	-0.96 [5.21]**	0.23	2.91	S	S	0.49
046-Meal and flour of wheat (0.03%)	2.42	-0.42 [3.21]	0.31	2.09	S	S	0.27
047-Meal & flour of cereals, except wheat (0.02%)	4.73**	-0.73 [4.52]**	0.006	0.002	S	S	0.42
048-Cereal preps & preps of flour (0.78%)	6.56**	-0.64 [5.56]**	0.49	17.38**	S	S	0.49
051-Fruit, fresh, and nuts excl. Oil nuts (0.003%)	5.35**	-0.56 [4.73]**	0.02	1.61	S	S	0.29
052-Dried fruit including artificially (0.01%)	2.89	-0.72 [3.52]*	1.01	0.13	S	S	0.36
053-Fruit, preserved and fruit preparation (0.27%)	5.32**	-0.53 [4.77]**	0.56	0.34	S	S	0.45
054-Vegetables, roots & tubers, fresh (0.68%)	6.41**	-0.40 [5.21]**	0.89	5.51**	S	S	0.49
055-Vegetables, roots & tubers preserved (0.98%)	5.27**	-0.28 [4.78]**	4.62**	0.38	S	NS	0.43
061-Sugar and honey (0.08%)	6.01**	-0.87 [5.07]**	0.49	0.07	S	S	0.47
062-Sugar confectionery, sugar preparation (0.12%)	4.73**	-0.32 [4.45]**	0.48	3.65*	NS	S	0.32
071-Coffee (0.17%)	3.82	-0.51 [4.04]**	4.18**	6.76**	NS	S	0.21
072-Cocoa (0.02%)	5.77**	-0.87 [5.03]**	0.01	0.26	S	S	0.48
073-Chocolate & other food preparations (0.26%)	3.43	-0.44 [3.85]**	2.96*	0.11	S	S	0.21
074-Tea and mate (0.01%)	6.73**	0.13 [5.32]**	2.31	1.91	S	S	0.34
075-Spices (0.007%)	3.23	-0.39 [3.75]*	0.31	0.72	S	S	0.46
081- Feed. Stuff for animals' excl. unmilled (0.55%)	3.62	-0.41 [3.96]**	1.51	0.11	S	S	0.26
099-Food preparations, n.e.s. (0.57%)	3.07	-0.41 [3.51]*	0.15	0.79	S	S	0.17
111-Nonalcoholic beverages, n.e.s. (0.13%)	4.89**	-0.18 [4.49]**	0.24	7.57**	S	S	0.44
112-Alcoholic beverages (0.22%)	3.97	-0.42 [4.16]**	0.89	11.54**	S	S	0.53
121-Tobacco, unmanufactured (0.01%)	2.56	-0.35 [3.22]	0.17	2.31	S	S	0.18
122-Tobacco manufactures (0.01%)	5.49**	-0.29 [4.87]**	2.48	15.76**	S	S	0.41
211-Hides & skins, exc. fur skins undressed (0.007%)	4.98**	-0.52 [4.61]**	0.11	0.17	S	S	0.27
212-Fur skins, undressed (0.06%)	3.95	-0.47 [4.04]**	1.34	0.005	S	S	0.33
221-Oil seeds, oil nuts and oil kernels (0.21%)	1.47	-0.43 [2.46]	0.02	0.12	S	S	0.18
231-Crude rubber incl. synthetic (0.08%)	6.12**	-0.25 [5.15]**	1.89	1.88	S	S	0.51
241-Fuel wood & charcoal (0.02%)	5.44**	-0.36 [4.88]**	1.18	0.15	S	S	0.39
242-Wood in the rough or roughly squared (0.07%)	1.95	-0.19 [2.84]	0.08	0.12	S	S	0.22
243-Wood, sharped or simply worked (0.92%)	7.25	-0.49 [5.61]**	0.003	0.81	S	S	0.57
251-Pulp & waste paper (0.41%)	3.09	-0.43 [3.61]*	2.28	0.02	S	S	0.12
262-Wool and other animal hair (0.0004%)	1.49	-0.31 [2.56]	0.007	1.88	S	S	0.41
263-Cotton (0.001%)	7.02**	-0.72 [5.51]**	0.01	1.46	S	S	0.43
265-Vegetable fibers, except cotton (0.001%)	4.74**	-0.59 [4.42]**	7.01**	12.78**	S	NS	0.29

266-Synthetic and regenerated artificially (0.02%)	1.36	-0.05 [2.37]	0.21	1.23	S	S	0.03
267-Waste materials from textile fabric (0.01%)	9.94**	-0.83 [6.61]**	2.28	3.26*	S	S	0.51
273-Stone, sand and gravel (0.07%)	4.43*	-0.32 [4.39]**	0.32	1.43	S	S	0.34
274-Sulphur & unroasted iron pyrites (0.01%)	7.69**	-0.51 [5.79]**	0.17	0.47	S	S	0.43
275-Natural abrasives incl. industrial (0.002%)	3.14	-0.70 [3.63]*	0.27	0.12	S	S	0.36
276-Other crude minerals (0.16%)	7.08**	-0.40 [5.42]**	20.98*	0.13	S	S	0.43
281-Iron ore & concentrates (0.22%)	5.32**	-0.28 [4.76]**	0.88	3.09*	S	S	0.41
282-Iron and steel scrap (0.24%)	6.28**	-0.73 [5.11]**	0.97	0.34	S	S	0.32
283-Ores & concentrates of non-ferrous (0.16%)	4.49*	-0.69 [4.41]**	1.88	0.53	S	S	0.42
284-Non-ferrous metal scrap (0.28%)	5.11**	-0.53 [4.96]**	8.32**	0.85	S	NS	0.61
291-Crude animal materials, n.e.s. (0.03%)	3.71	-0.28 [3.96]**	1.04	4.51**	S	S	0.27
292-Crude vegetable materials, n.e.s. (0.12%)	6.57**	-0.50 [5.29]**	0.004	14.91**	S	S	0.38
321-Coal, coke & briquettes (0.17%)	6.36**	-0.59 [5.24]**	0.27	1.31	S	NS	0.39
332-Petroleum products (4.55%)	4.76**	-0.11 [4.51]**	0.03	0.001	S	S	0.39
341-Gas, natural and manufactured (3.08%)	2.79	-0.39 [3.41]	2.99*	2.75*	S	NS	0.24
411-Animal oils and fats (0.02%)	3.75	-0.65 [3.96]**	0.005	0.25	S	S	0.52
421-Fixed vegetable oils, soft (0.27%)	7.26	-0.07 [0.07]	12.97**	2.21	S	S	0.58
431-Animal and veg. Oils & fats, processed (0.02%)	1.59	-0.22 [2.24]	0.03	10.74**	S	S	0.74
512-Organic chemicals (1.37%)	4.19*	-0.35 [3.26]	3.47*	0.02	S	S	0.27
513-Inorg. Chemical elements, oxides (0.36%)	3.32	-0.31 [3.75]*	0.02	1.89	S	S	0.29
514-Other inorganic chemicals (0.19%)	3.27	-0.19 [3.39]	0.82	3.76**	S	S	0.33
515-Radioactive and associated material (0.09%)	7.19**	-0.56 [5.57]**	1.69	1.95	S	S	0.58
521-Crude chemicals from coal, petroleum (0.04%)	5.92**	-0.42 [4.99]**	0.82	0.53	S	S	0.37
531-Synth. Organic dyestuffs, natural (0.02%)	4.37*	-0.23 [4.33]**	0.007	0.21	S	NS	0.35
532-Dyeing & tanning extracts, synthetic (0.003%)	6.33**	-0.49 [5.23]**	1.25	5.11**	S	S	0.34
533-Pigments, paints, varnishes & relatives (0.39%)	7.23**	-0.48 [5.63]**	0.85	2.97*	S	S	0.49
541-Medicinal & pharmaceutical products (1.26%)	1.85	-0.32 [2.81]	0.81	4.38**	S	S	0.16
551-Essential oils, perfume and flavor (0.08%)	2.61	-0.28 [3.34]	5.78**	4.73**	S	S	0.29
553-Perfumery, cosmetics, dentifrices (0.46%)	2.66	-0.23 [3.25]	8.81**	0.14	S	NS	0.12
554-Soaps, cleansing & polishing preparations (0.36%)	5.84**	-0.25 [5.04]**	2.73*	0.19	S	S	0.48
561-Fertilizers manufactured (0.66%)	6.01**	-1.41 [5.37]**	5.91**	1.04	S	S	0.56
571-Explosives and pyrotechnic products (0.05%)	8.44**	-0.47 [4.11]**	6.47**	4.71**	S	S	0.62
581-Plastic materials, regenerd. Cellulose (2.53%)	6.16**	-0.18 [4.13]**	0.11	3.72*	S	NS	0.35
599-Chemical materials and products, n.e.s. (1.04%)	7.96**	-0.76 [5.83]**	1.27	0.09	S	S	0.38
611-Leather (0.003%)	1.33	-0.05 [2.39]	0.21	2.22	S	S	0.22
612-Manuf. of leather or of artificial (0.01%)	6.41**	-0.50 [5.26]**	0.86	4.21**	S	S	0.37
613-Fur skins, tanned or dressed, including (0.001%)	4.85**	-0.32 [4.49]**	1.36	0.11	S	S	0.28
629-Articles of rubber, n.e.s (0.75%)	9.05**	-0.73 [6.24]**	2.27	0.09	S	S	0.64
631-Veneers, plywood boards & other woods (0.32%)	7.15**	-0.45 [5.56]**	0.13	2.51	S	S	0.44
632-Wood manufactures, n.e.s. (0.40%)	7.67**	-0.27 [5.62]**	0.67	0.17	S	S	0.58
633-Cork manufactures (0.001%)	6.73**	-0.53 [5.41]**	0.28	0.03	S	S	0.49
641-Paper and paperboard (1.31%)	6.45**	-0.29 [5.25]**	0.11	0.006	S	S	0.51
642-Articles of paper, pulp, paperboard (0.71%)	6.91**	-0.50 [5.47]**	2.56	0.01	S	S	0.44
651-Textile yarn and thread (0.10%)	2.45	-0.38 [3.25]	0.01	3.13*	S	NS	0.29
652-Cotton fabrics, woven ex. narrow (0.006%)	3.92	-0.04 [2.85]	0.06	0.98	S	S	0.21
653-Text fabrics woven ex narrow, spec, not cotton (0.08%)	4.02*	-0.37 [4.17]**	4.82**	0.09	S	NS	0.48
654- Tulle, lace, embroidery, ribbons, timmings (0.009%)	4.19*	-0.58 [4.16]**	0.06	3.16*	S	S	0.33

655-Special textile fabrics and related (0.18%)	3.85	-0.27 [4.04]**	0.001	2.26	S	S	0.28
656-Made up articles, wholly or chiefly (0.07%)	4.01*	-0.25 [4.18]**	0.54	6.57**	S	S	0.51
657-Floor coverings, tapestries, etc. (0.11%)	4.68*	-0.26 [4.32]**	8.91**	2.47	S	NS	0.43
661-Lime, cement & fabr. bldg.mat. Ex g (0.20%)	6.65**	-0.39 [5.33]**	0.76	0.84	S	S	0.59
662-Clay and refractory construction ma (0.04%)	5.08**	-0.51 [4.65]**	0.002	0.26	S	S	0.41
663-Mineral manufactures, n.e.s. (0.22%)	4.42*	-0.14 [4.35]**	0.23	0.04	S	S	0.49
664-Glass (0.22%)	3.09	-0.17 [3.59]*	2.18	2.84*	S	NS	0.25
665-Glassware (0.07%)	3.13	-0.33 [3.40]	6.99**	0.07	S	NS	0.19
666-Pottery (0.007%)	5.69**	-0.40 [4.97]**	0.02	0.14	S	S	0.38
667-Pearls and precious and semi precious (0.06%)	1.45	-0.21 [2.44]	0.001	4.12**	S	S	0.21
671-Pig iron, spiegeleisen, sponge iron (0.06%)	13.15**	-0.78 [7.49]**	0.59	0.05	S	S	0.56
672-Ingots & other primary forms of iron (0.25%)	5.88**	-0.52 [4.97]**	1.92	4.18**	S	S	0.45
673-Iron and steel bars, rods, angles (0.41%)	11.01**	-0.69 [6.95]**	0.45	1.08	S	S	0.57
674-Universals, plates and sheets of iron (0.75%)	5.89**	-0.48 [5.04]**	0.06	1.01	S	S	0.41
676-Rails & railway track constr materials of iron (0.03%)	2.25	-0.32 [3.11]	0.73	0.25	S	S	0.38
677-Iron and steel wire, excluding wire (0.05%)	9.27**	-0.45 [6.34]**	3.98**	2.53	S	S	0.44
678-Tubes, pipes and fittings of iron (0.52%)	5.58**	-0.60 [4.90]**	1.73	1.62	S	S	0.49
679-Iron steel castings forgings unwork (0.06%)	7.98**	-0.61 [5.84]**	0.81	0.02	S	S	0.59
681-Silver and platinum group metals (0.25%)	13.58**	-1.89 [7.65]**	1.52	5.73**	S	S	0.57
682-Copper (0.51%)	2.18	-0.50 [2.93]	0.05	2.12	S	S	0.21
683-Nickel (0.16%)	8.21**	-1.02 [6.01]**	0.01	0.67	S	S	0.53
684-Aluminium (1.25%)	1.62	-0.32 [2.65]	0.08	0.001	S	S	0.41
685-Lead (0.09%)	2.26	-0.44 [3.08]	2.76*	2.19	S	S	0.11
686-Zinc (0.16%)	8.05**	-0.74 [5.87]**	0.002	0.18	S	S	0.39
687-Tin (0.007%)	8.42**	-0.81 [2.94]	1.12	2.19	S	NS	0.39
689-Miscell.non ferrous base metals (0.05%)	3.01	-0.50 [3.49]*	0.28	0.17	S	S	0.25
691-Finished structural parts and structures (0.28%)	4.23*	-0.31 [4.27]**	2.15	0.15	S	S	0.44
692-Metal containers for storage and truck (0.18%)	3.45	-0.18 [3.82]**	2.07	5.36**	S	S	0.45
693-Wire products ex electric & fence (0.07%)	2.52	-0.15 [3.06]	4.07**	4.03**	S	S	0.16
694-Nails, screws, nuts, bolts, rivets (0.20%)	5.57**	-0.32 [4.91]**	1.71	10.52**	S	S	0.33
695-Tools for use in the hand or in machines (0.21%)	3.21	-0.35 [3.73]*	1.19	2.47	S	S	0.49
696-Cutlery (0.02%)	3.97*	-0.40 [4.01]**	0.03	0.05	S	S	0.27
697-Household equipment of base metals (0.08%)	8.61**	-0.43 [6.11]**	0.01	0.16	S	NS	0.45
698-Manufactures of metal, n.e.s. (0.71%)	7.95**	-0.36 [5.87]**	0.52	0.11	S	S	0.49
711-Power generating machinery, other than electronics (1.98%)	1.31	-0.23 [1.98]	14.65**	0.006	S	S	0.15
712-Agricultural machinery and implements (0.64%)	4.68*	-0.41 [4.31]**	0.02	7.79**	S	S	0.29
714-Office machines (0.54%)	2.24	-0.08 [3.08]	0.79	4.54**	S	NS	0.14
715-Metalworking machinery (0.64%)	8.23**	-0.38 [5.93]**	5.91**	7.11**	S	S	0.61
717-Textile and leather machinery (0.09%)	1.95	-0.02 [2.82]	2.85*	5.15**	S	S	0.21
718-Machines for special industries (0.05%)	4.69*	-0.57 [4.47]**	1.84	0.49	S	S	0.39
719-Machinery and appliances non electronics (4.33%)	5.29*	-0.37 [4.77]**	1.82	5.23**	NS	S	0.35
722-Electric power machinery and switch (1.05%)	7.67**	-0.52 [5.78]**	4.41**	0.26	S	S	0.51
723-Equipment for distributing electric (0.33%)	4.05*	-0.44 [4.14]**	0.01	0.53	S	S	0.29
724-Telecommunications apparatus (0.68%)	2.33	-0.27 [3.16]	0.03	0.43	S	S	0.21
725-Domestic electrical equipment (0.21%)	5.26**	-0.39 [4.70]**	0.004	0.04	S	S	0.31
726-Elec. apparatus for medical purposes (0.10%)	2.72	-0.17 [3.22]	4.04**	1.12	S	S	0.24
729-Other electrical machinery and apparatus (1.23%)	5.06**	-0.45 [4.67]**	1.06	0.52	S	S	0.37

731-Railway vehicles (0.19%)	3.83	-0.17 [4.05]**	0.51	0.01	S	S	0.47
732-Road motor vehicles (15.06%)	24.33**	-0.52 [10.33]**	2.97	3.53*	S	S	0.83
733-Road vehicles other than motor vehicles (0.52%)	6.55**	-0.54 [5.29]**	8.58**	0.26	S	S	0.44
734-Aircraft (1.21%)	1.29	-0.30 [2.36]	0.27	6.59**	S	NS	0.54
735-Ships and boats (0.14%)	5.41**	-0.35 [4.79]**	0.46	1.25	S	S	0.33
812-Sanitary, plumbing, heating & light (0.25%)	2.27	-0.22 [3.13]	1.05	4.47**	S	S	0.31
821-Furniture (1.01%)	4.56*	-0.17 [4.38]**	0.96	6.83**	S	S	0.56
831-Travel goods, handbags and similar (0.04%)	6.09**	-0.25 [5.15]**	7.08**	1.13	S	S	0.41
841-Clothing except fur clothing (0.25%)	5.57**	-0.19 [4.81]**	0.31	14.99**	S	S	0.46
842-Fur clothing and articles of artificial (0.003%)	4.27**	-0.46 [5.56]**	1.25	0.38	S	S	0.39
851-Footwear (0.03%)	4.09**	-0.18 [4.19]**	1.69	2.41	S	S	0.29
861-Scientific, medical, optical, meas. (1.11%)	5.16**	-0.54 [4.73]**	0.47	0.19	S	S	0.31
862-Photographic and cinematographic supply (0.02%)	2.63	-0.18 [3.34]	0.03	0.09	S	S	0.19
863-Developed cinematographic film (0.001%)	1.32	-0.14 [2.32]	7.03	5.69*	S	S	0.13
864-Watches and clocks (0.01%)	7.61**	-0.68 [5.74]**	0.56	0.32	S	S	0.46
891-Musical instruments, sound recorder (0.22%)	10.43**	-1.05 [6.74]**	1.31	0.42	S	S	0.48
892-Printed matter (0.52%)	6.38**	-0.24 [5.24]**	4.91**	4.79**	S	S	0.42
893-Articles of artificial plastic mate (1.11%)	6.25**	-0.33 [5.09]**	0.26	0.22	S	S	0.43
894-Perambulators, toys, games and sports (0.23%)	4.57*	-0.29 [4.37]**	0.72	0.21	S	S	0.45
895-Office and stationery supplies, n.e.s. (0.02%)	6.94**	-0.32 [5.08]**	0.24	5.91**	S	S	0.52
896-Works of art, collectors pieces (0.02%)	3.55	-0.43 [3.86]**	0.003	1.46	S	S	0.24
897-Jewellery and gold/silver smiths (0.20%)	1.97	-0.14 [2.63]	6.43**	0.27	S	NS	0.08
899-Manufactured articles, n.e.s. (0.18%)	5.31**	-0.39 [4.77]**	0.12	2.17	S	S	0.51
931-Special transactions not classed according to kind (4.41%)	3.02	-0.36 [3.52]*	0.14	9.41**	S	S	0.22

Notes:

a. The critical value of the F test at the 10% (5%) significance level when there are three exogenous variables (k=3) and 50 observations is 3.97 (4.70). These come from Narayan (2005, p. 1988). * (**) indicates a significant statistic at the 10% (5%) level.

b. Number inside the bracket in the ECM_{t-1} column is absolute value of the t-ratio, The critical value for k = 3 with 50 observations is -3.45 (-3.82) at the 10% (5%) significance level and these come from Banerjee et al. (1998, Table 1, p. 276).

c. LM is the Lagrange Multiplier test of residual serial correlation. It is distributed as χ^2 with one degree of freedom. Its critical value at the 10% (5%) level is 2.70 (3.84).

d. RESET is Ramsey's test for misspecification. It is distributed as χ^2 with one degree of freedom and its critical value at 10% (5%) level is 2.71 (3.84).

e. Abbreviation n.e.s. stands for not elsewhere specified.

g. Trade share is in percentage calculated for the year 2014.

Table 61: Short-Run Estimates of Nonlinear ARDL Model.

Industries (Based on 3-Digit Code Order)	Short-Run Coefficient Estimates							
	Δ POS_t	ΔPOS_{t-1}	Δ POS_{t-2}	Δ POS_{t-3}	Δ NEG_t	Δ NEG_{t-1}	Δ NEG_{t-2}	Δ NEG_{t-3}
001-Live animal (0.37%)	0.49 [0.14]				2.27 [0.69]			
011-Meat, fresh, chilled or frozen (0.64%)	1.18 [0.45]				1.93 [0.74]	-8.13 [2.98]**		
012-Meat, dried, salted or smoked (0.02%)	-3.55 [1.80]*				0.79 [0.71]			
013-Meat in airtight containers n.e.s. (0.17%)	-1.64 [0.99]				-2.72 [1.52]	-4.95 [2.65]**		
022-Milk and cream (0.03%)	-3.65 [0.80]				0.56 [0.21]			
024-Cheese and curd (0.01%)	-0.64 [0.22]				-2.09 [0.73]	1.47 [0.51]		
025-Eggs (0.03%)	-4.35 [1.02]	-10.84 [2.35]**			2.15 [1.12]			
031-Fish, fresh & simply preserved (0.48%)	1.41 [1.78]*				0.38 [0.73]			
032-Fish, in airtight containers, n.e.s (0.08%)	-0.18 [0.07]	-5.97 [2.15]**			0.51 [0.19]			
044-Maize corn, unmilled (0.07%)	-0.67 [0.15]	-8.09 [1.87]*			-0.09 [0.02]			
045-Cereals, unmilled excl. wheat, rice (0.08%)	-2.68 [0.93]				0.59 [0.35]			
046-Meal and flour of wheat (0.03%)	-6.60 [1.06]	-3.26 [0.47]			1.72 [0.29]			
047-Meal & flour of cereals, except wheat (0.02%)	3.11 [1.99]**				0.03 [0.11]			
048-Cereal preps & preps of flour (0.78%)	0.76 [0.56]				-2.23 [1.67]*	-2.64 [1.91]*		
051-Fruit, fresh, and nuts excl. Oil nuts (0.003%)	0.24 [0.13]				-1.84 [1.13]	-3.34 [2.01]**	1.95 [1.19]	
052-Dried fruit including artificially (0.01%)	3.84 [0.51]				-1.70 [0.22]			
053-Fruit, preserved and fruit preparation (0.27%)	0.83 [0.55]				-2.45 [1.59]	0.41 [0.26]		
054-Vegetables, roots & tubers, fresh (0.68%)	0.17 [0.12]	-6.27 [3.57]**	-3.54 [2.07]**	-2.03 [1.47]	-1.58 [1.18]	-4.68 [2.91]**		
055-Vegetables, roots & tubers preserved (0.98%)	5.86 [2.4]**				-3.36 [1.44]			
061-Sugar and honey (0.08%)	5.34 [1.78]*				-1.96 [0.63]	-3.95 [1.37]		
062-Sugar confectionery, sugar preparation (0.12%)	-1.18 [0.35]	-6.40 [1.68]*			-0.12 [0.03]			
071-Coffee (0.17%)	-10.30 [1.32]				1.51 [0.19]			
072-Cocoa (0.02%)	0.72 [0.12]				-0.97 [0.17]			
073-Chocolate & other food preparations (0.26%)	3.75 [1.66]*	-7.15 [2.87]**			-2.51 [1.14]			
074-Tea and mate (0.01%)	0.65 [0.15]				-0.83 [0.18]			
075-Spices (0.007%)	4.86 [1.41]				-0.41 [0.13]			
081- Feed. Stuff for animals' excl. unmilled (0.55%)	-2.64 [2.2]**	-2.88 [2.32]**			1.89 [1.56]	1.63 [1.34]	2.82 [2.46]**	3.70 [3.06]**
099-Food preparations, n.e.s. (0.57%)	2.33 [0.61]				-2.61 [0.66]			
111-Nonalcoholic beverages, n.e.s. (0.13%)	-2.57 [0.53]				3.87 [0.85]			
112-Alcoholic beverages (0.22%)	-2.71 [1.66]*				0.55 [0.34]			
121-Tobacco, unmanufactured (0.01%)	-11.40[2.0]**	10.67 [1.83]*			1.84 [0.32]	-15.67 [2.41]**		
122-Tobacco manufactures (0.01%)	-2.50 [5.35]**	1.65 [3.14]**			2.83 [3.57]**	0.70 [0.19]	2.83 [3.26]**	4.19 [4.38]**
211-Hides & skins, exc. fur skins undressed (0.007%)	-4.85 [1.71]*				4.51 [1.55]			
212-Fur skins, undressed (0.06%)	1.12 [0.73]				-2.71 [1.77]*	-2.84 [1.98]**	3.12 [2.08]**	
221-Oil seeds, oil nuts and oil kernels (0.21%)	-0.28 [0.08]				-0.34 [0.11]			
231-Crude rubber incl. synthetic (0.08%)	2.22 [2.51]**	-1.86 [2.16]**	-1.48 [1.84]*	-2.98 [3.62]**	1.06 [1.27]			
241-Fuel wood & charcoal (0.02%)	-0.72 [0.24]				-0.28 [0.11]			
242-Wood in the rough or roughly squared (0.07%)	1.25 [0.61]	-5.93 [2.65]**			-0.70 [0.32]			
243-Wood, sharped or simply worked (0.92%)	0.34 [0.27]				2.13 [1.61]			
251-Pulp & waste paper (0.41%)	-0.61 [0.56]	-2.87 [2.45]**			-1.99 [1.73]*			
262-Wool and other animal hair (0.0004%)	2.56 [0.69]	-5.75 [1.36]	-13.41 [3.42]**		-6.15 [1.69]*			
263-Cotton (0.001%)	7.75 [1.56]	8.30 [1.54]	6.24 [2.92]**	6.57 [3.31]**	4.73 [0.99]	7.36 [3.32]**		
265-Vegetable fibers, except cotton (0.001%)	9.70 [0.76]	-10.23 [0.70]			4.99 [0.42]	-8.15 [0. 68]	-9.56 [1.61]	

266-Synthetic and regenerated artificially (0.02%)	-0.80 [0.23]				-1.97 [0.56]			
267-Waste materials from textile fabric (0.01%)	1.89 [0.86]	-4.30 [1.75]*	-5.39 [2.56]**	-4.85 [2.33]**	-1.90 [0.97]	-6.39 [2.90]**	-4.52 [1.88]*	-4.63 [2.17]**
273-Stone, sand and gravel (0.07%)	2.37 [1.59]	-2.98 [1.87]*			-2.85 [1.96]**	-2.21 [1.47]	-3.45 [2.23]**	
274-Sulphur & unroasted iron pyrites (0.01%)	5.92 [1.28]	-10.50 [2.06]**			-7.45 [1.81]*	0.91 [0.21]	-1.81 [1.81]*	-10.95[2.7]**
275-Natural abrasives incl. industrial (0.002%)	2.03 [0.49]				0.77 [0.17]			
276-Other crude minerals (0.16%)	-1.55 [1.12]	5.33 [3.74]**			0.62 [0.51]	1.25 [0.97]	2.36 [1.66]*	
281-Iron ore & concentrates (0.22%)	-1.47 [0.77]	10.23 [4.61]**	5.74 [2.72]**	3.78 [1.96]**	-2.59 [1.37]			
282-Iron and steel scrap (0.24%)	-1.10 [0.54]				-2.59 [1.25]			
283-Ores & concentrates of non-ferrous (0.16%)	7.01 [2.06]**	-2.97 [0.83]	-4.35 [1.26]	-6.89 [2.13]**	-6.53 [2.01]**	-6.62 [1.96]**	-8.64 [2.41]**	
284-Non-ferrous metal scrap (0.28%)	-1.37 [0.50]				-0.05 [0.01]			
291-Crude animal materials, n.e.s. (0.03%)	0.43 [0.21]	-6.69 [2.74]**	-5.98 [2.47]**	-5.79 [2.65]**	-1.25 [1.25]	-3.34 [1.53]		
292-Crude vegetable materials, n.e.s. (0.12%)	-0.24 [0.20]				-0.65 [0.51]			
321-Coal, coke & briquettes (0.17%)	-1.80 [1.25]	4.18 [2.87]**	2.44 [1.71]*	5.91 [4.17]**	-0.82 [0.57]			
332-Petroleum products (4.55%)	-3.86 [2.35]**				-1.93 [1.13]			
341-Gas, natural and manufactured (3.08%)	2.80 [2.81]**				6.93 [1.31]			
411-Animal oils and fats (0.02%)	-0.78 [0.36]	2.84 [1.23]	-4.71 [2.31]**		2.81 [1.30]			
421-Fixed vegetable oils, soft (0.27%)	3.82 [1.13]	2.50 [0.71]	-1.19 [0.35]	9.27 [2.70]**	-5.98 [2.71]**			
431-Animal and veg. Oils & fats, processed (0.02%)	-4.22 [0.73]				4.86 [0.86]			
512-Organic chemicals (1.37%)	-0.36 [0.36]				0.72 [0.49]			
513-Inorg. Chemical elements, oxides (0.36%)	3.13 [2.43]**	-2.38 [1.81]*	-3.39 [2.87]**		-2.37 [1.94]*	-3.09 [2.36]**		
514-Other inorganic chemicals (0.19%)	1.07 [1.19]	1.62 [1.75]*			-0.57 [0.60]			
515-Radioactive and associated material (0.09%)	4.41 [1.25]	9.79 [2.64]**	7.80 [2.15]**		4.17 [1.13]			
521-Crude chemicals from coal, petroleum (0.04%)	-0.19 [0.04]				0.38 [0.09]	-12.97 [3.19]**		
531-Synth. Organic dyestuffs, natural (0.02%)	-2.61 [0.78]				2.60 [0.76]			
532-Dyeing & tanning extracts, synthetic (0.003%)	-11.70 [2.1]**				0.58 [0.11]			
533-Pigments, paints, varnishes & relatives (0.39%)	-1.05 [0.65]	-3.51 [1.97]**			0.88 [0.55]			
541-Medicinal & pharmaceutical products (1.26%)	3.38 [1.93]*				-3.18 [1.78]**			
551-Essential oils, perfume and flavor (0.08%)	2.64 [1.45]				-2.75 [1.58]			
553-Perfumery, cosmetics, dentifrices (0.46%)	2.31 [0.75]	-11.86 [3.31]**	-3.70 [1.35]	-3.80 [1.54]	0.39 [0.14]	-5.70 [2.04]**	-4.07 [1.31]	
554-Soaps, cleansing & polishing preparations (0.36%)	-0.19 [0.13]				1.51 [1.08]			
561-Fertilizers manufactured (0.66%)	13.46 [5.32]**				-9.10 [2.73]**			
571-Explosives and pyrotechnic products (0.05%)	6.71 [2.57]**				-3.27 [1.44]	-6.70 [2.89]**	-3.21 [1.39]	-8.61 [3.66]**
581-Plastic materials, regenerd. Cellulose (2.53%)	2.01 [1.76]*				-0.33 [0.31]			
599-Chemical materials and products, n.e.s. (1.04%)	-0.60 [0.46]				-0.68 [0.51]			
611-Leather (0.003%)	3.70 [1.18]	9.76 [2.92]**	6.48 [1.90]*	9.15 [2.57]**	7.06 [2.30]**	3.13 [0.91]	2.70 [0.79]	-9.87 [3.07]**
612-Manuf. of leather or of artificial (0.01%)	0.89 [0.41]				1.50 [0.75]			
613-Fur skins, tanned or dressed, including (0.001%)	0.28 [0.08]	-6.78 [1.95]*	-4.34 [1.43]	-9.86 [3.48]**	1.21 [0.42]	-9.12 [2.77]**	-12.21 [3.23]**	
629-Articles of rubber, n.e.s (0.75%)	1.15 [0.57]	2.83 [1.37]	5.87 [2.78]**		0.36 [0.17]			
631-Veneers, plywood boards & other woods (0.32%)	2.85 [1.27]				0.29 [0.13]	-4.38 [2.05]**		
632-Wood manufactures, n.e.s. (0.40%)	0.77 [0.57]				2.25 [1.69]*			
633-Cork manufactures (0.001%)	2.35 [0.36]				4.19 [0.25]			
641-Paper and paperboard (1.31%)	1.29 [1.62]				-0.20 [0.27]	-2.23 [2.92]**		
642-Articles of paper, pulp, paperboard (0.71%)	-0.02 [0.01]				0.89 [0.72]			
651-Textile yarn and thread (0.10%)	2.57 [1.02]				-1.39 [0.57]			
652-Cotton fabrics, woven ex. narrow (0.006%)	1.61 [0.47]	-4.46 [1.31]			-3.19 [0.95]			
653-Text fabrics woven ex narrow, spec, not cotton (0.08%)	-3.04 [1.12]				-0.57 [0.22]			
654- Tulle, lace, embroidery, ribbons, timmings (0.009%)	-4.32 [2.15]**				1.58 [0.83]	-3.40 [1.79]*		

655-Special textile fabrics and related (0.18%)	0.23 [0.16]				-1.67 [1.12]			
656-Made up articles, wholly or chiefly (0.07%)	2.36 [1.21]	-5.75 [2.57]**			-2.77 [1.43]	-3.27 [1.54]		
657-Floor coverings, tapestries, etc. (0.11%)	1.41 [0.54]				0.39 [0.16]	-5.37 [1.99]**		
661-Lime, cement & fabr. bldg.mat. Ex g (0.20%)	0.78 [0.42]				0.42 [0.24]			
662-Clay and refractory construction ma (0.04%)	-0.81 [0.64]				-1.04 [0.82]	-4.48 [3.19]		
663-Mineral manufactures, n.e.s. (0.22%)	-2.14 [1.41]				2.96 [2.02]**			
664-Glass (0.22%)	1.43 [0.59]				0.49 [0.20]	-0.86 [0.38]		
665-Glassware (0.07%)	-1.14 [0.39]				2.33 [0.83]			
666-Pottery (0.007%)	3.18 [0.91]				2.20 [0.65]			
667-Pearls and precious and semi precious (0.06%)	7.73 [2.25]**				-8.80 [2.53]**			
671-Pig iron, spiegeleisen, sponge iron (0.06%)	1.42 [1.14]				-0.70 [0.58]			
672-Ingots & other primary forms of iron (0.25%)	3.95 [0.79]				0.76 [0.16]			
673-Iron and steel bars, rods, angles (0.41%)	4.69 [1.82]*	-2.80 [1.01]			1.58 [0.62]			
674-Universals, plates and sheets of iron (0.75%)	6.94 [2.56]**				-0.21 [0.08]			
676-Rails & railway track constr materials of iron (0.03%)	1.95 [0.57]				-2.87 [0.84]	3.57 [1.15]	1.14 [0.34]	
677-Iron and steel wire, excluding wire (0.05%)	2.23 [1.22]				0.94 [0.54]	-2.59 [1.56]		
678-Tubes, pipes and fittings of iron (0.52%)	-0.91 [0.42]				-1.62 [0.81]	-3.12 [1.57]		
679-Iron steel castings forgings unwork (0.06%)	0.33 [0.13]				0.46 [0.17]			
681-Silver and platinum group metals (0.25%)	-2.67 [0.56]				4.75 [0.99]			
682-Copper (0.51%)	2.85 [1.25]	-3.39 [3.39]**			-3.11 [1.26]	-2.55 [1.09]		
683-Nickel (0.16%)	-3.69 [1.82]**	-9.39 [4.23]**	-11.27 [4.23]**		-0.13 [0.06]	-6.50 [3.13]**		
684-Aluminium (1.25%)	2.16 [1.61]				-2.26 [1.59]			
685-Lead (0.09%)	1.23 [0.25]				-6.25 [1.13]			
686-Zinc (0.16%)	1.30 [0.62]				-3.12 [1.47]			
687-Tin (0.007%)	2.16 [0.28]				-0.99 [0.12]			
689-Miscell.non ferrous base metals (0.05%)	-1.80 [0.97]				4.93 [2.55]**			
691-Finished structural parts and structures (0.28%)	1.25 [0.54]				1.14 [0.47]			
692-Metal containers for storage and truck (0.18%)	0.26 [0.14]				-2.29 [1.18]			
693-Wire products ex electric & fence (0.07%)	2.90 [1.45]				-0.81 [0.41]			
694-Nails, screws, nuts, bolts, rivets (0.20%)	1.31 [0.86]				-0.46 [0.32]	-4.05 [2.73]**		
695-Tools for use in the hand or in machines (0.21%)	0.78 [0.64]				-1.53 [1.45]	-2.50 [2.26]**	0.88 [0.83]	-3.05 [2.83]**
696-Cutlery (0.02%)	5.64 [1.12]				-2.62 [2.37]**			
697-Household equipment of base metals (0.08%)	-2.27 [1.14]				1.42 [0.75]	-4.39 [2.25]**		
698-Manufactures of metal, n.e.s. (0.71%)	-0.48 [0.46]				-0.65 [0.58]			
711-Power generating machinery, other than electronics (1.98%)	-1.02 [1.06]	0.12 [0.14]	-1.57 [1.64]*	-1.92 [2.02]**	-1.02 [1.13]	-0.27 [0.28]	0.27 [0.35]	3.35 [3.65]**
712-Agricultural machinery and implements (0.64%)	-0.52 [0.53]				-1.44 [1.46]			
714-Office machines (0.54%)	-0.57 [0.49]	2.55 [1.88]*	2.16 [1.65]*		-0.56 [0.45]			
715-Metalworking machinery (0.64%)	-0.35 [0.16]				2.29 [1.04]			
717-Textile and leather machinery (0.09%)	-4.76 [2.25]**				1.06 [0.50]			
718-Machines for special industries (0.05%)	-0.46 [0.33]				0.34 [0.25]	-4.06 [2.47]**		
719-Machinery and appliances non electronics (4.33%)	0.59 [0.58]				-0.54 [0.56]			
722-Electric power machinery and switch (1.05%)	-0.58 [0.51]				-0.31 [0.41]	-2.02 [1.84]*		
723-Equipment for distributing electric (0.33%)	1.08 [0.51]				0.10 [0.05]			
724-Telecommunications apparatus (0.68%)	-2.97 [1.31]	0.15 [0.06]	-0.67 [0.32]	-1.86 [0.97]	2.81 [1.25]	-3.97 [1.60]		
725-Domestic electrical equipment (0.21%)	0.57 [0.32]				1.23 [0.69]			
726-Elec. apparatus for medical purposes (0.10%)	0.23 [0.12]				0.97 [0.54]			
729-Other electrical machinery and apparatus (1.23%)	-0.39 [0.31]				1.14 [0.84]			

731-Railway vehicles (0.19%)	-0.49 [0.18]	1.34 [4.08]**			-2.51 [0.89]			
732-Road motor vehicles (15.06%)	-0.63 [0.94]	-1.63 [2.43]**			0.98 [1.47]			
733-Road vehicles other than motor vehicles (0.52%)	1.56 [1.01]	-2.28 [1.17]	-2.70 [1.54]		0.01 [0.01]	-4.38 [2.35]**	-2.38 [1.39]	
734-Aircraft (1.21%)	-1.38 [0.26]	13.50 [3.93]**			-11.46[2.04]**			
735-Ships and boats (0.14%)	0.31 [0.12]				5.07 [1.95]*			
812-Sanitary, plumbing, heating & light (0.25%)	-0.56 [0.31]				0.72 [0.39]			
821-Furniture (1.01%)	0.64 [0.42]				1.13 [0.73]			
831-Travel goods, handbags and similar (0.04%)	3.75 [1.84]*	-7.23 [3.03]**			-2.03 [1.06]			
841-Clothing except fur clothing (0.25%)	-0.21 [0.13]	-2.97 [1.80]*			1.35 [0.87]			
842-Fur clothing and articles of artificial (0.003%)	-0.09 [0.02]				0.24 [0.06]			
851-Footwear (0.03%)	2.92 [1.24]	-2.55 [0.98]	-2.01 [0.79]	-6.80 [2.76]**	-1.25 [0.50]	-6.18 [2.32]**	-3.88 [1.28]	
861-Scientific, medical, optical, meas. (1.11%)	1.14 [0.63]				0.06 [0.03]			
862-Photographic and cinematographic supply (0.02%)	-4.69 [1.62]				5.43 [2.01]**	5.46 [2.13]**	8.32 [3.18]**	
863-Developed cinematographic film (0.001%)	-5.09 [1.08]	9.48 [1.93]*	10.37 [2.10]**	10.2 [2.36]**	-10.80 [2.4]**	-13.86 [2.77]**	-16.89 [3.15]**	
864-Watches and clocks (0.01%)	9.42 [3.46]**				-1.36 [0.52]	6.03 [2.34]**		
891-Musical instruments, sound recorder (0.22%)	-0.98 [0.49]	-5.46 [2.41]**			-2.38 [1.22]	-3.63 [1.71]*		
892-Printed matter (0.52%)	0.35 [0.29]				0.88 [0.75]			
893-Articles of artificial plastic mate (1.11%)	1.93 [1.17]				-1.50 [0.93]			
894-Perambulators, toys, games and sports (0.23%)	1.32 [0.85]	0.59 [0.41]			-3.24 [2.21]**			
895-Office and stationery supplies, n.e.s. (0.02%)	3.83 [1.90]*				0.13 [0.06]			
896-Works of art, collectors pieces (0.02%)	-0.41 [0.11]				1.03 [0.29]			
897-Jewellery and gold/silver smiths (0.20%)	-2.19 [0.83]	5.77 [2.23]**			3.76 [1.39]			
899-Manufactured articles, n.e.s. (0.18%)	1.23 [0.41]				4.44 [1.45]			
931-Special transactions not classed according to kind (4.41%)	-1.39 [0.45]				9.41 [2.99]**			

Notes: Numbers inside the brackets are absolute values of the t-ratios. The critical value of standard t-ratio is 1.64 (1.96) at the 10% (5%) significance level.
* indicates significance at the 10% level and ** at the 5% level.

Table 62: Long-Run Coefficient Estimates of Nonlinear ARDL Model.

Industries (Based on 3-Digit Code Order)	Long-Run Coefficient Estimates				
	Constant	*Ln* $Y_{U.S}$	*Ln* Y_{CANADA}	*POS*	*NEG*
001-Live animal (0.37%)	-2.94 [0.60]	-3.09 [0.79]	4.19 [1.19]	2.21 [0.51]	0.90 [0.35]
011-Meat, fresh, chilled or frozen (0.64%)	21.30 [2.97]	-11.46 [2.29]	5.69 [1.49]	6.77 [3.79]**	4.72 [3.18]**
012-Meat, dried, salted or smoked (0.02%)	-38.46 [2.40]	15.55 [1.58]	-4.34 [0.41]	-22.26 [1.67]*	4.98 [0.72]
013-Meat in airtight containers n.e.s. (0.17%)	4.24 [2.26]	-7.38 [4.59]**	6.06 [4.53]**	4.28 [2.01]**	3.93 [3.06]**
022-Milk and cream (0.03%)	-3.52 [0.59]	5.21 [1.11]	-4.10 [0.97]	-4.58 [0.82]	0.70 [0.21]
024-Cheese and curd (0.01%)	-3.90 [1.28]	0.27 [0.12]	0.80 [0.40]	-0.67 [0.24]	3.82 [2.29]**
025-Eggs (0.03%)	0.91 [0.11]	-2.01 [0.39]	1.95 [0.48]	2.87 [0.35]	4.29 [0.94]
031-Fish, fresh & simply preserved (0.48%)	12.99 [2.65]	-2.61 [0.70]	-.56 [0.18]	7.18 [1.23]	1.95 [0.61]
032-Fish, in airtight containers, n.e.s (0.08%)	5.18 [1.97]	-2.47 [1.24]	1.14 [0.67]	7.90 [2.86]**	4.18 [2.63]**
044-Maize corn, unmilled (0.07%)	9.72 [0.67]	-7.74 [1.70]*	5.10 [0.85]	3.17 [0.72]	-1.38 [0.24]
045-Cereals, unmilled excl. wheat, rice (0.08%)	-11.43 [3.62]	7.45 [3.13]**	-3.87 [1.88]*	-2.68 [0.93]	0.59 [0.35]
046-Meal and flour of wheat (0.03%)	4.42 [1.28]	8.38 [0.53]	-3.34 [0.26]	3.33 [1.49]	4.70 [1.48]
047-Meal & flour of cereals, except wheat (0.02%)	-3.45 [2.46]	3.54 [1.70]*	1.73 [0.59]	3.10 [1.99]**	3.68 [2.40]**
048-Cereal preps & preps of flour (0.78%)	14.34 [2.78]	-8.13 [3.19]*	4.12 [2.26]**	5.44 [2.22]**	2.32 [1.21]
051-Fruit, fresh, and nuts excl. Oil nuts (0.003%)	3.42 [1.31]	-4.89 [2.75]**	3.12 [2.27]**	5.56 [2.32]**	1.19 [0.95]
052-Dried fruit including artificially (0.01%)	-5.77 [1.16]	-2.37 [3.17]**	2.06 [3.49]**	4.46 [2.41]**	2.50 [0.88]
053-Fruit, preserved and fruit preparation (0.27%)	-5.27 [2.23]	6.39 [3.91]**	-5.43 [3.65]**	0.26 [0.12]	0.47 [0.33]
054-Vegetables, roots & tubers, fresh (0.68%)	0.65 [0.37]	-1.92 [1.48]	1.23 [1.21]	10.67 [5.75]**	5.01 [4.63]**
055-Vegetables, roots & tubers preserved (0.98%)	11.02 [0.69]	-8.69 [1.62]	5.34 [1.19]	9.13 [1.23]	2.33 [1.37]
061-Sugar and honey (0.08%)	5.31 [2.04]	0.42 [0.23]	-1.84 [1.22]	3.58 [1.47]	0.64 [0.48]
062-Sugar confectionery, sugar preparation (0.12%)	20.15 [1.92]	-3.79 [0.62]	-1.72 [0.35]	2.60 [2.13]**	6.42 [1.42]
071-Coffee (0.17%)	-27.81 [3.52]	9.12 [1.46]	-1.97 [0.36]	-2.83 [1.72]*	-0.48 [0.11]
072-Cocoa (0.02%)	9.18 [0.69]	3.11 [3.89]**	-5.31 [3.34]**	-7.46 [1.14]	-6.71 [1.76]*
073-Chocolate & other food preparations (0.26%)	18.01 [3.01]	-5.28 [1.28]	0.36 [0.12]	8.48 [2.95]**	6.12 [2.14]**
074-Tea and mate (0.01%)	1.93 [0.05]	-7.58 [1.49]	7.48 [1.32]	-2.03 [0.81]	-2.02 [1.51]
075-Spices (0.007%)	-5.21 [0.66]	4.41 [0.85]	-3.37 [0.63]	0.23 [1.82]*	2.74 [3.36]**
081- Feed. Stuff for animals' excl. unmilled (0.55%)	0.94 [0.75]	1.68 [1.93]*	-2.02 [2.79]**	0.50 [0.37]	-1.23 [1.33]
099-Food preparations, n.e.s. (0.57%)	3.94 [0.54]	-1.53 [0.27]	-0.12 [0.02]	5.70 [1.48]	1.35 [1.32]
111-Nonalcoholic beverages, n.e.s. (0.13%)	28.75 [0.42]	-14.97 [0.53]	7.86 [0.51]	9.79 [0.61]	5.36 [1.01]
112-Alcoholic beverages (0.22%)	6.64 [5.56]	1.01 [1.02]	-1.82 [2.08]**	-4.17 [4.12]**	1.68 [2.58]**
121-Tobacco, unmanufactured (0.01%)	-7.80 [6.11]	6.13 [3.61]**	4.21 [2.85]**	-11.09 [4.60]**	6.83 [4.63]**
122-Tobacco manufactures (0.01%)	-31.40 [7.38]	13.05 [4.75]**	-3.97 [1.71]*	-6.11 [5.82]**	-2.55 [3.85]**
211-Hides & skins, exc. fur skins undressed (0.007%)	-12.15 [2.82]	3.58 [1.15]	-0.33 [0.12]	-7.82 [1.87]*	-6.83 [2.89]**
212-Fur skins, undressed (0.06%)	11.54 [2.42]	7.78 [1.99]**	-10.87 [4.24]**	1.64 [1.81]*	-4.29 [7.52]**
221-Oil seeds, oil nuts and oil kernels (0.21%)	-22.38 [2.75]	-2.08 [0.33]	7.56 [1.28]	-9.61 [1.21]	4.89 [0.93]
231-Crude rubber incl. synthetic (0.08%)	6.37 [0.67]	-4.96 [1.05]	3.33 [1.34]	6.87 [0.77]	5.84 [1.46]
241-Fuel wood & charcoal (0.02%)	-10.84 [1.41]	3.72 [0.69]	-0.57 [0.15]	2.57 [0.36]	8.23 [2.11] **
242-Wood in the rough or roughly squared (0.07%)	8.39 [2.48]	-.2.79 [1.08]	0.27 [0.12]	8.54 [2.35]**	2.68 [1.26]
243-Wood, sharped or simply worked (0.92%)	4.09 [1.66]	0.71 [0.50]	-.1.07 [0.82]	2.27 [1.09]	3.45 [3.11]**
251-Pulp & waste paper (0.41%)	15.01 [1.89]	-4.96 [4.49]**	1.50 [1.76]*	3.21 [2.53]**	-3.19 [4.35]**
262-Wool and other animal hair (0.0004%)	25.66 [4.45]	-2.71 [0.62]	-4.81 [1.45]	9.07 [3.34]**	-1.45 [0.55]
263-Cotton (0.001%)	-6.13 [1.31]	11.81 [3.55]**	-11.68 [4.49]**	-6.59 [1.18]	9.11 [2.95]**
265-Vegetable fibers, except cotton (0.001%)	3.68 [2.01]	-3.82 [4.12]**	2.03 [3.64]**	5.66 [4.20]**	2.15 [3.88]**
266-Synthetic and regenerated artificially (0.02%)	-34.07 [1.36]	-10.87 [0.47]	19.91 [0.83]	-3.76 [1.25]	-7.48 [0.52]
267-Waste materials from textile fabric (0.01%)	-2.14 [1.15]	-0.15 [0.12]	0.20 [0.22]	5.13 [2.72]**	5.35 [4.80]**

273-Stone, sand and gravel (0.07%)	0.98 [0.33]	0.63 [0.31]	-0.64 [0.39]	4.16 [1.37]	7.32 [3.84]**
274-Sulphur & unroasted iron pyrites (0.01%)	22.76 [3.59]	-3.23 [7.27]**	2.93 [7.92]**	1.50 [2.38]**	5.05 [1.36]
275-Natural abrasives incl. industrial (0.002%)	0.11 [0.02]	10.12 [3.56]**	-10.67 [4.26]**	-1.03 [0.30]	-0.69 [0.34]
276-Other crude minerals (0.16%)	-2.53 [0.46]	6.10 [1.58]	-5.28 [2.08]**	-7.37 [1.49]	-5.41 [2.45]**
281-Iron ore & concentrates (0.22%)	0.18 [0.07]	10.39 [3.80]**	-9.83 [4.08]**	-5.86 [4.57]**	-2.48 [3.02]**
282-Iron and steel scrap (0.24%)	0.05 [0.03]	-4.41 [3.57]**	4.22 [4.20]**	-1.23 [1.45]	2.74 [1.63]
283-Ores & concentrates of non-ferrous (0.16%)	24.07 [3.55]	-2.07 [5.72]**	3.11 [5.64]**	10.08 [1.48]	-1.32 [0.51]
284-Non-ferrous metal scrap (0.28%)	-0.52 [0.31]	-0.44 [0.31]	0.81 [0.63]	-1.44 [0.90]	0.04 [0.05]
291-Crude animal materials, n.e.s. (0.03%)	17.62 [5.74]	-0.82 [0.39]	-3.82 [2.19]**	1.26 [3.65]**	3.01 [1.59]
292-Crude vegetable materials, n.e.s. (0.12%)	0.60 [0.31]	3.42 [2.46]**	-3.57 [2.95]**	1.15 [0.53]	0.59 [0.44]
321-Coal, coke & briquettes (0.17%)	-12.53 [4.92]	12.77 [6.74]**	-9.87 [6.44]**	-8.46 [2.92]**	-4.91 [3.26]**
332-Petroleum products (4.55%)	-15.92 [5.68]	1.42 [0.53]	3.52 [1.42]	-6.36 [2.55]**	6.61 [4.15]**
341-Gas, natural and manufactured (3.08%)	-6.28 [1.44]	-4.75 [1.16]	7.84 [2.16]**	-0.71 [0.17]	11.88 [4.34]**
411-Animal oils and fats (0.02%)	-7.02 [2.28]	-3.93 [1.80]*	5.57 [3.21]**	-4.80 [1.61]	-3.82 [2.32]**
421-Fixed vegetable oils, soft (0.27%)	13.83[0.08]	6.65 [0.01]	-6.32 [0.11]	4.75 [0.16]	5.66 [0.10]
431-Animal and veg. Oils & fats, processed (0.02%)	-3.66 [3.94]	17.22 [3.11]**	-8.41 [3.84]**	-9.82 [3.32]**	8.05 [4.45]**
512-Organic chemicals (1.37%)	-5.33 [2.19]	-5.33 [2.19]**	6.09 [2.91]**	0.86 [1.39]	0.48 [0.29]
513-Inorg. Chemical elements, oxides (0.36%)	5.56 [2.25]	-6.13 [4.62]**	4.78 [4.54]**	4.70 [1.99]**	2.09 [1.62]
514-Other inorganic chemicals (0.19%)	-4.98 [1.17]	4.25 [1.41]	-2.73 [1.01]	-4.21 [0.95]	0.09 [0.03]
515-Radioactive and associated material (0.09%)	-16.85 [2.90]	-7.48 [3.97]**	11.94 [5.53]**	-6.61 [1.17]	0.65 [0.20]
521-Crude chemicals from coal, petroleum (0.04%)	1.23 [0.15]	-11.39 [2.75]**	10.51 [3.16]**	13.32 [1.65]*	8.72 [1.89]*
531-Synth. Organic dyestuffs, natural (0.02%)	-8.08 [0.78]	7.30 [0.80]	-5.71 [0.59]	5.38 [0.60]	-5.34 [0.85]
532-Dyeing & tanning extracts, synthetic (0.003%)	-4.51 [0.52]	11.63 [3.32]**	-10.73 [3.66]**	-3.96 [0.44]	2.52 [2.53]**
533-Pigments, paints, varnishes & relatives (0.39%)	-4.01 [0.71]	-8.89 [1.69]*	9.24 [2.31]**	8.19 [1.56]	4.55 [2.05]**
541-Medicinal & pharmaceutical products (1.26%)	-4.73 [1.35]	-2.36 [0.82]	2.80 [1.15]	5.25 [1.59]	0.05 [0.02]
551-Essential oils, perfume and flavor (0.08%)	2.71 [0.56]	0.45 [0.12]	-1.83 [0.59]	1.02 [0.27]	-3.33 [1.33]
553-Perfumery, cosmetics, dentifrices (0.46%)	15.39 [1.48]	-14.87 [1.92]*	4.88 [1.29]	3.82 [2.04]**	1.75 [2.41]**
554-Soaps, cleansing & polishing preparations (0.36%)	2.96 [0.48]	-12.20 [2.41]**	10.82 [2.79]**	10.95 [1.98]**	6.15 [2.36]**
561-Fertilizers manufactured (0.66%)	7.34 [4.39]	-13.82 [4.55]**	9.16 [4.84]**	10.15 [4.91]**	-6.23 [1.95]*
571-Explosives and pyrotechnic products (0.05%)	3.64 [5.44]	-5.39 [1.51]	-3.44 [1.38]	12.45 [3.48]**	3.77 [1.26]
581-Plastic materials, regenerd. Cellulose (2.53%)	-3.75 [0.49]	-7.13 [1.17]	7.70 [1.76]*	9.35 [1.33]	8.03[2.28]**
599-Chemical materials and products, n.e.s. (1.04%)	-7.22 [6.27]	1.23 [1.56]	0.23 [0.34]	-1.18 [1.28]	-0.62 [1.12]
611-Leather (0.003%)	-2.92 [0.91]	2.38 [0.21]	0.89 [0.09]	-7.09 [0.42]	15.09 [1.48]
612-Manuf. of leather or of artificial (0.01%)	-6.97 [2.62]	-2.10 [1.01]	3.91 [2.24]**	1.32 [0.59]	5.30 [4.06]**
613-Fur skins, tanned or dressed, including (0.001%)	1.42 [0.38]	0.28 [0.10]	-0.96 [0.45]	11.92 [2.63]**	8.96 [2.77]**
629-Articles of rubber, n.e.s (0.75%)	-8.04 [4.66]	-6.35 [5.01]**	8.36 [8.23]**	-1.14 [0.72]	1.87 [2.16]**
631-Veneers, plywood boards & other woods (0.32%)	6.61 [1.47]	-1.52 [0.42]	-0.06 [0.02]	11.15 [2.61]**	8.13 [3.41]**
632-Wood manufactures, n.e.s. (0.40%)	12.07 [1.48]	-5.14 [1.23]	1.98 [0.68]	9.95 [2.25]**	4.85 [3.32]**
633-Cork manufactures (0.001%)	11.07 [1.19]	-2.69 [3.95]**	1.37 [3.61]**	14.67 [1.72]*	3.05 [0.67]
641-Paper and paperboard (1.31%)	-7.70 [2.56]	4.89 [2.21]**	8.04 [2.19]**	5.34 [3.12]**	11.76 [3.16]**
642-Articles of paper, pulp, paperboard (0.71%)	-8.20 [3.84]	-0.60 [0.60]	2.54 [2.16]**	1.24 [0.65]	3.02 [2.76]**
651-Textile yarn and thread (0.10%)	-2.84 [0.53]	7.01 [1.64]*	-6.40 [1.78]*	4.95 [0.98]	2.85 [0.92]
652-Cotton fabrics, woven ex. narrow (0.006%)	-16.87 [3.32]	8.64 [2.75]**	-4.34 [1.64]*	0.33 [0.06]	11.43 [3.08]**
653-Text fabrics woven ex narrow, spec, not cotton (0.08%)	-9.87 [2.11]	6.22 [4.75]**	-3.97 [4.44]**	-0.19 [0.04]	0.92 [0.32]
654- Tulle, lace, embroidery, ribbons, timmings (0.009%)	-16.40 [6.75]	-1.63 [0.97]	5.61 [3.83]**	-0.33 [0.14]	4.27 [2.89]**
655-Special textile fabrics and related (0.18%)	0.15 [0.03]	0.01 [0.004]	-0.41 [0.13]	4.29 [0.76]	1.98 [0.53]
656-Made up articles, wholly or chiefly (0.07%)	6.31 [0.76]	-11.21 [1.88]*	8.84 [2.13]**	9.89 [2.23]**	2.95 [2.69]**
657-Floor coverings, tapestries, etc. (0.11%)	12.41 [1.81]	-8.76 [1.69]*	4.69 [1.17]	20.63 [3.13]**	11.57 [3.41]**

661-Lime, cement & fabr. bldg.mat. Ex g (0.20%)	-4.62 [2.62]	0.008 [0.007]	1.73 [1.72]*	-1.70 [1.08]	4.67 [5.35]**
662-Clay and refractory construction ma (0.04%)	-6.63 [5.11]	3.66 [3.82]**	-2.24 [2.78]**	-0.17 [0.14]	2.67 [3.46]**
663-Mineral manufactures, n.e.s. (0.22%)	-14.10 [6.86]	3.80 [2.47]**	-0.02 [0.02]	-2.47 [1.42]	4.96 [4.77]**
664-Glass (0.22%)	0.37 [0.37]	1.37 [0.70]	-1.71 [0.77]	2.93 [0.92]	3.86 [2.64]**
665-Glassware (0.07%)	-18.25 [5.59]	-6.91 [2.81]**	11.29 [5.58]**	-0.45 [0.17]	6.13 [3.87]**
666-Pottery (0.007%)	-3.62 [0.50]	-0.01 [0.003]	0.68 [0.21]	2.63 [0.42]	7.84 [2.56]**
667-Pearls and precious and semi precious (0.06%)	23.16 [2.34]	-12.86 [1.73]*	5.87 [1.04]	12.61 [2.02]**	3.95 [0.68]
671-Pig iron, spiegeleisen, sponge iron (0.06%)	3.09 [3.35]	-1.99 [2.83]**	1.15 [1.95]*	3.20 [3.79]**	0.31 [0.64]
672-Ingots & other primary forms of iron (0.25%)	4.82 [0.65]	-14.29 [2.43]**	13.26 [2.65]**	4.75 [0.72]	3.07 [0.77]
673-Iron and steel bars, rods, angles (0.41%)	3.62 [1.01]	-12.54 [5.14]**	11.59 [5.14]**	8.84 [3.01]**	8.67 [5.21]**
674-Universals, plates and sheets of iron (0.75%)	7.54 [1.22]	-8.85 [2.43]**	6.91 [2.48]**	7.14 [1.32]	5.34 [2.10]**
676-Rails & railway track constr materials of iron (0.03%)	-16.39 [3.72]	1.03 [0.27]	3.21 [0.97]	-12.08 [2.52]**	-1.20 [0.37]
677-Iron and steel wire, excluding wire (0.05%)	1.25 [0.32]	-10.83 [4.67]**	10.83 [5.56]**	3.03 [1.01]	4.52 [2.78]**
678-Tubes, pipes and fittings of iron (0.52%)	-4.54 [2.91]	-4.68 [3.81]**	5.84 [5.68]**	-1.02 [0.75]	1.57 [1.84]*
679-Iron steel castings forgings unwork (0.06%)	-5.35 [1.36]	12.48 [3.92]**	-11.54 [4.28]**	2.67 [0.75]	2.15 [1.04]
681-Silver and platinum group metals (0.25%)	5.38 [3.17]	-1.29 [0.98]	0.32 [0.28]	4.20 [2.49]**	4.13 [4.15]**
682-Copper (0.51%)	10.05 [4.48]	-4.16 [2.66]**	1.60 [1.26]	6.21 [2.81]**	0.53 [0.45]
683-Nickel (0.16%)	6.01 [2.58]	-2.74 [1.34]	1.88 [1.16]	1.58 [0.62]	-0.22 [0.18]
684-Aluminium (1.25%)	5.09 [3.31]	-1.41 [1.17]	0.26 [0.26]	2.43 [1.58]	-0.36 [0.41]
685-Lead (0.09%)	14.89 [2.36]	-4.61 [0.93]	1.19 [0.27]	3.71 [0.62]	-6.97 [1.93]*
686-Zinc (0.16%)	-4.34 [2.59]	-10.53 [8.65]**	2.50 [2.21]**	-3.70 [2.28]**	-1.39 [1.55]
687-Tin (0.007%)	-3.84 [0.67]	12.10 [2.65]**	-11.33 [2.86]**	-6.03 [1.11]	-10.10 [3.06]**
689-Miscell.non ferrous base metals (0.05%)	-8.45 [6.04]	3.41 [2.29]**	-1.22 [1.21]	-0.16 [0.12]	4.34 [5.34]**
691-Finished structural parts and structures (0.28%)	-7.55 [1.36]	2.11 [0.50]	-0.11 [0.03]	5.01 [0.86]	8.24 [2.23]**
692-Metal containers for storage and truck (0.18%)	-6.02 [1.88]	6.35 [2.59]**	-4.87 [2.15]**	-2.59 [0.87]	1.79 [0.99]
693-Wire products ex electric & fence (0.07%)	20.54 [1.41]	-6.67 [1.24]	1.09 [0.18]	9.91 [1.49]	2.25 [1.78]*
694-Nails, screws, nuts, bolts, rivets (0.20%)	0.67 [3.13]	-8.64 [4.06]**	8.48 [4.89]**	2.83 [0.89]	5.47 [3.13]**
695-Tools for use in the hand or in machines (0.21%)	8.39 [0.51]	-6.68 [0.82]	3.51 [0.91]	12.79 [0.91]	4.27 [0.98]
696-Cutlery (0.02%)	-11.16 [2.11]	11.24 [2.76]**	-8.95 [2.47]**	3.98 [0.78]	12.42 [3.82]**
697-Household equipment of base metals (0.08%)	-14.97 [5.43]	2.62 [1.46]	1.31 [0.86]	-1.43 [0.58]	5.92 [3.94]**
698-Manufactures of metal, n.e.s. (0.71%)	-3.85 [1.89]	-2.39 [2.05]**	3.46 [3.41]**	-1.42 [0.84]	1.18 [1.32]
711-Power generating machinery, other than electronics (1.98%)	1.18 [0.45]	-1.15 [0.90]	0.73 [0.73]	-0.48 [0.18]	-2.50 [1.88]*
712-Agricultural machinery and implements (0.64%)	-1.08 [1.12]	1.28 [1.76]*	-1.04 [1.62]	-1.87 [2.08]**	-0.37 [0.71]
714-Office machines (0.54%)	-12.83 [4.93]	6.14 [2.72]**	-2.76 [1.43]	-9.71 [3.11]**	-1.09 [0.64]
715-Metalworking machinery (0.64%)	-5.52 [2.18]	2.19 [1.75]*	-0.98 [0.83]	1.43 [0.81]	1.91 [2.19]**
717-Textile and leather machinery (0.09%)	-27.90 [0.71]	5.28 [0.54]	-5.49 [0.51]	-7.40 [0.45]	5.79 [0.41]
718-Machines for special industries (0.05%)	-3.39 [1.71]	-4.27 [2.79]**	4.63 [3.77]**	4.92 [2.66]**	3.56 [3.49]**
719-Machinery and appliances non electronics (4.33%)	-3.68 [1.56]	-0.87 [0.63]	1.64 [1.29]	2.46 [1.22]	3.37 [2.79]**
722-Electric power machinery and switch (1.05%)	-4.44 [2.44]	-4.83 [3.85]**	5.78 [5.89]**	0.99 [0.65]	2.30 [2.78]**
723-Equipment for distributing electric (0.33%)	3.63 [0.89]	0.82 [0.27]	-2.06 [0.75]	5.03 [1.24]	3.60 [1.45]
724-Telecommunications apparatus (0.68%)	1.79 [0.94]	-1.24 [0.93]	0.69 [0.66]	3.97 [1.84]*	1.79 [1.35]
725-Domestic electrical equipment (0.21%)	-6.03 [1.74]	-0.85 [0.34]	2.02 [0.95]	7.14 [1.96]**	8.67 [3.83]**
726-Elec. apparatus for medical purposes (0.10%)	4.49 [0.84]	-1.83 [0.39]	-0.12 [0.02]	5.02 [1.58]	7.73 [1.42]
729-Other electrical machinery and apparatus (1.23%)	-4.51 [1.81]	1.62 [1.07]	-0.67 [0.53]	0.80 [0.37]	1.65 [1.45]
731-Railway vehicles (0.19%)	-23.38 [3.01]	-3.59 [0.54]	9.23 [1.59]	-7.48 [2.13]**	-2.69 [0.98]
732-Road motor vehicles (15.06%)	-0.08 [0.07]	2.18 [2.95]**	-1.99 [3.22]**	1.06 [1.08]	1.88 [3.71]**

733-Road vehicles other than motor vehicles (0.52%)	-0.67 [0.61]	-2.21 [2.52]**	1.86 [2.49]**	7.62 [6.47]**	7.28 [9.83]**
734-Aircraft (1.21%)	24.89 [6.14]	-11.26 [3.87]**	4.02 [1.61]	6.47 [4.18]**	-9.51 [3.28]**
735-Ships and boats (0.14%)	2.86 [0.64]	5.26 [1.71]*	-5.83 [2.14]**	5.45 [1.41]	7.64 [3.43]**
812-Sanitary, plumbing, heating & light (0.25%)	-15.33 [4.38]	1.21 [0.39]	2.27 [0.85]	1.43 [0.41]	4.96 [2.28]**
821-Furniture (1.01%)	9.43 [1.20]	-2.11 [0.56]	-0.21 [0.06]	9.16 [1.33]	6.38 [1.89]*
831-Travel goods, handbags and similar (0.04%)	19.55 [0.13]	-9.90 [0.63]	3.73 [0.34]	11.72 [0.62]	7.54 [0.42]
841-Clothing except fur clothing (0.25%)	4.72 [0.99]	3.38 [0.37]	-13.94 [1.71]*	4.97 [1.15]	2.52 [1.54]
842-Fur clothing and articles of artificial (0.003%)	1.09 [0.22]	8.39 [2.27]**	-8.00 [2.39]**	2.65 [0.85]	4.42 [1.61]
851-Footwear (0.03%)	-1.57 [0.68]	-1.57 [0.69]	-0.15 [0.07]	5.35 [1.53]	6.08 [2.49]**
861-Scientific, medical, optical, meas. (1.11%)	-6.24 [2.62]	-3.54 [1.78]*	4.67 [2.78]**	1.68 [0.82]	1.16 [0.91]
862-Photographic and cinematographic supply (0.02%)	-15.98 [3.14]	-0.71 [0.19]	4.95 [1.72]*	-9.64 [2.08]**	-0.07 [0.02]
863-Developed cinematographic film (0.001%)	-5.09 [9.33]	3.92 [8.68]**	-2.33 [6.43]**	-3.34 [5.18]**	0.94 [0.25]
864-Watches and clocks (0.01%)	-7.78 [3.13]	5.90 [2.86]**	-4.32 [2.16]**	2.04 [0.80]	4.79 [2.88]**
891-Musical instruments, sound recorder (0.22%)	-3.27 [2.17]	-1.27 [1.08]	1.60 [1.68]*	4.52 [3.14]**	3.51 [4.23]**
892-Printed matter (0.52%)	-6.25 [1.26]	-0.008 [0.004]	1.46 [0.79]	2.41 [0.55]	4.95 [1.89]*
893-Articles of artificial plastic mate (1.11%)	0.63 [0.13]	-7.10 [2.37]**	6.60 [2.93]**	8.45 [1.89]*	6.40 [3.09]**
894-Perambulators, toys, games and sports (0.23%)	18.95 [1.61]	-4.81 [0.87]	-0.61 [0.16]	16.86 [1.83]*	6.06 [1.72]*
895-Office and stationery supplies, n.e.s. (0.02%)	-3.66 [0.48]	-5.21 [0.78]	5.42 [0.98]	3.09 [0.40]	4.65 [1.08]
896-Works of art, collectors pieces (0.02%)	5.65 [0.94]	-13.40 [3.18]**	12.06 [3.24]**	11.40 [2.02]**	10.01 [2.95]**
897-Jewellery and gold/silver smiths (0.20%)	-25.48 [6.28]	6.89 [2.55]**	-0.31 [0.13]	-7.01 [1.74]*	5.93 [2.73]**
899-Manufactured articles, n.e.s. (0.18%)	-3.11 [0.37]	1.25 [0.32]	-0.82 [0.22]	4.50 [0.66]	4.33 [1.33]
931-Special transactions not classed according to kind (4.41%)	-2.80 [0.35]	16.03 [2.51]**	-14.67 [2.80]**	-1.52 [0.19]	4.11 [0.97]

Notes: Numbers inside the brackets are absolute values of the t-ratios. The critical value of standard t-ratio is 1.64 (1.96) at the 10% (5%) significance level.
* indicates significance at the 10% level and ** at the 5% level.

Table 63: Diagnostic Statistics Associated with Nonlinear ARDL Model (5).									
Industries (Based on 3-Digit Code Order)	**Diagnostics**								
	F	*ECM_{t-1}*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ*	*Adj. R^2*	*Wald-Short*	*Wald-Long*
001-Live animal (0.37%)	4.16*	-0.54 [4.73]**	0.68	0.002	S	S	0.31	1.94	6.77**
011-Meat, fresh, chilled or frozen (0.64%)	7.04**	-0.36 [6.29]**	0.003	1.76	S	NS	0.47	1.79	4.47**
012-Meat, dried, salted or smoked (0.02%)	1.32	-0.11 [2.53]	0.21	11.31**	S	NS	0.05	0.01	2.09
013-Meat in airtight containers n.e.s. (0.17%)	7.96**	-0.65 [6.66]**	0.02	0.03	S	S	0.56	0.09	0.49
022-Milk and cream (0.03%)	3.56	-0.52 [3.37]	7.02**	1.88	S	NS	0.21	1.41	0.04
024-Cheese and curd (0.01%)	2.63	-0.47 [3.26]	0.13	0.17	S	S	0.19	0.34	13.74**
025-Eggs (0.03%)	3.12	-0.53 [4.17]**	0.002	4.56**	S	S	0.48	2.49	0.40
031-Fish, fresh & simply preserved (0.48%)	1.88	-0.21 [3.11]	0.01	4.16**	S	S	0.15	2.43	1.37
032-Fish, in airtight containers, n.e.s (0.08%)	5.79**	-0.71 [5.56]**	0.21	1.73	S	S	0.36	1.08	6.60**
044-Maize corn, unmilled (0.07%)	4.91**	-0.34 [5.18]**	5.22**	0.02	S	S	0.39	0.50	1.13
045-Cereals, unmilled excl. wheat, rice (0.08%)	5.59**	-1.01 [5.54]**	0.28	1.17	S	S	0.51	0.03	1.61
046-Meal and flour of wheat (0.03%)	2.53	-0.29 [3.72]*	5.07**	0.008	S	NS	0.36	0.67	1.70
047-Meal & flour of cereals, except wheat (0.02%)	3.51	-0.77 [4.43]**	0.004	0.28	S	S	0.39	0.01	0.40
048-Cereal preps & preps of flour (0.78%)	5.22**	-0.36 [5.42]**	0.07	3.53*	S	S	0.46	0.35	2.56
051-Fruit, fresh, and nuts excl. Oil nuts (0.003%)	4.73**	-0.52 [4.72]**	0.41	1.59	S	S	0.34	0.23	4.62**
052-Dried fruit including artificially (0.01%)	4.31*	-0.86 [4.43]**	0.39	0.45	S	S	0.44	0.58	6.37**
053-Fruit, preserved and fruit preparation (0.27%)	3.63	-0.51 [4.51]**	0.71	0.05	S	S	0.45	0.54	0.10
054-Vegetables, roots & tubers, fresh (0.68%)	7.29**	-0.67 [6.42]**	0.12	5.99**	S	S	0.59	1.18	13.78**
055-Vegetables, roots & tubers preserved (0.98%)	5.75**	-0.26 [5.66]**	1.22	0.41	S	NS	0.46	3.31*	0.22
061-Sugar and honey (0.08%)	5.56**	-0.78 [5.49]**	0.11	0.04	S	S	0.49	3.03*	4.33**
062-Sugar confectionery, sugar preparation (0.12%)	3.51	-0.36 [4.41]**	0.26	6.21**	S	S	0.42	0.99	3.88**
071-Coffee (0.17%)	4.03*	-0.65 [4.64]**	2.81*	5.67**	NS	S	0.26	1.50	6.23**
072-Cocoa (0.02%)	4.59**	-0.78 [5.13]**	0.03	0.83	S	S	0.46	0.11	0.01
073-Chocolate & other food preparations (0.26%)	4.71**	-0.38 [5.13]**	0.69	0.71	S	NS	0.33	0.03	6.08**
074-Tea and mate (0.01%)	6.21**	0.15 [4.69]**	0.29	0.73	S	S	0.29	1.64	0.53
075-Spices (0.007%)	4.26*	-0.45 [4.92]**	0.92	0.02	S	S	0.49	0.41	2.52
081- Feed. Stuff for animals' excl. unmilled (0.55%)	5.71**	-0.70 [5.65]**	3.23*	0.36	S	S	0.38	5.01**	2.63
099-Food preparations, n.e.s. (0.57%)	2.41	-0.35 [3.34]*	2.27	0.43	S	S	0.14	0.38	0.24
111-Nonalcoholic beverages, n.e.s. (0.13%)	2.97	-0.16 [4.06]**	0.47	8.03**	S	S	0.43	0.88	0.02
112-Alcoholic beverages (0.22%)	6.27**	-1.13 [5.81]**	1.06	10.57**	S	S	0.62	0.83	6.14**
121-Tobacco, unmanufactured (0.01%)	7.34**	-1.61 [6.39]**	0.28	2.75	S	S	0.48	1.19	10.17**
122-Tobacco manufactures (0.01%)	4.17*	-0.71 [7.23]**	2.31	14.66	NS	S	0.57	10.91**	22.64**
211-Hides & skins, exc. fur skins undressed (0.007%)	3.96*	-0.45 [4.62]**	0.01	0.69	S	S	0.29	2.61	0.25
212-Fur skins, undressed (0.06%)	10.25**	-1.33 [7.49]**	0.17	2.48	S	S	0.68	0.17	0.09
221-Oil seeds, oil nuts and oil kernels (0.21%)	1.85	-0.31 [3.13]	0.01	0.37	S	S	0.22	0.02	0.03
231-Crude rubber incl. synthetic (0.08%)	3.76	-0.24 [4.45]**	3.98**	2.58	S	S	0.59	3.22*	0.04
241-Fuel wood & charcoal (0.02%)	2.51	-0.31 [3.47]	6.58**	1.48	S	S	0.17	0.13	0.45
242-Wood in the rough or roughly squared (0.07%)	4.44*	-0.48 [4.57]**	0.35	0.12	S	S	0.29	1.10	3.02*
243-Wood, sharped or simply worked (0.92%)	5.17**	-0.55 [5.36]**	0.27	0.52	S	S	0.56	0.63	0.41
251-Pulp & waste paper (0.41%)	11.93**	-0.68 [8.17]**	10.53**	3.74*	NS	S	0.57	0.45	9.67**
262-Wool and other animal hair (0.0004%)	6.01**	-0.69 [5.85]**	1.01	0.001	S	S	0.63	1.09	22.03**
263-Cotton (0.001%)	8.62**	-0.85 [6.91]**	0.84	0.07	S	S	0.53	3.47*	1.48

265-Vegetable fibers, except cotton (0.001%)	4.87**	-0.62 [4.96]**	0.88	21.86**	S	NS	0.38	1.31	4.93**
266-Synthetic and regenerated artificially (0.02%)	1.24	-0.08 [2.46]	0.03	0.44	S	S	0.02	0.08	0.82
267-Waste materials from textile fabric (0.01%)	7.44**	-0.92 [6.54]**	1.56	3.38*	S	S	0.49	0.31	0.05
273-Stone, sand and gravel (0.07%)	5.27**	-0.42 [5.45]**	0.72	0.01	S	S	0.43	4.18**	2.95*
274-Sulphur & unroasted iron pyrites (0.01%)	5.95**	-0.65 [5.83]**	0.29	0.15	S	S	0.52	0.66	5.70**
275-Natural abrasives incl. industrial (0.002%)	2.32	-0.71 [3.53]	0.55	0.13	S	S	0.35	0.02	0.08
276-Other crude minerals (0.16%)	5.89**	-0.40 [5.81]**	18.23**	2.52	NS	S	0.51	0.01	0.39
281-Iron ore & concentrates (0.22%)	10.19**	-0.67 [7.61]**	9.47**	9.51**	S	S	0.62	10.68**	22.31**
282-Iron and steel scrap (0.24%)	6.83**	-0.87 [5.79]**	3.13*	0.15	S	S	0.43	0.006	5.51**
283-Ores & concentrates of non-ferrous (0.16%)	7.28**	-0.68 [6.47]**	1.23	0.17	S	S	0.61	1.59	4.62**
284-Non-ferrous metal scrap (0.28%)	6.28**	-0.73 [5.01]**	4.89**	0.16	S	S	0.31	0.09	1.09
291-Crude animal materials, n.e.s. (0.03%)	6.13**	-0.56 [5.85]**	1.64	9.93**	S	S	0.36	4.18**	15.16**
292-Crude vegetable materials, n.e.s. (0.12%)	5.19**	-0.49[0.50]	0.007	13.75**	S	S	0.39	0.01	0.74
321-Coal, coke & briquettes (0.17%)	5.51**	-0.49 [5.46]**	0.72	0.12	S	S	0.42	5.83**	3.66**
332-Petroleum products (4.55%)	6.89**	-0.45 [6.14]**	0.04	0.55	S	S	0.53	0.51	8.24**
341-Gas, natural and manufactured (3.08%)	4.77**	-0.79 [5.15]**	1.53	5.16**	S	NS	0.39	0.06	6.40**
411-Animal oils and fats (0.02%)	4.23*	-0.60 [4.79]**	0.03	0.29	S	S	0.54	1.31	1.05
421-Fixed vegetable oils, soft (0.27%)	5.29**	0.01 [5.47]**	9.71**	3.15*	NS	S	0.57	3.39*	0.03
431-Animal and veg. Oils & fats, processed (0.02%)	4.49*	-0.19 [2.06]	0.07	10.11**	S	S	0.16	6.37**	2.63
512-Organic chemicals (1.37%)	3.25	-0.35 [4.20]**	3.42*	0.001	S	S	0.26	0.21	1.29
513-Inorg. Chemical elements, oxides (0.36%)	7.09**	-0.55 [6.34]**	12.08**	0.03	S	S	0.47	0.75	4.81**
514-Other inorganic chemicals (0.19%)	3.38	-0.20 [4.18]**	0.69	1.54	S	S	0.41	1.73	2.06
515-Radioactive and associated material (0.09%)	7.72**	-0.53 [6.53]**	0.01	0.17	S	S	0.61	3.41*	3.40*
521-Crude chemicals from coal, petroleum (0.04%)	5.96**	-0.42[5.53]**	0.04	0.83	S	S	0.42	2.73*	2.60
531-Synth. Organic dyestuffs, natural (0.02%)	2.99	-0.22 [4.04]**	0.001	0.04	S	NS	0.35	1.41	0.01
532-Dyeing & tanning extracts, synthetic (0.003%)	4.88**	-0.49 [5.20]**	2.82*	2.11	S	S	0.33	1.45	0.07
533-Pigments, paints, varnishes & relatives (0.39%)	5.06**	-0.35 [5.35]**	1.26	7.03**	S	S	0.51	2.42	0.87
541-Medicinal & pharmaceutical products (1.26%)	1.94	-0.37 [3.23]	0.03	6.41**	S	S	0.32	4.35**	3.14*
551-Essential oils, perfume and flavor (0.08%)	2.99	-0.28 [3.88]**	4.34**	3.81*	S	S	0.36	3.96**	1.28
553-Perfumery, cosmetics, dentifrices (0.46%)	10.91**	-0.35 [7.95]**	2.53	6.41**	S	S	0.59	0.63	3.01*
554-Soaps, cleansing & polishing preparations (0.36%)	5.14**	-0.25 [5.34]**	2.28	0.52	S	S	0.49	0.28	1.56
561-Fertilizers manufactured (0.66%)	8.67**	-0.11 [7.38]**	4.39**	2.69	S	S	0.69	1.25	19.37**
571-Explosives and pyrotechnic products (0.05%)	7.11**	-0.50 [6.34]**	2.96	0.45	S	S	0.71	7.88**	4.48**
581-Plastic materials, regenerd. Cellulose (2.53%)	4.99**	-0.20 [5.28]**	14.59**	7.17**	NS	NS	0.49	0.10	0.08
599-Chemical materials and products, n.e.s. (1.04%)	6.33**	-0.78 [5.88]**	11.19**	0.25	S	NS	0.38	0.02	0.86
611-Leather (0.003%)	2.38	-0.18 [3.59]	0.93	5.64**	S	S	0.36	2.85*	3.17*
612-Manuf. of leather or of artificial (0.01%)	5.66**	-0.65 [5.62]**	0.58	10.48**	S	S	0.41	0.08	3.83*
613-Fur skins, tanned or dressed, including (0.001%)	6.86**	-0.75 [6.31]**	2.43	2.28	S	S	0.49	0.002	1.52
629-Articles of rubber, n.e.s (0.75%)	9.22**	-1.09 [7.17]**	4.07**	1.15	S	S	0.28	3.45*	5.70**
631-Veneers, plywood boards & other woods (0.32%)	6.12**	-0.42 [5.80]**	0.71	2.93*	S	S	0.46	2.01	1.42
632-Wood manufactures, n.e.s. (0.40%)	5.45**	-0.18 [4.98]**	0.81	0.71	S	S	0.48	0.44	0.62
633-Cork manufactures (0.001%)	1.71	-0.25 [2.53]	0.001	0.005	S	S	0.12	0.08	0.02
641-Paper and paperboard (1.31%)	6.04**	-0.22 [5.62]**	0.18	0.002	S	S	0.54	1.01	0.21
642-Articles of paper, pulp, paperboard (0.71%)	5.15**	-0.56 [5.52]**	2.72*	0.005	S	S	0.43	0.84	1.00
651-Textile yarn and thread (0.10%)	2.08	-0.39 [3.37]	0.02	2.89*	S	S	0.31	0.93	0.49
652-Cotton fabrics, woven ex. narrow (0.006%)	3.73	-0.50 [4.53]**	1.88	0.55	S	S	0.37	1.33	4.85**
653-Text fabrics woven ex narrow, spec, not cotton (0.08%)	3.08	-0.39 [4.13]**	4.04**	0.18	S	S	0.47	0.15	0.03

654- Tulle, lace, embroidery, ribbons, timmings (0.009%)	4.87**	-0.61 [5.19]**	0.16	4.67**	S	S	0.43	0.30	7.22**
655-Special textile fabrics and related (0.18%)	3.14	-0.27 [4.16]**	0.26	6.68**	S	S	0.27	0.36	0.01
656-Made up articles, wholly or chiefly (0.07%)	5.39**	-0.30 [5.54]**	1.31	7.31**	S	S	0.52	0.34	1.98
657-Floor coverings, tapestries, etc. (0.11%)	5.54**	-0.36 [5.49]**	3.89**	0.98	S	NS	0.51	8.27**	2.16
661-Lime, cement & fabr. bldg.mat. Ex g (0.20%)	7.92**	-0.40 [5.24]**	0.72	0.89	S	S	0.58	0.93	7.57**
662-Clay and refractory construction ma (0.04%)	5.59**	-0.74 [5.51]**	1.85	0.19	S	S	0.47	0.02	10.65**
663-Mineral manufactures, n.e.s. (0.22%)	3.11	-0.54 [4.14]**	0.74	1.08	S	S	0.39	3.29*	5.56**
664-Glass (0.22%)	2.49	-0.19 [3.54]	21.02**	3.22	NS	S	0.22	0.001	1.56
665-Glassware (0.07%)	5.11**	-0.79 [0.83]	2.21	4.02**	S	S	0.49	4.41**	8.02**
666-Pottery (0.007%)	4.71**	-0.51 [5.12]**	0.16	0.005	S	S	0.39	0.05	1.14
667-Pearls and precious and semi precious (0.06%)	3.53	-0.34 [4.43]**	0.006	0.66	S	S	0.42	5.86**	6.81**
671-Pig iron, spiegeleisen, sponge iron (0.06%)	9.16**	-1.02 [1.25]	1.47	0.51	S	S	0.71	1.21	6.34**
672-Ingots & other primary forms of iron (0.25%)	4.48*	-0.53 [4.84]**	1.77	4.14**	S	S	0.44	0.03	0.03
673-Iron and steel bars, rods, angles (0.41%)	7.19**	-0.59 [6.29]**	0.71	0.39	S	S	0.48	1.09	0.19
674-Universals, plates and sheets of iron (0.75%)	7.88**	-0.48 [5.27]**	0.21	0.67	S	S	0.42	2.15	0.10
676-Rails & railway track constr materials of iron (0.03%)	1.93	-0.33 [2.95]	0.29	0.07	S	S	0.36	3.51*	3.17*
677-Iron and steel wire, excluding wire (0.05%)	7.19**	-0.44 [6.29]**	4.73**	4.39**	S	NS	0.43	3.11*	0.01
678-Tubes, pipes and fittings of iron (0.52%)	5.26**	-0.82 [5.41]**	1.17	2.29	S	S	0.51	1.05	1.50
679-Iron steel castings forgings unwork (0.06%)	6.08**	-0.62 [5.77]**	1.01	0.005	S	S	0.58	0.01	0.05
681-Silver and platinum group metals (0.25%)	10.36**	-1.91 [7.62]**	2.08	5.94**	S	NS	0.56	0.47	0.02
682-Copper (0.51%)	3.86	-0.66 [4.34]**	4.02**	3.96**	S	S	0.29	0.78	5.45**
683-Nickel (0.16%)	8.02**	-0.87 [6.75]**	0.01	0.41	S	S	0.62	10.57**	1.07
684-Aluminium (1.25%)	2.91	-0.66 [4.01]*	1.71	0.55	S	S	0.43	2.87*	6.45**
685-Lead (0.09%)	3.47	-0.70 [4.34]**	0.14	6.11**	S	S	0.23	0.68	7.33**
686-Zinc (0.16%)	5.74**	-0.83 [5.47]**	2.35	0.21	S	S	0.41	3.94**	0.97
687-Tin (0.007%)	6.39**	-0.78 [5.65]**	0.45	2.08	S	NS	0.36	0.02	0.02
689-Miscell.non ferrous base metals (0.05%)	5.14**	-0.90 [5.27]**	0.006	0.13	S	S	0.43	3.09*	9.57**
691-Finished structural parts and structures (0.28%)	3.36	-0.37 [4.31]**	0.91	0.002	S	S	0.43	0.03	0.29
692-Metal containers for storage and truck (0.18%)	3.19	-0.24 [4.16]**	3.66*	7.12**	S	S	0.47	0.34	3.03*
693-Wire products ex electric & fence (0.07%)	2.14	-0.10 [3.25]	2.82*	5.11**	S	S	0.17	0.86	0.56
694-Nails, screws, nuts, bolts, rivets (0.20%)	5.08**	-0.39 [3.50]	2.59	12.94**	S	NS	0.37	3.55*	0.62
695-Tools for use in the hand or in machines (0.21%)	4.39**	-0.21 [4.95]**	3.66*	3.84**	S	S	0.54	2.54	0.66
696-Cutlery (0.02%)	5.54**	-0.61 [5.38]**	0.46	2.83*	S	S	0.39	2.84*	8.74**
697-Household equipment of base metals (0.08%)	6.75**	-0.60 [6.25]**	0.16	0.48	S	S	0.46	0.02	6.65**
698-Manufactures of metal, n.e.s. (0.71%)	6.72**	-0.51 [6.10]**	1.02	0.29	S	S	0.51	0.06	2.60
711-Power generating machinery, other than electronics (1.98%)	6.06**	-0.46 [5.87]**	1.11	0.02	S	S	0.59	1.57	1.63
712-Agricultural machinery and implements (0.64%)	4.23**	-0.52 [4.57]**	2.09	3.61*	S	S	0.32	0.05	7.69**
714-Office machines (0.54%)	3.89	-0.33 [4.63]**	0.64	0.21	S	S	0.27	2.38	7.08**
715-Metalworking machinery (0.64%)	13.78**	-0.29 [2.94]	0.26	0.02	S	S	0.26	1.29	6.88**
717-Textile and leather machinery (0.09%)	2.28	-0.05 [3.32]	1.69	6.19*	S	S	0.29	2.64	0.74
718-Machines for special industries (0.05%)	4.94**	-0.59 [5.26]**	1.93	1.51	S	S	0.44	1.44	0.99
719-Machinery and appliances non electronics (4.33%)	3.87	-0.35 [4.57]**	4.07**	6.89*	NS	S	0.32	0.43	0.03
722-Electric power machinery and switch (1.05%)	8.33**	-0.58 [6.13]**	2.54	0.42	S	S	0.53	0.56	0.79
723-Equipment for distributing electric (0.33%)	3.29	-0.43 [4.21]**	0.05	0.03	S	S	0.31	0.19	0.63
724-Telecommunications apparatus (0.68%)	4.05*	-0.19 [1.54]	0.06	0.73	S	S	0.04	1.05	2.96*
725-Domestic electrical equipment (0.21%)	4.27*	-0.41 [4.72]**	0.02	0.14	S	S	0.29	0.07	1.02
726-Elec. apparatus for medical purposes (0.10%)	3.52	-0.23 [4.38]**	0.13	0.77	S	S	0.38	0.02	1.45

729-Other electrical machinery and apparatus (1.23%)	3.63	-0.48 [4.47]**	0.68	0.73	S	S	0.36	0.43	0.08
731-Railway vehicles (0.19%)	4.71**	-0.27 [5.09]**	0.006	0.11	S	S	0.55	4.41**	6.10**
732-Road motor vehicles (15.06%)	22.61**	-0.56 [9.29]**	2.49	1.69	S	S	0.84	5.21**	0.65
733-Road vehicles other than motor vehicles (0.52%)	8.02**	-0.81[6.68]**	0.43	0.03	S	S	0.55	0.53	0.36
734-Aircraft (1.21%)	5.59**	-1.03 [5.57]**	0.15	8.09**	S	NS	0.79	6.52**	6.47**
735-Ships and boats (0.14%)	3.99*	-0.37 [4.59]**	0.61	1.92	S	S	0.34	1.63	1.33
812-Sanitary, plumbing, heating & light (0.25%)	3.05	-0.39 [3.89]**	0.19	0.25	S	S	0.29	0.05	1.81
821-Furniture (1.01%)	4.17*	-0.16 [4.47]**	0.69	7.02**	S	S	0.55	0.01	1.05
831-Travel goods, handbags and similar (0.04%)	7.45**	-0.06 [0.06]	0.03	0.68	S	S	0.49	0.13	0.37
841-Clothing except fur clothing (0.25%)	4.61*	-0.09 [4.95]**	0.65	11.71**	NS	S	0.47	1.96	0.27
842-Fur clothing and articles of artificial (0.003%)	3.97*	-0.37 [4.46]**	0.02	0.007	S	S	0.29	0.01	0.16
851-Footwear (0.03%)	5.34**	-0.63 [5.56]**	0.82	5.32**	S	NS	0.42	0.12	0.11
861-Scientific, medical, optical, meas. (1.11%)	3.95*	-0.53 [4.70]**	3.71*	1.05	S	S	0.31	0.17	0.15
862-Photographic and cinematographic supply (0.02%)	3.57	-0.42 [4.43]**	0.53	0.08	S	S	0.31	4.87**	8.48**
863-Developed cinematographic film (0.001%)	11.74**	-0.69 [8.12]**	0.04	5.14**	S	S	0.58	6.03**	4.46**
864-Watches and clocks (0.01%)	6.29**	-0.76 [5.92]**	0.62	4.11**	S	S	0.55	0.53	3.11*
891-Musical instruments, sound recorder (0.22%)	8.11**	-1.11 [6.81]**	1.01	0.21	S	S	0.48	0.98	0.99
892-Printed matter (0.52%)	4.85*	-0.37 [5.16]**	6.17**	10.05**	S	S	0.41	0.06	1.11
893-Articles of artificial plastic mate (1.11%)	5.02**	-0.28 [5.12]**	0.04	0.96	S	S	0.46	0.82	0.05
894-Perambulators, toys, games and sports (0.23%)	4.69*	-0.21 [5.14]**	0.12	0.002	S	S	0.56	1.31	3.74*
895-Office and stationery supplies, n.e.s. (0.02%)	5.72**	-0.34 [5.32]**	0.002	4.23**	S	S	0.54	0.50	0.60
896-Works of art, collectors pieces (0.02%)	2.65	-0.44 [3.76]**	0.004	1.14	S	S	0.22	0.04	0.21
897-Jewellery and gold/silver smiths (0.20%)	4.29*	-0.53 [4.87]**	1.44	2.91*	NS	S	0.38	0.07	6.44**
899-Manufactured articles, n.e.s. (0.18%)	3.54	-0.37 [4.41]**	0.16	2.23	S	S	0.49	0.43	0.01
931-Special transactions not classed according to kind (4.41%)	2.16	-0.32 [3.37]	0.11	19.33**	S	NS	0.27	2.96*	0.58

Notes:

c. The critical value of the F test at the 10% (5%) significance level when there are three exogenous variables (k=3) and 50 observations is 3.97 (4.70). These come
from Narayan (2005, p. 1988). * (**) indicates a significant statistic at the 10% (5%) level.

d. Number inside the bracket in the ECM_{t-1} column is absolute value of the t-ratio, The critical value for k = 4 with 50 observations is -3.67 (-4.03) at the 10% (5%) significance level and these come from Banerjee et al. (1998, Table 1, p. 276).

c. LM is the Lagrange Multiplier test of residual serial correlation. It is distributed as χ^2 with one degree of freedom. Its critical value at the 10% (5%) level is 2.70 (3.84).

d. RESET is Ramsey's test for misspecification. It is distributed as χ^2 with one degree of freedom and its critical value at 10% (5%) level is 2.71 (3.84).

e. Both Wald statistics are distributed as χ^2 with one degree of freedom. The critical value at 10% (5%) level is 2.71 (3.84).

e. Abbreviation n.e.s. stands for not elsewhere specified.

g. Trade share is in percentage calculated for the year 2014.

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Appendix

Data Definition and Sources

A) In the Aggregate trade model:

We used Quarterly data over the period 1973 Q1-2014 Q2. The sources are:

1) International Financial Statistics of the IMF
2) Federal Reserve Bank of St. Louis

B) In the Bilateral trade model:

Same sources of data as in the aggregate model are used for the bilateral model.

C) In the Bilateral trade model:

The empirical works are done using annual data over 1962-2014. The sources are:

1) International Financial Statistics of IMF
2) Federal Reserve Bank of St. Louis
3) World Bank

Variables:

A) In the aggregated trade model:

TB_i = Trade Balance defined as imports over exports

Y = Measure of income. It is index of real GDP. The data comes from source 1.

YW = Measure of world income. It is index of industrial production in industrial countries. The data comes from source 1.

REX = The Real Effective Exchange Rate. A decline represents a real depreciation of domestic currency. The data comes from source 2.

B) In the bilateral trade model:

TB_i = The United States trade balance with partner i. It is defined as the United States imports from partner i, divided by her exports to trade partner i. The data comes from source 1.

Y_{US} = Measure of income in the United States. It is index of real GDP. The data comes from source 1.

Y_i = Measure of income in trade partner i. It is index of real GDP. The data comes from source 1.

REX_i = The Real Bilateral Exchange Rate of the United States dollar against the currency of trade partner i. It is defined as $REX_{i,t} = (P_{US,t}.NEX_{i,t}/P_{i,t})$. The $NEX_{i,t}$ is the nominal exchange rate and it is defined as unit numbers of trade partner i's currency per the United States dollar. The $P_{US,t}$is the price level in the United States and the $P_{i,t}$ is the price level at trade partner i that we used CPI for both of them from source 2. Thus, a decline in REX reflects a real depreciation of the United States dollar.

C) In the industry level trade model:

TB_i = The industry i trade balance. It is defined as the United States imports of industry i from Canada, divided by her exports of industry i to Canada. The data comes from source 3.

Y_{US} = Measure of income in the United States. It is index of real GDP. The data comes from source 1.

Y_{CAN} = Measure of income in Canada. It is index of real GDP. The data comes from source 1.

REX_i = The Real Bilateral Exchange Rate of the United States dollar against the Canadian dollar. It is defined as $REX_{i,t} = (P_{US,t}.NEX_t/P_{CAN,t})$. The $NEX_{i,t}$ is the nominal exchange rate and it is defined as unit numbers of Canadian dollar per the United States dollar. The $P_{US,t}$is the price level in the United States and the $P_{CAN,t}$ is the price level at Canada that we used CPI for both of them from source 2. Thus, a decline in REX reflects a real depreciation of the United States dollar.

Curriculum Vitae
Hadiseh Fariditavana

Education

2016 Ph.D., Economics, University of Wisconsin-Milwaukee, Milwaukee, WI,
2009 B.A., Economics, University of Tehran, Tehran, Iran

Current Position

2015-2016 University of Wisconsin Whitewater, Department of Economics, Adjunct Faculty

Fields of Research Interest

International Economics, Applied Macroeconomics, Economic Development

Publication

- Hadiseh Fariditavana. "Nonlinear ARDL approach and the J-curve phenomenon." *Open Economic Review* (2015), (with Mohsen Bahmani-Oskooee).

- Hadiseh Fariditavana. "Nonlinear ARDL approach, asymmetric effects and the J-curve." *Journal of Economic Studies* 42.3 (2015): 519-530, (with Mohsen Bahmani-Oskooee).

- Hadiseh Fariditavana, (2014) "Do Exchange Rate Changes have Symmetric Effect on the S-Curve?", *Economics Bulletin*, Vol. 34 No. 1 pp. 164-173, (with Mohsen Bahmani-oskooee).

Work in Progress

- "Asymmetry Cointegration and the J-Curve: Evidence from US-Canada Commodity Trade" (with Mohsen Bahmani-Oskooee).

Software Skills

E-views, Microfit, STATA, Microsoft office

Teaching Experience

2015–2016 Adjunct Faculty, Economics Department, University of Wisconsin-Whitewater

- Statistics
- Introduction to Macroeconomics

2012–2014 Instructor, Department of Economics, University of Wisconsin-Milwaukee

- Principle of Macroeconomics
- Economics of Personal Finance
- Economic Development
- International Economics

2011–2012 Graduate Assistant, Department of Economics, University of Wisconsin-Milwaukee

- Principle of Macroeconomics

Honors and Awards

2014 William L. Holahan Prize for Outstanding Teaching, University of Wisconsin-Milwaukee 2011 Graduate Teaching Assistance

Academic Service

2015 Speaker at UW-Milwaukee Department of Economics TA Training

Professional Association

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