

# **Movement of Trade Balance and Exchange Rate Sensitivity of Industry Trade Flows**

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## **ABSTRACT**

This paper investigates, using *disaggregate* trade data from 65 Indian industries and the bounds testing approach, the short run and the long run effects of changes in India's real exchange rate on the pattern of movement of trade balance over time as well as on the sensitivity of exports and imports for each of those 65 industries. The results reveal that real depreciation of India's currency has favorable effects on the trade balance as well as on the inpayments and outpayments of majority of the industries in the short-run but not in the long-run.

**JEL Classification: F31**

**Key Words: Industry Data, Trade Balance, Bounds Testing.**

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## **I. Introduction**

The twin policies of trade liberalization and floating exchange rate regime, as adopted by the Government of India during the year 1991 and onwards, led to both a surge in India's exports and an improvement in the country's trade balance, with depreciation of the currency being one of the principle contributing factors. It has, however, been observed that an improvement in the trade balance of a country as a result of currency depreciation is not an instantaneous outcome; in fact, empirical evidences (Magee, 1973; Bahmani-Oskooee, 1986) lend credence to the fact that a country's trade balance worsens in the short run before eventually improving in the long run. Increased foreign capital inflows in recent times, in the form of foreign direct investment flows, portfolio investment flows, external commercial borrowings and investments and remittances under the current flexible exchange rate regime, have transformed Indian macroeconomics, with the appreciation of the rupee having an adverse effect on India's trade balance - the trade deficit in the year 2007 being almost 30 percent higher than in 2006.

The objective of this paper is to analyze, using annual bilateral disaggregate trade data from the year 1972 until 2006 between India and her largest trading partner, the United States, both the *short run* and the *long run* effects of changes in the real exchange rate on (a) the *pattern of movement* of each industry's trade balance over time, and on (b) the *sensitivity* of each industry's export earnings and outpayments to changes in the real exchange rate. Such analysis will help determine the appropriate policy responses to attract foreign capital into India, and will help answer one of the most important macroeconomic questions prevailing in the country today: should India adopt a pegged or a flexible exchange rate regime?

## **II. The Pattern of Movement of Trade Balance over Time**

The study of the pattern of movement of a country's trade balance due to devaluation or depreciation has received considerable attention from international economists. Due to the presence of adjustment lags and also due to the fact that goods in transit are measured at old prices, it is believed that an initial deterioration precedes improvement in the trade balance. Studies that investigated the impact of the real depreciation of the Indian rupee on India's trade balance produced mixed results. Advances in time series modelling have pointed out deficiencies in previous studies – the use of non-stationary data to carry out empirical analysis is believed to have given rise to spurious results. Subsequent studies used cointegration and error correction modelling techniques in an attempt to identify any significant

relation between the real value of the rupee and the Indian trade balance. Rose and Yellen (1989) considered bilateral disaggregate trade data and Arora et al. (2003) used bilateral trade balance between India and her seven major trading partners, and were able to provide empirical support for short-run deterioration followed by long-run improvement. Studies by Rose (1990), Bahmani-Oskoe (1991), Alse (1994) and Bulaswar et al. (1996), however, showed lack of any significant relation between India's trade balance and its real exchange rate.

Bahmani-Oskoe (1985, 1989) introduced and tested a trade balance model and observed that the real depreciation has neither short-run nor long-run effects, but measurement of the trade balance in terms of a foreign currency by Himarios (1989) showed that the Indian trade balance did in fact respond to real depreciation. This led to the conclusion that relation between the trade balance and the real exchange rate depends on the units of measurement. Bahmani-Oskoe and Malixi (1992) used a unit-free measurement, i.e. they considered the ratio of exports over imports and noticed that the real depreciation of the rupee has negative effects on India's trade balance in both the short-run and the long-run. The results of these studies are considered to have shortcomings since they did not consider either the integrating or even the cointegrating properties of the variables. Although Rose (1990), Bahmani-Oskoe (1991), Bahmani and Alse (1994) and Bulaswar et al. (1996) have all considered cointegration analysis, they were not able to establish cointegration between the Indian trade balance and the real value of the rupee, thereby implying that the real depreciation of the rupee has no long run effect in improving India's trade balance. A common feature of their studies was that they used aggregate trade data in their analysis. In sections III and IV this paper investigates whether the lack of a long-run relation between the real value of the rupee and the bilateral trade balance between India and the U.S.A. is due to aggregation bias, and also analyzes the cointegration and error-correction modelling and assesses the short-run and the long-run effects of changes in India's real exchange rate on the trade balance of *each* industry.

### III. The Model

The study of the pattern of movement of trade balance over time to changes in India's real income, foreign real income, and real exchange rate in the paper will involve a trade balance model similar to the one considered by Bahmani Oskoe and Brooks (1999) and also used by S. Arora et. al (2003):

$$(1) \quad LnTB_{i,t} = a + bLnY_{IN,t} + cLnY_{U.S.,t} + dLnREX_{i,t} + \varepsilon_t$$

The trade balance variable,  $TB_i$ , is defined as a ratio of exports over imports for industry  $i$ , thereby allowing it to be expressed in both log form and in a unit free measurement. As for the signs of the coefficients, as long as an increase in  $Y_{IN}$  leads to an increase in imports, the sign of  $b$  will be negative. However, if an increase in  $Y_{IN}$  leads to an increase in the production of import-substitution goods, then there is every possibility for the coefficient  $b$  to be positive. The same logic might as well be applied to the sign of the coefficient  $c$ . The real exchange rate in the model is defined as the ratio of the number of Indian Rupee per US Dollar, or, INR/USD; hence, an increase in REX would imply appreciation of the US Dollar and depreciation of the Indian Rupee. If increases or decreases in the real exchange rate lead to corresponding changes in the trade balance in the same direction, then the sign of  $d$  will be positive.

The application of cointegration and error-correction modelling is required to incorporate short-run dynamics into the trade balance model defined by the above equation. The procedure to be followed for this purpose is the advanced cointegration approach as developed by Pesaran and Shin (1995) and Pesaran et al. (1996), and that requires the trade balance model to be expressed in the following Autoregressive Distributed Lag form:

(2)

$$\begin{aligned} \partial \text{Ln}TB_{i,t} = & a + \sum_{j=1}^{n1} b_j \partial \text{Ln}TB_{i,t-j} + \sum_{j=0}^{n2} c_j \partial \text{Ln}Y_{IN,t-j} + \sum_{j=0}^{n3} d_j \partial \text{Ln}Y_{U.S.,t-k} + \sum_{j=0}^{n4} e_j \partial \text{Ln}REX_{i,t-j} + \\ & \beta_1 \text{Ln}TB_{i,t-1} + \beta_2 \text{Ln}Y_{IN,t-1} + \beta_3 \text{Ln}Y_{U.S.,t-1} + \beta_4 \text{Ln}REX_{i,t-1} + v_t \end{aligned}$$

As per the Pesaran and Shin approach, the null hypothesis of the non existence of long-run relationship between the trade balance and the explanatory variables, defined by  $H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$  will be tested against the alternate hypothesis  $H_1 : \beta_1 \neq 0, \beta_2 \neq 0, \beta_3 \neq 0, \beta_4 \neq 0$ .

The appropriate test statistic for testing the null hypothesis will be the F-statistic, with two sets of critical values as computed by Pesaran et al. (1996). Following the Pesaran approach, one set of critical values assumes that the variables will be  $I(1)$ , while the other set assumes that the variables are  $I(0)$ .

Such an approach provides a band that covers all possible classifications of the variables. If the computed value of the F-statistic lies above the band, then the null hypothesis will be rejected, indicating cointegration. If the computed value of F-statistic lies below the band, then it will indicate lack of cointegration. A value within the band will give rise to an inconclusive result; inclusion of the error correction term might help in averting this.

Considering the fact that the results of the F-test are sensitive to the number of lags being imposed as established by Bahmani-Oskooee and Goswami (2004), following Bahmani-Oskooee and Gelan (2006), a maximum of four lags will be imposed on the first differenced variable, and then the Akaike Information Criterion (AIC) will be applied to select the optimum number of lags. The analysis of the short run movement of the trade balance will depend upon the coefficients of the real exchange rate along with the estimates of lagged error correction term, the results of which will be reported in a separate table. Initial deterioration is followed by an improvement if negative values for  $e_j$  at lower lags are followed by positive values at higher lags. For the long run impact on the trade balance, the estimates of  $\beta_1, \beta_2, \beta_3$ , and  $\beta_4$  from equation (2), normalized by the estimate of  $\beta_1$ , will be considered.

#### **IV. Empirical Results**

The error-correction model outlined by equation (2) is estimated for 65 industries using bilateral disaggregate annual trade data between India and the U.S.A. covering the period 1972 until 2006. Based on Pesaran et. Al (2001) AIC criteria is used to select the optimum number of lags, and following Bahmani-Oskoe and Gelan (2006), F-test at optimum lags is carried out. Table 1 reports both the short-run and the long-run coefficient estimates, while Table 2 reports diagnostic statistics which includes, apart from F-test statistics, other statistics.

#### **Tables 1 & 2 to be included here**

To examine the short-run impact of depreciation in the real exchange rate on India's trade balance, one needs to look at the short-run coefficient estimates. Given that there are 35 observations and 3 independent variables, the t-critical value corresponding to 10% level of significance and 31 degrees of freedom is 1.696. It can be observed that there are 41 industries in which there is at least one lagged coefficient that is significant at the 10% level. In case of the following 15 industries initial deterioration is followed by an improvement: crude vegetable materials, organic chemicals, articles of rubber, text fabrics woven ex narrow, special textile fabrics, pearls, iron and steel bars, office machines, metalworking machinery, textile and leather machinery, other electrical machinery, photographic and cinematographic items, developed cinematographic film, musical instruments and sound recorders, and manufactured articles. There are 20 industries in which the short-run effects lasts into the long-run. The results reveal that for only the following three industries - tubes and pipes and fittings of iron,

metal containers for storage, and machinery and non-electric appliances, the long-run coefficient is significantly positive, while for the following 17 industries the long-run coefficient is significantly negative: crude vegetable materials, organic chemicals, other inorganic chemicals, synthetic organic dyestuffs, chemical materials and products, articles of rubber, pearls and precious and semi-precious stones, iron and steel bars and rods and angles, office machines, telecommunications apparatus, other electrical machinery and apparatus, photographic and cinematographic items, musical instruments and sound recorders, printed matter, articles of artificial plastic mate, office and stationery supplies, and manufactured articles.

Cointegration among variables is an important condition for the long-run variables to be meaningful. In view of the upper bound value critical value being 3.52, the variables will be cointegrated if the calculated F-statistic exceeds the critical value, and that is true for 45 industries. In the remaining cases, an alternative test for cointegration, following Bahmani-Oskoe and Ardalani (2006) is considered. An error-correction term, *ECM*, is formed from the long-run coefficient estimates reported in Table 1. The lagged level variables are replaced by  $ECM_{t-1}$  and the error-correction model is re-estimated after imposing the optimum lags on each first-differenced variable. A significantly negative  $ECM_{t-1}$  coefficient will support cointegration and adjustment among variables of the trade balance toward long-run equilibrium. As can be viewed in Table 2, almost all the industries (52), carry a significantly negative coefficient.

The Langange Multiplier (LM) statistic is used for testing serial correlation, and it has a chi-square distribution with one degree of freedom. A critical value of 3.84 shows that residuals in almost all the industries, except for wool and other animal hair, crude vegetable materials, wood manufactures, and domestic electrical equipment, are autocorrelation free. As for Ramsey's RESET test for misspecification, it also has a chi-square distribution with one degree of freedom. A critical value of 3.84 reveals that most optimal models are correctly specified, except for the following industries: tobacco unmanufactured, crude vegetable materials, perfumery and cosmetics, chemical materials and products, special textile fabrics and related, nails and screws, textile and leather machinery, domestic electrical equipment, sanitary and plumbing, perambulators and toys. Following once more Pesaran *et al.* (2001), the CUSUM and CUSUMSQ tests for the residuals of each optimal model is used to examine the stability of both the short-run as well as the long-run coefficient estimates. A stable estimated model is denoted as 'S' and an unstable model is denoted as 'U.' It can easily be observed

that most of the models are stable, and the values of the adjusted  $R^2$  indicate a good fit of the model in majority of the cases.

## V. The Sensitivity of Industry Trade Flows

According to the well-known Marshall-Lerner (ML) condition, either currency devaluation under a fixed exchange rate regime or even driving down the value of a currency under managed float can improve trade balance as long as the sum of export and import demand elasticities add up to unity, but absence of price level data at the commodity level rules out the possibility of estimating the ML condition for import and export demand of each commodity. The ML condition is, however, a long-run condition. Magee (1973) was of the view that the short-run effects of devaluations could be quite different from the long-run effects. The presence of lags in the adjustment process imply that the trade balance deteriorate initially before improving later on. In recent times, economists have shifted their attention from estimating the ML condition to establishing a direct relation between the trade balance and the real exchange rate, and this direct relation has been used to distinguish the short-run effects of currency devaluation from its long-run effects. Section VI attempts to identify industries whose trade flows are *sensitive* to the real exchange rate.

## VI. The Framework

To measure the long run effects of changes in the real exchange rate on the value of exports and imports of some specific Indian industry, the following two equations will be considered:

$$(3) \quad \text{Ln}VX_{i,t}^{IN} = g + h\text{Ln}Y_{U.S.,t} + j\text{Ln}REX_{i,t} + \theta_{i,t}$$

$$(4) \quad \text{Ln}VM_{i,t}^{IN} = k + l\text{Ln}Y_{IN,t} + m\text{Ln}REX_{i,t} + \gamma_{i,t}$$

where,  $VX_i^{IN}$  is positively related with  $Y_{U.S.}$ , and  $REX_i$ . On the other hand,  $VM_i^{IN}$  is positively related with  $Y_{IN}$ , but negatively with  $REX_i$ .

In order to analyze the short run effects, the two equations will be expressed in an error-correction format that based on Pesaran (2001) bounds-testing approach:

$$(5) \quad \partial \text{Ln}VX_{i,t}^{IN} = g' + \sum_{y=1}^{n1} h_y' \partial \text{Ln}VX_{i,t-y}^{IN} + \sum_{y=0}^{n2} j_y' \partial \text{Ln}Y_{U.S., t-y} + \sum_{y=0}^{n3} p_y' \text{Ln}REX_{i,t-y} + h \text{Ln}VX_{i,t-1}^{IN} + j \text{Ln}Y_{U.S., t-1} + p \text{Ln}REX_{t-1} + \lambda_{i,t}$$

$$(6) \quad \partial \text{Ln}VM_{i,t}^{IN} = d' + \sum_{y=1}^{n1} s_y' \partial \text{Ln}VM_{i,t-y}^{IN} + \sum_{y=0}^{n2} t_y' \partial \text{Ln}Y_{IN, t-y} + \sum_{y=0}^{n3} z_y' \text{Ln}REX_{i,t-y} + s \text{Ln}VX_{i,t-1}^{IN} + t \text{Ln}Y_{IN, t-1} + z \text{Ln}REX_{t-1} + \zeta_{i,t}$$

For the estimation of the error correction models given by (5) and (6), AIC will be used, as a first step, to select the optimum number of lags. Next, F-test will be carried out to test among the variables. Both upper and lower bound critical values will be determined following Pesaran (2001). The long run effects of changes in the real exchange rate on the exports will be inferred by the coefficient  $p$  which is normalized by  $h$  in equation (5), and on the imports by the coefficient  $z$  that is normalized by  $s$  in equation (6). The short run effects of changes in the real exchange rate will be given by the coefficients  $p_y'$  in equation (5), and on imports by the coefficients  $z_y'$  in equation (6). To analyze adjustment toward equilibrium, equations (5) and (6) will be re-estimated at optimum lags after replacing the lagged level variables by the long run coefficients, which will be used as proxy to estimate the linear combination of the lagged level variables, denoted as  $ECM_{t-1}$ . A negative and significant  $ECM_{t-1}$  will be an indication for adjustment toward equilibrium, as well as for establishing cointegration among the variables as shown by Bahmani-Oskooee and Ardalani (2006).

## VI a. Sensitivity Analysis of the Export Model - Empirical Results

The results of the sensitivity analysis for the export model are reported in tables 3 and 4.



### Tables 3 & 4 to be included here

Table 3 reports both the short-run and the long-run effects of the real exchange rate. The t-critical value at 10% level of significance for 32 degrees of freedom is 1.694. It is observed that there are 39 industries in which there is at least one lagged coefficient that is significant at the 10% level. This implies that the real depreciation of the rupee has short-run effects on 39 industries. In the following 10 industries, initial deterioration is followed by an improvement: other crude minerals, essential oils and perfume, chemical materials and products, wood manufactures, pearls and precious and semi-precious stones, tubes and pipes and fittings of iron, copper, electric power machinery and switch, sanitary and plumbing equipments, and photographic and cinematographic items. The long-run coefficient estimates reveal that in 18 industries the short-run effects last into the long-run, and those industries are: synthetic organic dyestuffs, soaps and cleansing materials, articles of rubber, textile yarn and thread, special textile fabrics, pig iron and spiegeleisen, tubes and pipes and fittings of iron, iron steel castings forgings, copper, aluminium, finished structural parts, manufactures of metal, agricultural machinery, textile and leather machinery, other electrical machinery and apparatus, clothing except fur clothing, musical instruments and sound recorders and articles of artificial plastic mate. In the following 14 industries the long-run coefficients are significantly positive: synth.organic dyestuffs, soaps and cleansing materials, articles of rubber, textile yarn and thread, special textile fabrics, pig iron and spiegeleisen, iron steel castings forgings, aluminium, agricultural machinery and implement, textile and leather machinery, other electrical machinery and apparatus, clothing except fur clothing, musical instruments and sound recorders and articles of artificial plastic mate. However, for the following four industries the long-run coefficient is significantly negative: tubes and pipes and fittings of iron, copper, finished structural parts, and manufactures of metal. It might be concluded that, for those four industries, U.S. demand for goods is inelastic. As the results show, U.S. income carries an expected positive and highly significant coefficient in 39 industries, which implies that economic growth in the U.S. can boost India's export earnings in the long-run.

The results in table 4 reveal that for 29 industries, the F-statistic exceeds the critical value of 4.14, and almost all the industries, 58 of them, carry negative and significant  $ECM_{t-1}$  coefficient, thereby providing evidence of cointegration. The Langrange Multiplier (LM) statistics to check for autocorrelation among estimated optimum models are also reported in table 4. The LM statistic is distributed as chi-square with one degree of freedom. Except for the following four industries - chemical materials and products, manuf.of leather, tubes and pipes and fittings of iron, and machinery

and non-electrical appliances, the LM statistic is less than the critical value of 3.84 for all the other industries. Ramsey's RESET test for functional misspecification distributed as chi-square with one degree of freedom, rejects misspecification of the optimum models in 54 industries. Following Bahmani-Oskooee et al. (2005), CUSUM and CUSUMSQ tests are applied to the residuals of the optimum models to check the stability of both the short-run and the long-run coefficients and, as the result reveal, majority of the models appear to be stable by the CUSUM test. The values of the adjusted  $R^2$  suggest a good fit in majority of the cases.

### **VI b. Sensitivity Analysis of the Import Model - Empirical Results**

The results of the sensitivity analysis for the import model are reported in tables 5 and 6.

#### **Tables 5 & 6 to be included here**

The short-run and the long-run coefficients are reported in table 5. Considering t-critical value of 1.694 at 10% level of significance, there are 26 industries in which there is at least one lagged coefficient at the 10% level, which implies that the real depreciation of the rupee has short-run effects in 26 industries. In the following four industries initial deterioration is followed by an improvement: wool and other animal hair, crude vegetable materials, manuf. of leather, and photographic and cinematographic items. The short-run effects last into the long-run in case of the following 11 industries: other inorganic chemicals, perfumery and cosmetics and dentifrices, chemical materials and products, wood manufactures, pig iron and spiegeleisen, iron and steel bars, metal containers for storage, metalworking machinery, machines for special industries, telecommunications apparatus, and office and stationery supplies. There are six industries in which the long-run coefficient is significantly positive: perfumery and cosmetics, wood manufactures, pig iron and spiegeleisen, metal containers for storage, metalworking machinery, and office and stationery supplies. In the following five industries the long-coefficient is significantly negative: other inorganic chemicals, chemical materials and products, iron and steel bars and rods, machines for special industries and telecommunications apparatus. For these five industries it can be concluded that the Indian demand for U.S. goods is inelastic. As is evident from the results, Indian income carries an expected and highly significant positive coefficient for 35 industries, which implies that India's economic growth can boost U.S. export earnings in the long-run.

The diagnostic tests for the import value model are reported in table 6. The results are very similar to those obtained in the export model. For 29 industries, the F-statistic is greater than the upper bound critical value of 4.14, thereby providing evidence of cointegration in only those industries. The significantly negative coefficient of  $ECM_{t-1}$ , however, supports cointegration in 57 industries. A comparison of the LM test statistics with that of the critical value reveals lack of autocorrelation in majority of the industries except for wool and other animal hair, iron and steel wire, printed matter and and manufactured articles. The results of Ramsey's RESET test for misspecification rejects misspecification of the optimum models in 58 industries. The results of the CUSUM and CUSUMSQ tests support stability of both the short-run and the long-run coefficients in majority of the cases.

## VII. Conclusion

Previous attempts by researchers to study the effects of depreciation of the Indian rupee on her trade balance using aggregate trade data failed to provide sufficient empirical evidence of an improvement in India's trade balance due to a real depreciation of the rupee. Although a study by Arora et al. (2003) that used disaggregated bilateral trade data between India and seven of her largest trading partners was able to find evidences of favorable long-run effects of real depreciation of the rupee on India's trade balance with Germany, Italy, Japan and Australia, the results in case of the Unites States, India's largest trading partner, was not the same. This paper, using annual disaggregate trade data from the year 1972 until 2006 and Pesaran et al.'s (2001) bounds testing approach, observed that while 41 of the 65 industries studied responded significantly to changes in the real depreciation of the rupee in the short-run, initial deterioration was followed by an improvement in only 15 industries. In case of the long-run effects, the real depreciation of the rupee has favourable effects in only three industries. It follows from the analysis of the pattern of movement of India's balance that, while real depreciation of the rupee has short-run effects on India's trade balance, there is not much evidence of favourable long-run effects. The sensitivity analysis reveals that while the real depreciation of the rupee has significant short-run effects on the inpayments of about 60 percent of the industries and on the outpayments of about 40 percent of the industries, the short-run effects of real depreciation on the inpayments and outpayments last into the long-run in case of only 22 percent and 8 percent of the industries, respectively. There is no adequate empirical evidence that suggests that real depreciation has favourable long-run effects on both the inpayments and outpayments for majority of the industries; instead, it appears that the level of economic activity in India and the United States is, in fact, the long-run determinant.

## *Appendix*

### *Data Sources:*

Annual disaggregate trade data between India and the USA, from 1972 until 2006, has been considered for industry level analysis. The following databases will be referred to for the analysis:

1. World Bank
2. International Financial Statistics, IMF.

### *Nomenclature:*

<i>Variables</i>	<i>Definition</i>	<i>Data source</i>
$X_i$	Indian industry $i$ 's export earnings from USA.	1
$M_i$	Indian industry $i$ 's import value (outpayments) to USA.	1
$TB_i$	Indian industry $i$ 's trade balance with respect to USA, expressed as a ratio of exports over imports.	1
$VX_i^{IN}$	Value of Indian industry $i$ 's exports to USA.	1
$VM_i^{IN}$	Value of Indian industry $i$ 's imports (outpayments) to USA.	1
$CPI_{IN}$	Consumer Price Index of India.	2
$CPI_{US}$	Consumer Price Index of USA.	2
$Y_{IN}$	Real GDP of India.	2
$Y_{US}$	Real GDP of USA.	2
$REX$	Real exchange rate between India and USA.	2
$NEX$	Nominal exchange rate between India and USA.	2

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**TABLE 1: Short-Run and Long-Run Coefficient Estimates of the Trade Balance Model**

Industry	Short-Run Coefficient Estimates				Long-Run Coefficient Estimates			
	$\Delta Ln RE_t$	$\Delta Ln RE_{t-1}$	$\Delta Ln RE_{t-2}$	$\Delta Ln RE_{t-3}$	Constant	$Ln Y_{U.S.}$	$Ln Y_{In.}$	$Ln RE$
Cereal preps & preps of flour of fr	0.04 (0.05)				24.99 (1.14)	-4.09 (0.37)	-1.35 (0.23)	0.10 (0.05)
Tobacco, unmanufactured	1.18 (0.72)				-40.69 (1.99)	20.99 (1.93)	-14.50 (2.443)	1.18 (0.72)
Wool and other animal hair	10.79 (2.11)	4.08 (0.68)	13.20 (2.66)	7.74 (1.83)	-118.98 (2.99)	61.20 (2.94)	-32.13 (2.92)	-5.43 (0.95)
Other crude minerals	-1.61 (0.77)	1.22 (0.48)	4.40 (2.04)	-2.48 (1.31)	6.16 (0.20)	-4.05 (0.25)	3.26 (0.39)	-0.98 (0.29)
Crude vegetable materials, nes	-2.82 (2.80)	-1.56 (1.64)	3.33 (3.72)	3.58 (4.62)	17.47 (5.53)	-8.67 (4.72)	-1.00 (2.08)	-40.40 (6.91)
Organic chemicals	-6.77 (4.58)	4.27 (3.50)			-33.66 (4.18)	23.97 (5.39)	-14.81 (6.31)	-2.17 (3.89)
Inorg.chemicals-elems.,oxides,halog	0.14 (0.04)				-44.03 (1.41)	28.56 (1.78)	-13.12 (1.62)	-6.43 (1.81)
Other inorganic chemicals	-2.28 (1.77)				-7.80 (0.20)	11.11 (0.52)	-4.18 (0.39)	-5.72 (1.78)
Synth.organic dyestuffs, natural ind	-2.22 (3.47)				-4.96 (0.56)	1.35 (0.28)	0.66 (0.26)	-2.22 (3.47)
Medicinal & pharmaceutical products	3.85 (1.45)				1.22 (0.02)	9.06 (0.41)	-8.18 (0.67)	-3.49 (0.52)
Essential oils, perfume and flavour	0.80 (0.55)	1.39 (0.91)	-0.42 (0.30)	-2.23 (1.91)	-1.22 (0.29)	5.17 (2.34)	-5.17 (4.40)	-0.13 (0.23)
Perfumery, cosmetics, dentifrices,	-2.57 (2.23)				-47.81 (1.76)	24.79 (1.71)	-11.22 (1.61)	-3.02 (1.44)
Soaps, cleansing & polishing prepara	0.29 (0.16)				-5.95 (0.25)	12.27 (1.00)	-5.53 (0.86)	-6.39 (2.07)
Chemical materials and products, nes	-4.34 (3.74)	2.17 (1.79)	3.58 (2.87)	-2.04 (2.33)	13.26 (2.38)	1.74 (0.60)	-2.23 (1.48)	-2.67 (3.79)
Manuf.of leather or of artif.or rec	6.18 (3.39)	4.88 (2.27)	5.28 (2.70)	5.31 (3.20)	-39.57 (2.64)	12.83 (1.58)	-4.88 (1.09)	-1.04 (0.81)
Articles of rubber, nes	-6.14 (4.56)	-1.35 (0.83)	1.80 (1.35)		-8.97 (0.64)	9.56 (1.23)	-5.13 (1.20)	-3.29 (2.67)
Wood manufactures, nes	0.44 (0.35)	7.59 (5.99)	2.82 (2.06)	-6.69 (6.12)	-63.80 (5.88)	30.13 (5.20)	-18.92 (5.92)	1.66 (1.27)
Paper and paperboard	-1.99 (1.51)				-27.74 (1.47)	22.88 (2.32)	-14.63 (2.78)	-2.53 (1.46)
Articles of paper, pulp, paperboard	-2.03 (1.39)				-116.07 (0.82)	76.36 (0.78)	-43.34 (0.87)	-11.09 (0.44)
Textile yarn and thread	1.26 (0.48)	-3.42 (1.13)	-5.35 (1.79)	-4.50 (1.90)	-98.68 (1.63)	58.64 (1.75)	-32.68 (1.73)	-2.71 (0.67)
Text fabrics woven ex narrow, spec,	-3.17 (1.45)	-2.29 (1.22)	0.03 (0.02)	2.15 (1.74)	-62.87 (1.68)	31.42 (1.02)	-21.71 (0.94)	2.27 (0.45)
Tulle, lace, embroidery, ribbons, t	-4.52 (3.30)				-53.54 (2.47)	26.50 (2.26)	-15.72 (2.42)	0.26 (0.17)
Special textile fabrics and related	-2.76 (1.30)	1.67 (0.81)	5.01 (2.73)		-6.84 (0.35)	7.38 (0.73)	-5.19 (0.98)	-1.71 (0.95)
Made-up articles, wholly or chiefly	0.07 (0.05)				52.33 (3.36)	-26.73 (3.10)	14.00 (3.07)	0.05 (0.05)
Mineral manufactures, nes	-1.00 (0.86)	0.11 (0.08)	0.65 (0.47)	-1.51 (1.48)	-134.76 (0.84)	75.71 (0.81)	-39.67 (0.81)	-5.87 (0.60)
Glass	0.61 (0.53)				-69.95 (2.29)	38.20 (2.30)	-24.74 (2.70)	1.51 (0.59)
Glassware	-2.50 (1.06)	-1.34 (0.57)	-2.80 (1.10)	-3.68 (1.89)	34.36 (0.33)	-8.33 (0.16)	-0.99 (0.03)	4.23 (0.55)
Pearls and precious and semi-precio	-0.84 (1.07)	1.85 (2.44)			-9.52 (1.52)	2.14 (0.62)	0.49 (0.29)	-1.24 (1.74)
Pig iron, spiegeleisen, sponge iron	-5.89 (1.55)				224.31 (0.88)	-99.99 (0.82)	46.17 (0.77)	1.59 (0.16)
Iron and steel bars, rods, angles, sha	-3.57 (1.40)	-1.51 (0.50)	6.28 (2.07)	3.32 (1.98)	1.26 (0.02)	8.89 (0.20)	0.18 (0.01)	-10.12 (1.73)
Iron and steel wire, excluding wire	-1.25 (0.71)				117.54 (2.06)	-49.54 (1.69)	27.31 (1.68)	-3.41 (0.75)
Tubes, pipes and fittings of iron or	1.25 (1.04)	0.61 (0.47)	0.48 (0.42)	-2.09 (2.25)	9.66 (1.84)	-3.68 (1.31)	0.02 (0.01)	1.29 (2.39)
Iron steel castings forgings unwork	-2.84 (0.42)	-2.63 (0.40)	-12.14 (2.01)	-10.32 (2.60)	-2713.8 (0.17)	1507.3 (0.17)	-856.35 (0.17)	-78.13 (0.16)
Copper	-2.43 (1.02)	1.62 (0.82)	0.38 (0.20)	-6.38 (4.20)	-9.83 (0.67)	13.22 (1.62)	-11.91 (2.49)	0.91 (0.55)
Aluminium	-0.18 (0.11)				24.36 (0.77)	-5.07 (0.30)	0.01 (0.001)	-0.28 (0.11)
Finished structural parts and struc	-2.75 (0.80)				80.76 (2.78)	-47.04 (2.99)	24.69 (3.13)	3.98 (1.61)
Metal containers for storage and tr	2.35 (1.90)				13.60 (1.06)	-5.11 (0.77)	-0.07 (0.02)	2.35 (1.90)
Wire products - ex electric - & fen	1.56 (1.47)				218.99 (1.38)	-111.26 (1.39)	59.55 (1.37)	5.97 (1.08)

Nails, screws, nuts, bolts, rivets and	-1.71 (0.99)	-2.26 (1.43)	-2.75 (1.88)	-2.47 (2.42)	-35.57 (0.76)	21.16 (0.80)	-17.28 (1.02)	5.22 (0.85)
Tools for use in the hand or in mac	-1.75 (2.02)	0.12 (0.09)	-2.03 (1.79)	-2.15 (2.50)	-90.78 (1.98)	49.98 (2.00)	-28.44 (1.97)	-0.86 (0.31)
Manufactures of metal, nes	0.08 (0.14)				-6.34 (0.85)	3.32 (0.83)	0.18 (0.14)	12.26 (0.86)
Power generating machinery, other t	-3.22 (3.55)	-2.11 (2.37)			15.58 (1.96)	-3.85 (0.89)	-0.25 (0.11)	0.83 (1.32)
Agricultural machinery and implemen	1.43 (0.86)	4.27 (2.14)	6.55 (4.03)		32.77 (2.95)	-10.50 (1.77)	2.89 (0.97)	-0.66 (0.52)
Office machines	-4.27 (2.02)	4.77 (1.71)	6.80 (2.99)	3.20 (1.97)	25.68 (3.32)	-4.23 (1.06)	3.17 (1.55)	-5.04 (5.06)
Metalworking machinery	-1.00 (0.60)	-1.76 (1.04)	1.68 (1.11)	3.06 (2.55)	7.95 (0.10)	7.94 (0.19)	-4.59 (0.20)	-8.48 (0.61)
Textile and leather machinery	-2.11 (1.24)	3.65 (1.77)			13.16 (0.84)	-2.65 (0.33)	0.12 (0.03)	-0.02 (0.01)
Machines for special industries	1.57 (1.54)				9.12 (0.83)	5.53 (0.97)	-4.25 (1.48)	-3.38 (3.19)
Machinery and appliances-non electr	-1.35 (3.91)	-0.99 (2.60)	-0.57 (1.61)	-1.09 (3.52)	30.64 (6.67)	-9.32 (3.80)	1.83 (1.68)	1.04 (1.89)
Electric power machinery and switch	1.32 (0.71)	-4.02 (2.29)	-7.67 (4.11)	-3.95 ( 2.92)	-15.79 (0.38)	18.34 (0.79)	-17.41 (1.13)	4/80 (1.02)
Telecommunications apparatus	-5.72 (2.74)	-3.09 (1.55)			-94.91 (2.42)	58.96 (2.69)	-28.75 (2.63)	-9.59 (3.08)
Domestic electrical equipment	-1.12 (0.75)				-90.96 (3.13)	52.30 (3.32)	-31.65 (3.67)	-1.65 (0.73)
Other electrical machinery and appa	-0.72 (0.79)	3.53 (3.01)	3.18 (3.33)		-2.12 (0.33)	7.02 (1.97)	-3.90 (2.07)	-2.96 (5.03)
Road motor vehicles	-0.43 (0.55)				28.88 (2.01)	-7.51 (0.99)	1.54 (0.40)	-0.88 (0.59)
Aircraft	-0.05 (0.03)				113.11 (3.59)	-47.52 (2.89)	23.52 (2.73)	-0.10 (0.03)
Sanitary, plumbing, heating & lightin	2.88 (1.57)				-34.10 (1.68)	16.66 (1.56)	-12.37 (2.12)	2.88 (1.57)
Clothing except fur clothing	-0.22 (0.14)				76.87 (3.57)	-42.91 (3.63)	25.26 (4.04)	-0.22 (0.14)
Scientific, medical, optical, meas./co	1.20 (1.47)				20.25 (2.91)	-6.28 (1.67)	2.42 (1.27)	0.002 (0.004)
Photographic and cinematographic su	-8.81 (2.99)	3.02 (1.17)			13.65 (0.52)	2.96 (0.21)	0.91 (0.12)	-7.04 (3.35)
Developed cinematographic film	-1.36 (0.65)	0.28 (0.12)	4.66 (2.12)	4.68 (2.62)	-46.31 (0.90)	28.61 (1.05)	-8.94 (0.68)	-10.98 (1.24)
Musical instruments, sound recorders	-3.06 (2.40)	3.62 (2.04)	3.93 (2.47)	1.84 (1.41)	-12.01 (0.70)	10.04 (1.14)	1.97 (0.41)	-10.69 (3.49)
Printed matter	0.36 (0.46)	2.54 (2.68)	2.56 (3.60)		-15.55 (5.60)	10.26 (7.09)	-5.97 (7.92)	-0.83 (2.36)
Articles of artificial plastic mate	1.89 (1.46)	3.01 (1.80)	1.97 (1.40)		-18.73 (1.75)	14.12 (2.56)	-7.89 (2.79)	-3.00 (2.17)
Perambulators, toys, games and sporti	-1.76 (1.56)				-108.19 (7.32)	52.76 (6.57)	-28.37 (6.56)	-1.76 (1.56)
Office and stationery supplies, nes	-2.17 (1.79)				-30.15 (1.52)	22.03 (2.05)	-13.18 (2.45)	-2.81 (1.75)
Manufactured articles, nes	-4.66 (3.35)	-0.70 (0.41)	3.92 (3.05)	1.57 (1.21)	-80.73 (3.82)	44.80 (3.72)	-22.63 (3.60)	-5.72 (2.17)

Note: Numbers inside parentheses are the absolute value of t-ratios

**TABLE 2: Diagnostic Statistics Associated with the Trade Balance Model**

<b>Industry</b>	<i>F</i>	<i>ECM<sub>t-1</sub></i>	<i>LM</i>	<i>RESET</i>	<i>CUSUM</i>	<i>CUSUMSQ</i>	<i>Adj. R<sup>2</sup></i>
Cereal preps & preps of flour of fr	2.33	-0.44 (2.74)	0.28	0.36	U	S	0.19
Tobacco, unmanufactured	6.20	-1.18 (5.33)	0.06	9.19	S	S	0.52
Wool and other animal hair	4.65	-0.69 (3.81)	5.09	0.05	S	S	0.53
Other crude minerals	1.78	-0.54 (2.27)	0.06	0.50	S	U	0.50
Crude vegetable materials, nes	19.56	-1.11 (7.05)	9.12	5.04	S	U	0.86
Organic chemicals	4.86	-1.17 (4.03)	1.47	1.05	S	S	0.58
Inorg.chemicals-elems.,oxides,halog	1.97	-0.59 (2.97)	0.01	2.70	S	S	0.24
Other inorganic chemicals	1.92	-0.40 (2.75)	0.46	1.15	U	U	0.31
Synth.organic dyestuffs, natural ind	11.72	-0.98 (7.38)	3.53	3.32	S	S	0.72
Medicinal & pharmaceutical products	4.08	-0.38 (1.13)	0.02	0.13	S	S	0.36
Essential oils, perfume and flavour	7.23	-1.85 (5.12)	0.15	0.03	S	U	0.56
Perfumery, cosmetics, dentifrices,	4.52	-0.85 (2.50)	3.17	7.69	S	U	0.81
Soaps, cleansing & polishing prepara	2.83	-0.44 (2.82)	0.01	0.02	S	U	0.34
Chemical materials and products, nes	8.15	-1.19 (5.29)	1.67	5.76	S	S	0.84
Manuf.of leather or of artif.or rec	6.12	-0.87 (5.36)	0.001	0.004	S	S	0.66
Articles of rubber, nes	5.08	-0.68 (3.30)	3.19	0.85	S	S	0.79
Wood manufactures, nes	11.32	-0.64 (6.19)	4.36	0.00079	S	S	0.94
Paper and paperboard	6.62	-0.79 (4.94)	0.02	2.20	S	U	0.48
Articles of paper, pulp, paperboard	3.65	-0.18 (0.61)	0.87	1.45	S	S	0.50
Textile yarn and thread	1.12	-0.42 (1.57)	1.75	0.24	S	S	0.46
Text fabrics woven ex narrow, spec,	5.25	-0.25 (0.69)	1.58	0.96	S	S	0.58
Tulle, lace, embroidery, ribbons, t	5.24	-0.51 (3.59)	0.11	0.27	S	S	0.42
Special textile fabrics and related	10.25	-0.73 (4.48 )	0.45	8.27	S	S	0.65
Made-up articles, wholly or chiefly	9.11	-1.34 (5.71)	2.97	1.52	S	S	0.67
Mineral manufactures, nes	2.43	-0.19 (0.74)	0.22	0.34	S	S	0.57
Glass	3.53	-0.41 (2.80)	0.60	3.50	S	S	0.21
Glassware	1.00	-0.22 (1.29)	0.45	1.31	S	S	0.48
Pearls and precious and semi-precio	5.49	-0.89 (3.23)	0.05	0.15	S	S	0.68
Pig iron, spiegeleisen, sponge iron	4.11	-0.21 (1.13)	1.77	0.92	S	S	0.64
Iron and steel bars, rods, angles, sha	2.19	-0.24 (2.57)	0.40	0.77	S	U	0.82
Iron and steel wire, excluding wire	3.15	-0.37 (3.22)	0.51	0.08	S	S	0.39
Tubes, pipes and fittings of iron or	10.90	-1.57 (6.42)	0.62	1.64	S	S	0.66
Iron steel castings forgings unwork	4.72	-0.07 (0.17)	1.90	0.34	S	S	0.52



Copper	7.90	-0.79 (5.17)	1.81	1.58	S	S	0.87
Aluminium	2.03	-0.66 (2.80)	0.61	0.06	S	S	0.70
Finished structural parts and struc	5.12	-0.87 (4.83)	0.20	0.01	S	S	0.39
Metal containers for storage and tr	9.29	-0.83 (6.32)	3.41	0.03	S	S	0.66
Wire products - ex electric - & fen	4.38	-0.26 (1.70)	0.28	1.19	S	S	0.51
Nails, screws, nuts, bolts, rivets and	1.64	-0.23 (1.38)	0.29	11.89	S	S	0.60
Tools for use in the hand or in mac	3.45	-0.26 (2.22)	0.14	3.58	S	S	0.39
Manufactures of metal, nes	1.99	-0.46 (2.61)	0.19	1.48	S	U	0.22
Power generating machinery, other t	21.16	-0.94 (7.66)	3.45	1.28	S	S	0.85
Agricultural machinery and implemen	6.42	-0.86 (5.44)	0.05	2.29	S	S	0.68
Office machines	6.90	-1.49 (4.95)	1.57	0.04	S	S	0.69
Metalworking machinery	6.16	-0.15 (0.94)	0.75	0.16	S	S	0.63
Textile and leather machinery	1.43	-0.65 (2.29)	0.22	7.98	S	U	0.36
Machines for special industries	6.73	-0.68 (4.54)	0.02	0.08	S	U	0.60
Machinery and appliances-non electr	14.71	-0.77 (3.71)	0.89	1.36	S	S	0.83
Electric power machinery and switch	3.83	-0.38 (1.71)	0.52	0.23	S	S	0.62
Telecommunications apparatus	3.80	-0.57 (2.70)	1.67	0.004	S	S	0.49
Domestic electrical equipment	4.79	-0.68 (3.90)	13.17	13.64	S	U	0.61
Other electrical machinery and appa	15.62	-1.17 (5.89)	3.79	0.02	S	S	0.82
Road motor vehicles	2.19	-0.50 (2.93)	1.34	0.27	S	S	0.16
Aircraft	2.87	-0.52 (3.76)	2.72	0.45	S	S	0.30
Sanitary, plumbing, heating & lightin	8.52	-1.03 (6.16)	0.23	5.00	S	S	0.52
Clothing except fur clothing	4.92	-0.82 (4.77)	0.19	0.10	S	S	0.48
Scientific, medical, optical, meas./co	7.82	-1.04 (5.99)	0.61	0.12	S	U	0.60
Photographic and cinematographic su	2.57	-0.78 (2.85)	2.58	1.72	S	S	0.74
Developed cinematographic film	1.60	-0.25 (1.76)	0.27	3.66	S	S	0.32
Musical instruments, sound recorders	3.28	-0.45 (2.68)	0.05	1.26	S	S	0.45
Printed matter	8.34	-1.39 (5.33)	0.13	1.17	S	S	0.62
Articles of artificial plastic mate	8.67	-0.73 (5.38)	0.01	0.55	S	U	0.53
Perambulators, toys, games and sporti	5.90	-0.86 (5.21)	0.10	11.67	S	U	0.39
Office and stationery supplies, nes	4.92	-0.77 (4.04)	0.25	0.05	S	S	0.59
Manufactured articles, nes	5.52	-0.45 (3.12)	2.54	0.13	S	S	0.66

Note: The upper bound critical value of the F test for cointegration is 3.52 at the 10% level of significance. This comes from Pesaran et al. (2001, Table CI, p. 300). Numbers inside parentheses are the absolute value of t-ratios

LM = Lagrange multiplier test of residual serial correlation. It is distributed as  $\chi^2(1)$ . RESET = Ramsey's test for function form. It is distributed as  $\chi^2(1)$ .

**TABLE 3: Short and Long-Run Coefficients of the Export Value Model**

Industry	Short-Run Coefficient Estimates				Long-Run Coefficient Estimates		
	$\Delta \ln RE_t$	$\Delta \ln RE_{t-1}$	$\Delta \ln RE_{t-2}$	$\Delta \ln RE_{t-3}$	Constant	$\ln Y_{U.S.}$	$\ln RE$
Cereal preps & preps of flour of fr	0.01 (0.02)				-13.01 (5.19)	4.96 (4.32)	0.02 (0.02)
Tobacco, unmanufactured	-1.56 (0.67)	2.43 (0.77)	1.12 (0.41)	-4.86 (2.20)	-4.28 (0.43)	2.74 (0.51)	-0.13 (0.03)
Wool and other animal hair	-8.54 (2.81)	-4.31 (0.99)	-6.38 (1.87)		13.42 (0.91)	-7.37 (0.88)	7.42 (1.07)
Other crude minerals	1.34 (1.25)	-1.04 (0.74)	-0.87 (0.70)	2.52 (2.48)	2.13 (0.71)	3.13 (1.84)	-1.97 (1.40)
Crude vegetable materials, nes	0.86 (1.42)	-1.02 (1.48)	-1.25 (2.06)		5.92 (2.87)	0.85 (0.80)	0.53 (0.64)
Organic chemicals	0.54 (1.18)				-19.30 (13.06)	6.17 (7.96)	0.94 (1.34)
Inorg.chemicals-elems.,oxides,halog	2.21 (1.14)				-14.45 (2.71)	2.13 (0.77)	3.74 (1.51)
Other inorganic chemicals	0.32 (0.82)				-5.25 (6.34)	2.97 (6.91)	0.32 (0.82)
Synth.organic dyestuffs, natural ind	1.54 (2.24)				- 4.81 (2.55)	1.48 (2.12)	2.43 (3.77)
Medicinal & pharmaceutical products	-0.71 (0.65)				-28.55 (8.16)	9.09 (5.17)	-1.04 (0.66)
Essential oils, perfume and flavour	-0.88 (0.68)	-1.28 (0.80)	0.96 (0.70)	2.47 (2.14)	-16.74 (10.56)	6.75 (7.76)	-0.50 (0.71)
Perfumery, cosmetics, dentifrices,	0.43 (0.32)				-11.52 (3.91)	4.57 (3.01)	0.43 (0.32)
Soaps, cleansing & polishing prepara	1.99 (1.95)				-21.40 (5.05)	3.41 (1.54)	3.73 (1.88)
Chemical materials and products, nes	3.33 (3.08)	-1.31 (0.88)	-1.15 (0.91)	3.30 (3.19)	-28.57 (7.11)	9.51 (4.20)	-1.08 (0.58)
Manuf.of leather or of artif.or rec	-0.10 (0.37)				11.63 (3.09)	0.07 (0.06)	-0.44 (0.36)
Articles of rubber, nes	2.03 (3.04)				-6.30 (3.41)	1.16 (1.28)	2.98 (3.75)
Wood manufactures, nes	-0.53 (0.43)	-2.40 (1.48)	-0.21 (0.15)	2.33 (1.99)	-14.98 (1.87)	6.40 (1.41)	-1.58 (0.43)
Paper and paperboard	2.34 (1.93)				-18.57 (1.24)	-2.06 (0.20)	10.70 (1.06)
Articles of paper, pulp, paperboard	0.48 (0.72)				-27.59 (4.86)	6.55 (2.02)	1.98 (0.59)
Textile yarn and thread	-1.44 (1.20)	-3.35 (2.04)	-3.11 (2.32)		-0.51 (0.15)	0.001 (0.0007)	3.03 (2.16)
Text fabrics woven ex narrow, spec,	0.19 (0.64)				-24.98 (0.63)	5.99 (1.12)	2.62 (0.39)
Tulle, lace, embroidery, ribbons, t	0.83 (1.06)				-10.31 (3.00)	4.88 (2.85)	-0.92 (0.64)
Special textile fabrics and related	0.22 (0.15)	-2.71 (1.39)	-5.39 (3.18)	-3.18 (2.00)	-8.74 (2.14)	-1.25 (0.55)	6.54 (3.37)
Made-up articles, wholly or chiefly	0.67 (2.59)				-20.16 (3.67)	4.86 (3.63)	3.47 (1.47)
Mineral manufactures, nes	-0.84 (1.52)				-3.09 (1.12)	4.24 (3.09)	-2.02 (1.78)
Glass	-3.90 (2.46)	-2.43 (1.47)			- 4.43 (0.58)	3.92 (1.01)	-1.16 (0.36)
Glassware	1.14 (1.08)				-21.31 (6.75)	7.95 (4.93)	-1.53 (1.14)
Pearls and precious and semi-precio	-0.71 (2.23)	-0.16 (0.40)	1.25 (3.78)		6.73 (1.71)	2.50 (2.04)	-1.20 (1.08)
Pig iron, spiegeleisen, sponge iron	5.59 (3.04)				-0.15 (0.02)	-6.52 (1.71)	10.31 (2.92)
Iron and steel bars, rods, angles, sha	0.63 (0.50)				-37.61 (1.72)	5.44 (0.58)	4.22 (0.48)
Iron and steel wire, excluding wire	1.70 (1.24)	3.94 (2.20)	1.96 (1.22)	6.49 (5.17)	-52.42 (4.82)	17.33 (3.01)	-5.17 (1.16)
Tubes, pipes and fittings of iron or	-1.32 (1.75)	-0.15 (0.14)	0.61 (0.70)	1.66 (2.35)	-12.73 (5.49)	8.45 (6.29)	-3.96 (3.56)
Iron steel castings forgings unwork	-2.20 (1.48)	-3.54 (2.17)			-11.89 (4.97)	3.54 (2.86)	1.83 (1.80)
Copper	-4.05 (1.79)	0.02 (0.01)	1.38 (0.48)	4.55 (1.89)	8.63 (2.24)	-0.44 (0.15)	-29.43 (4.00)
Aluminium	2.91 (1.96)	-1.02 (0.51)	-6.01 (3.49)	-3.39 (2.47)	-19.23 (6.38)	4.19 (2.57)	2.43 (1.84)

Finished structural parts and struc	0.32 (0.38)	1.22 (1.10)	0.83 (0.85)	2.53 (3.23)	-4.69 (1.81)	5.38 (3.58)	-2.73 (2.21)
Metal containers for storage and tr	2.15 (1.36)				-12.93 (5.74)	4.85 (4.12)	-0.40 (0.39)
Wire products - ex electric - & fen	-0.31 (0.40)				-14.61 (4.05)	5.57 (3.16)	-0.63 (0.41)
Nails, screws, nuts, bolts, rivets and	-1.71 (1.99)				-3.88 (1.28)	3.66 (2.37)	-0.66 (0.49)
Tools for use in the hand or in mac	0.24 (0.38)	-1.71 (2.04)	-0.89 (1.34)		0.44 (0.18)	1.98 (1.54)	0.30 (0.29)
Manufactures of metal, nes	0.28 (0.42)	1.05 (1.15)	1.51 (2.02)	1.26 (2.30)	-9.32 (5.80)	6.14 (6.37)	-2.02 (2.46)
Power generating machinery, other t	0.55 (0.69)	1.03 (1.25)			-14.90 (9.23)	7.18 (8.12)	-1.77 (2.33)
Agricultural machinery and implemen	-0.09 (0.05)	-4.69 (2.17)	-7.35 (4.16)		-22.01 (5.09)	4.25 (1.88)	3.79 (2.09)
Office machines	-1.64 (0.81)				-20.18 (2.85)	2.57 (0.79)	5.24 (2.13)
Metalworking machinery	0.11 (0.09)	0.46 (0.29)	-2.58 (2.03)		-6.36 (0.52)	0.77 (0.12)	2.97 (0.50)
Textile and leather machinery	-0.34 (0.40)	-3.38 (3.23)	-2.31 (2.45)		-11.00 (6.57)	2.86 (3.31)	1.74 (2.52)
Machines for special industries	-1.95 (1.78)	-1.90 (1.60)			-19.85 (5.96)	5.45 (3.48)	1.61 (1.25)
Machinery and appliances-non electr	0.11 (0.22)				-16.37 (6.37)	8.22 (4.63)	-2.29 (1.26)
Electric power machinery and switch	-1.95 (1.59)	1.32 (0.81)	3.08 (2.14)	1.60 (1.41)	-34.68 (8.08)	11.52 (4.61)	-1.78 (0.89)
Telecommunications apparatus	0.79 (0.80)				-22.27 (3.63)	5.26 (1.70)	2.31 (0.83)
Domestic electrical equipment	-0.63 (0.34)				-16.04 (1.82)	6.22 (1.36)	-1.45 (0.35)
Other electrical machinery and appa	-0.75 (1.19)	-3.46 (3.64)	-2.76 (3.40)		-8.08 (5.44)	1.62 (2.19)	3.04 (5.51)
Road motor vehicles	-0.61 (0.91)				-15.69 (5.70)	4.95 (3.60)	1.31 (1.09)
Aircraft	0.31 (0.24)				-14.89 (1.19)	4.28 (0.74)	1.25 (0.25)
Sanitary, plumbing, heating & lightin	-4.98 (2.43)	-0.67 (0.29)	-1.53 (0.72)	3.49 (2.10)	-18.93 (1.76)	8.16 (1.49)	-3.07 (0.68)
Clothing except fur clothing	0.76 (2.22)				-2.04 (2.28)	2.55 (7.25)	1.18 (3.96)
Scientific, medical, optical, meas./co	-1.86 (2.75)				-7.20 (0.89)	5.20 (2.19)	-1.48 (0.63)
Photographic and cinematographic su	5.99 (2.20)	-3.77 (1.37)	3.17 (1.30)		-10.16 (1.01)	-2.03 (0.41)	5.75 (1.54)
Developed cinematographic film	-1.09 (0.80)				-1.81 (0.13)	-4.11 (0.45)	6.60 (0.82)
Musical instruments, sound recorders	-0.51 (0.56)	-4.75 (3.47)	-1.70 (1.42)		-9.83 (2.75)	-0.99 (0.55)	6.61 (4.74)
Printed matter	-0.23 (0.73)				-10.08 (5.19)	4.74 (4.76)	-0.62 (0.72)
Articles of artificial plastic mate	-1.84 (1.77)				-28.82 (16.54)	6.29 (6.38)	2.81 (2.87)
Perambulators, toys, games and sporti	-0.88 (1.42)				-7.77 (2.69)	3.20 (2.05)	0.66 (0.47)
Office and stationery supplies, nes	-1.49 (0.73)	-2.58 (0.84)	-3.05 (1.15)	-3.60 (1.93)	-23.07 (3.55)	3.56 (1.02)	4.62 (1.62)
Manufactured articles, nes	0.82 (1.45)	-0.32 (0.41)	-2.55 (3.78)	-0.70 (1.26)	-14.48 (7.07)	4.76 (4.38)	0.68 (0.78)

Note: Numbers inside parentheses are the absolute value of t-ratios

**TABLE 4: Diagnostic Statistics Associated with the Export Value Model**

<b>Industry</b>	<i>F</i>	<i>ECM<sub>t-1</sub></i>	<i>LM</i>	<i>RESET</i>	<i>CUSUM</i>	<i>CUSUMSQ</i>	<i>Adj. R<sup>2</sup></i>
Cereal preps & preps of flour of fr	1.07	-0.32 (1.71)	0.12	1.03	S	S	0.25
Tobacco, unmanufactured	2.38	-0.48 (2.64)	0.79	11.07	S	U	0.38
Wool and other animal hair	2.69	-0.47 (2.09)	0.45	0.60	S	S	0.61
Other crude minerals	3.05	-0.70 (2.68)	2.83	0.37	S	S	0.69
Crude vegetable materials, nes	3.22	-0.56 (2.76)	1.94	0.52	S	U	0.42
Organic chemicals	5.70	-0.57 (3.99)	2.75	0.77	S	S	0.36
Inorg.chemicals-elems.,oxides,halog	1.62	-0.59 (2.47)	1.10	0.02	S	U	0.26
Other inorganic chemicals	7.12	-0.98 (4.79)	1.07	0.02	S	S	0.42
Synth.organic dyestuffs, natural ind	5.43	-0.63 (3.43)	0.18	1.64	S	U	0.48
Medicinal & pharmaceutical products	4.97	-0.68 (4.08)	0.08	1.34	S	S	0.32
Essential oils, perfume and flavour	11.18	-1.54 (5.64)	1.51	1.04	S	S	0.54
Perfumery, cosmetics, dentifrices,	9.58	-1.20 (5.60)	0.002	0.06	S	U	0.53
Soaps, cleansing & polishing prepara	3.80	-0.53 (3.25)	1.22	0.30	S	U	0.23
Chemical materials and products, nes	4.12	-0.54 (4.15)	4.56	5.81	U	U	0.65
Manuf.of leather or of artif.or rec	15.80	-0.23 (5.54)	9.93	6.38	S	U	0.71
Articles of rubber, nes	9.02	-0.68 (5.04)	3.24	0.08	S	U	0.73
Wood manufactures, nes	2.14	-0.30 (2.19)	0.94	0.79	S	S	0.20
Paper and paperboard	1.92	-0.22 (1.32)	0.02	4.21	S	U	0.33
Articles of paper, pulp, paperboard	1.69	-0.24 (1.63)	0.03	1.31	S	S	0.18
Textile yarn and thread	6.12	-0.70 (4.20)	0.05	1.15	S	S	0.35
Text fabrics woven ex narrow, spec,	6.59	-0.08 (0.78)	0.22	2.06	S	S	0.41
Tulle, lace, embroidery, ribbons, t	2.50	-0.38 (2.46)	0.08	3.42	S	S	0.23
Special textile fabrics and related	9.57	-0.66 (4.41)	0.15	0.80	S	S	0.56
Made-up articles, wholly or chiefly	7.21	-0.19 (2.14)	2.47	5.22	S	U	0.51
Mineral manufactures, nes	0.93	-0.41 (1.78)	0.05	0.18	S	S	0.24
Glass	1.86	-0.32 (2.24)	0.03	0.22	S	S	0.17
Glassware	5.92	-0.54 (3.70)	1.85	1.01	S	S	0.39
Pearls and precious and semi-precio	22.96	-0.25 (3.94)	0.004	4.91	S	S	0.85
Pig iron, spiegeleisen, sponge iron	2.52	-0.54 (2.72)	0.01	0.24	S	S	0.59
Iron and steel bars, rods, angles, sha	0.85	-0.15 (1.40)	0.48	0.91	S	S	0.25
Iron and steel wire, excluding wire	8.17	-0.35 (3.52)	1.80	0.32	S	S	0.70
Tubes, pipes and fittings of iron or	5.50	-0.64 (4.21)	4.99	4.12	S	S	0.48
Iron steel castings forgings unwork	11.55	-1.04 (6.12)	0.50	0.10	S	U	0.52
Copper	3.58	-0.65 (2.44)	0.77	1.55	S	S	0.56
Aluminium	9.81	-0.99 (5.68)	0.31	2.18	S	S	0.76
Finished structural parts and struc	6.03	-0.66 (4.22)	1.72	0.30	S	S	0.45

Metal containers for storage and tr	13.70	-0.99 (6.66)	2.74	3.81	S	U	0.65
Wire products - ex electric - & fen	3.46	-0.49 (3.61)	0.18	0.00072	S	U	0.28
Nails, screws, nuts, bolts, rivets and	2.57	-0.38 (2.62)	0.09	2.82	S	S	0.41
Tools for use in the hand or in mac	3.79	-0.46 (3.36)	1.67	0.001	S	S	0.33
Manufactures of metal, nes	4.07	-0.69 (3.82)	1.15	0.27	S	S	0.39
Power generating machinery, other t	23.74	-0.75 (7.29)	0.01	0.01	S	S	0.82
Agricultural machinery and implemen	11.85	-0.74 (5.78)	0.34	0.72	S	U	0.58
Office machines	4.04	-0.57 (2.57)	0.58	1.42	U	S	0.35
Metalworking machinery	1.46	-0.19 (1.37)	1.18	0.60	S	S	0.23
Textile and leather machinery	7.09	-0.85 (4.80)	0.92	0.09	S	S	0.44
Machines for special industries	5.09	-0.54 (3.68)	0.06	0.37	S	S	0.57
Machinery and appliances-non electr	3.96	-0.27 (2.20)	5.62	0.34	S	S	0.45
Electric power machinery and switch	4.82	-0.63 (3.31)	0.002	0.04	S	S	0.38
Telecommunications apparatus	1.64	-0.34 (2.19)	2.44	0.03	S	S	0.14
Domestic electrical equipment	1.96	-0.44 (2.50)	2.14	13.05	S	U	0.37
Other electrical machinery and appa	21.78	-0.98 (6.99)	0.01	0.20	S	S	0.75
Road motor vehicles	1.81	-0.35 (2.33)	1.76	0.17	S	S	0.12
Aircraft	1.35	-0.24 (1.83)	0.05	2.45	S	S	0.34
Sanitary, plumbing, heating & lightin	1.98	-0.34 (1.76)	0.00017	0.06	S	S	0.53
Clothing except fur clothing	3.19	-0.65 (2.88)	2.35	0.63	S	S	0.74
Scientific, medical, optical, meas./co	3.92	-0.21 (1.69)	1.49	3.35	S	S	0.52
Photographic and cinematographic su	1.09	-0.44 (1.90)	0.01	1.32	S	S	0.72
Developed cinematographic film	1.22	-0.15 (1.41)	0.73	4.49	S	U	0.18
Musical instruments, sound recorders	6.97	-0.57 (4.27)	0.00056	0.63	S	S	0.43
Printed matter	1.86	-0.37 (2.52)	0.004	5.77	U	S	0.12
Articles of artificial plastic mate	14.01	-0.77 (5.49)	0.44	0.04	S	S	0.63
Perambulators, toys, games and sporti	2.38	-0.29 (2.53)	0.00056	0.49	S	S	0.27
Office and stationery supplies, nes	3.00	-0.59 (2.93)	0.04	2.82	S	S	0.47
Manufactured articles, nes	4.77	-0.58 (3.68)	3.66	4.60	S	S	0.63

Note: The upper bound critical value of the F test for cointegration is 4.14 at the 10% level of significance. This comes from Pesaran te al. (2001, Table CI, p. 300).

Numbers inside parentheses are the absolute value of t-ratios. LM = Lagrange multiplier test of residual serial correlation. It is distributed as  $\chi^2(1)$ .

RESET = Ramsey's test for function form. It is distributed as  $\chi^2(1)$ .

**TABLE 5: Short and Long-Run Coefficients of the Import Value Model**

Industry	Short-Run Coefficient Estimates				Long-Run Coefficient Estimates		
	$\Delta Ln RE_t$	$\Delta Ln RE_{t-1}$	$\Delta Ln RE_{t-2}$	$\Delta Ln RE_{t-3}$	Constant	$Ln Y_{ln}$	$Ln RE$
Cereal preps & preps of flour of fr	0.003 (0.005)				12.43 (4.51)	-0.66 (0.72)	0.01 (0.01)
Tobacco, unmanufactured	-0.41 (0.23)				1.38 (0.93)	-1.51 (2.12)	2.16 (2.18)
Wool and other animal hair	-0.70 (0.26)	0.90 (0.31)	6.72 (2.38)	7.49 (3.30)	3.37 (0.41)	2.99 (0.66)	-4.26 (0.57)
Other crude minerals	-0.74 (1.11)				7.67 (2.62)	1.44 (1.09)	-2.14 (1.15)
Crude vegetable materials, nes	-1.47 (1.35)	-1.15 (0.94)	2.64 (2.46)	2.12 (2.06)	3.12 (1.19)	1.83 (1.74)	-1.04 (0.67)
Organic chemicals	-1.45 (2.48)				3.52 (1.99)	0.84 (1.53)	1.35 (1.53)
Inorg.chemicals-elems.,oxides,halog	-0.03 (0.03)				5.84 (0.91)	1.31 (0.56)	-0.12 (0.03)
Other inorganic chemicals	-1.71 (1.77)				11.72 (2.61)	3.42 (2.00)	-4.71 (1.71)
Synth.organic dyestuffs, natural ind	0.61 (0.92)				-4.06 (3.64)	2.07 (5.05)	0.61 (0.92)
Medicinal & pharmaceutical products	-1.31 (1.66)				-84.51 (0.24)	-9.92 (0.19)	37.68 (0.24)
Essential oils, perfume and flavour	-0.20 (0.69)				4.85 (4.59)	1.64 (4.13)	-0.41 (0.65)
Perfumery, cosmetics, dentifrices,	-1.45 (1.49)	-2.15 (2.13)			-3.60 (11.38)	1.88 (11.37)	0.82 (3.53)
Soaps, cleansing & polishing prepara	0.81 (0.99)	-0.64 (0.71)	-1.85 (2.31)		2.34 (0.99)	0.59 (0.51)	1.26 (0.82)
Chemical materials and products, nes	-0.64 (1.99)				4.97 (5.98)	2.43 (6.15)	-1.13 (2.19)
Manuf.of leather or of artif.or rec	2.11 (1.21)	-2.56 (1.29)	0.14 (0.08)	3.37 (2.25)	42.27 (0.47)	15.60 (0.62)	-28.68 (0.53)
Articles of rubber, nes	-0.60 (1.59)				5.55 (1.83)	2.61 (2.98)	-1.99 (1.22)
Wood manufactures, nes	-0.29 (0.14)	0.11 (0.06)	-0.09 (0.05)	-3.11 (1.97)	-7.61 (2.56)	-1.09 (0.51)	4.07 (1.78)
Paper and paperboard	-1.17 (0.93)				-0.69 (0.40)	1.02 (1.23)	1.75 (1.49)
Articles of paper, pulp, paperboard	0.09 (0.11)				-0.43 (0.04)	1.73 (1.32)	0.41 (0.12)
Textile yarn and thread	-0.49 (0.61)				5.87 (2.17)	1.47 (1.46)	-0.95 (0.58)
Text fabrics woven ex narrow, spec,	0.19 (0.12)				-11.74 (9.63)	2.23 (4.74)	2.55 (3.61)
Tulle, lace, embroidery, ribbons, t	-0.39 (0.45)				-6.16 (7.66)	1.72 (5.14)	1.35 (2.59)
Special textile fabrics and related	-0.41 (0.51)	-1.72 (1.65)	-1.39 (1.51)	-1.97 (2.48)	-1.08 (0.61)	-0.18 (0.15)	1.29 (1.64)
Made-up articles, wholly or chiefly	-2.24 (1.56)				3.52 (1.17)	3.65 (2.69)	-3.05 (1.66)
Mineral manufactures, nes	-0.16 (0.39)				2.98 (2.06)	1.58 (2.99)	-0.33 (0.38)
Glass	0.02 (0.03)				2.19 (0.76)	1.28 (1.35)	0.05 (0.03)
Glassware	-0.48 (1.02)				1.82 (1.03)	2.05 (3.07)	-1.02 (0.99)
Pearls and precious and semi-precio	-0.36 (0.77)				1.14 (0.45)	3.51 (3.65)	-1.01 (0.70)
Pig iron, spiegeleisen, sponge iron	2.27 (1.87)				2.32 (0.98)	-2.04 (1.91)	2.99 (2.07)
Iron and steel bars, rods, angles, sha	-2.07 (2.25)				4.65 (2.71)	2.76 (4.18)	-2.51 (2.41)
Iron and steel wire, excluding wire	-1.28 (1.06)				2.36 (1.00)	2.26 (2.03)	-1.53 (1.01)
Tubes, pipes and fittings of iron or	-1.00 (2.14)				7.58 (3.36)	1.92 (2.27)	-2.22 (1.47)
Iron steel castings forgings unwork	5.88 (1.83)	3.07 (0.77)	-0.95 (0.28)	-6.15 (2.21)	-3.95 (1.07)	-0.004 (0.002)	2.48 (0.72)
Copper	-0.43 (0.68)				5.19 (2.98)	1.09 (1.62)	-0.69 (0.67)
Aluminium	-0.18 (0.13)				5.75 (1.46)	0.78 (0.53)	-0.29 (0.13)
Finished structural parts and struc	-1.69 (0.89)				-1.36 (0.42)	3.20 (2.69)	-1.69 (0.89)
Metal containers for storage and tr	2.44 (3.50)				-0.07 (0.06)	-0.51 (1.11)	2.44 (3.50)

Wire products - ex electric - & fen	0.10 (0.15)				-2.43 (2.03)	1.89 (4.29)	0.10 (0.15)
Nails, screws, nuts, bolts, rivets and	-0.59 (1.55)				0.59 (0.56)	2.70 (6.86)	-1.05 (1.68)
Tools for use in the hand or in mac	-0.87 (1.35)	0.40 (0.56)	-0.85 (1.33)		7.33 (3.72)	1.39 (1.24)	-0.80 (0.53)
Manufactures of metal, nes	-0.27 (0.80)				3.16 (1.72)	2.08 (3.01)	-0.82 (0.75)
Power generating machinery, other t	-1.61 (2.74)	-1.30 (2.22)			6.40 (13.99)	1.31 (5.36)	-0.29 (0.89)
Agricultural machinery and implemen	0.51 (0.65)				0.49 (0.22)	0.93 (1.14)	0.86 (0.65)
Office machines	-3.52 (4.72)	-3.67 (4.98)			-15.86 (0.88)	7.76 (1.13)	-3.94 (0.59)
Metalworking machinery	2.13 (2.29)	-2.33 (2.25)	-1.50 (1.63)		1.22 (1.27)	0.48 (0.85)	1.76 (2.25)
Textile and leather machinery	-1.65 (1.28)				2.54 (1.15)	0.17 (0.18)	1.78 (1.23)
Machines for special industries	-0.82 (2.18)				9.65 (6.23)	1.53 (2.76)	-1.69 (1.80)
Machinery and appliances-non electr	-0.37 (1.43)				9.83 (6.09)	1.54 (2.60)	-1.21 (1.25)
Electric power machinery and switch	-0.05 (0.15)				3.89 (2.71)	1.64 (2.99)	-0.12 (0.14)
Telecommunications apparatus	-0.94 (2.67)				-0.04 (0.06)	3.42 (14.55)	-0.94 (2.67)
Domestic electrical equipment	-0.35 (0.75)				3.91 (1.90)	1.68 (2.04)	-0.92 (0.75)
Other electrical machinery and appa	-0.36 (1.39)				10.23 (2.09)	1.86 (1.86)	-1.84 (0.80)
Road motor vehicles	-0.15 (0.28)				8.16 (6.73)	0.47 (0.97)	-0.21 (0.28)
Aircraft	-1.05 (0.97)				7.74 (3.10)	2.20 (2.29)	-1.46 (0.97)
Sanitary, plumbing, heating & lightin	1.09 (0.54)				-9.66 (1.79)	2.27 (1.17)	1.78 (0.57)
Clothing except fur clothing	-1.27 (0.97)				0.83 (0.24)	2.90 (2.29)	-1.99 (0.99)
Scientific, medical, optical, meas./co	-0.82 (2.58)				11.59 (2.18)	3.32 (2.96)	-3.65 (1.44)
Photographic and cinematographic su	-0.40 (0.62)	-0.08 (0.09)	1.47 (2.11)	1.01 (1.66)	4.30 (2.96)	2.85 (3.23)	-1.85 (1.41)
Developed cinematographic film	-4.79 (3.50)	-2.65 (1.81)			3.79 (1.99)	0.15 (0.16)	0.74 (0.54)
Musical instruments, sound recorders	-0.68 (0.70)				-7.88 (4.25)	2.90 (3.82)	1.67 (1.46)
Printed matter	-1.39 (1.94)	-0.88 (1.56)			22.39 (0.25)	0.34 (0.07)	-4.79 (0.19)
Articles of artificial plastic mate	0.71 (1.04)				-6.81 (2.65)	1.91 (1.87)	1.71 (1.13)
Perambulators, toys, games and sporti	1.23 (1.18)				-12.21 (4.31)	2.47 (2.28)	2.20 (1.34)
Office and stationery supplies, nes	-0.16 (0.24)	-1.62 (1.91)	-3.10 (4.09)	-1.97 (3.02)	-6.27 (10.18)	1.40 (3.71)	2.04 (3.72)
Manufactured articles, nes	-3.20 (2.16)	-2.35 (1.74)			19.99 (0.42)	4.21 (0.54)	-5.58 (0.38)

Note: Numbers inside parentheses are the absolute value of t-ratios

**TABLE 6: Diagnostic Statistics Associated with the Import Value Model**

<b>Industry</b>	<i>F</i>	<i>ECM<sub>t-1</sub></i>	<i>LM</i>	<i>RESET</i>	<i>CUSUM</i>	<i>CUSUMSQ</i>	<i>Adj. R<sup>2</sup></i>
Cereal preps & preps of flour of fr	2.20	-0.47 (3.17)	0.13	2.04	S	S	0.24
Tobacco, unmanufactured	21.98	-1.20 (8.28)	0.23	3.08	S	S	0.69
Wool and other animal hair	4.80	-0.34 (2.35)	4.06	0.40	S	S	0.47
Other crude minerals	1.47	-0.35 (1.94)	4.84	0.14	S	U	0.35
Crude vegetable materials, nes	9.70	-0.49 (3.89)	1.23	10.14	S	U	0.55
Organic chemicals	2.09	-0.36 (2.36)	0.28	1.22	S	S	0.40
Inorg.chemicals-elems.,oxides,halog	0.91	-0.26 (1.71)	0.74	3.50	S	S	0.03
Other inorganic chemicals	2.38	-0.36 (2.71)	0.06	1.20	S	U	0.15
Synth.organic dyestuffs, natural ind	9.78	-1.09 (5.59)	0.97	0.03	S	U	0.50
Medicinal & pharmaceutical products	2.50	0.04 (0.22)	0.00014	1.87	S	U	0.20
Essential oils, perfume and flavour	3.48	-0.47 (2.91)	0.05	4.02	S	S	0.19
Perfumery, cosmetics, dentifrices,	13.17	-2.28 (5.72)	1.60	1.16	S	S	0.71
Soaps, cleansing & polishing prepara	2.09	-0.34 (3.43)	1.04	0.01	S	U	0.54
Chemical materials and products, nes	4.23	-0.56 (3.38)	2.92	0.16	S	S	0.50
Manuf.of leather or of artif.or rec	3.26	-0.08 (0.70)	1.07	0.27	S	S	0.63
Articles of rubber, nes	3.47	-0.30 (2.45)	1.76	0.64	S	U	0.34
Wood manufactures, nes	4.51	-0.53 (1.69)	0.08	0.01	S	S	0.77
Paper and paperboard	4.45	-0.60 (3.57)	0.82	5.55	S	S	0.49
Articles of paper, pulp, paperboard	1.93	-0.23 (1.04)	0.02	0.07	S	S	0.48
Textile yarn and thread	2.28	-0.52 (3.00)	0.95	3.57	S	U	0.19
Text fabrics woven ex narrow, spec,	2.14	-1.01 (2.29)	1.85	0.46	S	U	0.47
Tulle, lace, embroidery, ribbons, t	7.20	-0.84 (4.82)	0.43	0.05	U	U	0.42
Special textile fabrics and related	4.48	-0.42 (3.27)	0.03	0.02	U	U	0.28
Made-up articles, wholly or chiefly	5.27	-0.74 (3.98)	0.96	0.93	S	S	0.39
Mineral manufactures, nes	3.01	-0.48 (2.94)	1.65	0.91	S	U	0.19
Glass	1.54	-0.30 (1.79)	1.17	2.63	S	S	0.13
Glassware	6.36	-0.47 (4.07)	0.60	2.20	S	S	0.36
Pearls and precious and semi-precio	3.55	-0.36 (3.19)	0.20	0.03	S	S	0.37
Pig iron, spiegeleisen, sponge iron	5.77	-0.76 (4.22)	0.44	0.002	S	S	0.32
Iron and steel bars, rods, angles, sha	3.98	-0.83 (3.93)	0.13	0.30	S	U	0.29
Iron and steel wire, excluding wire	4.61	-0.84 (3.75)	4.03	0.00044	S	U	0.38
Tubes, pipes and fittings of iron or	3.84	-0.45 (2.15)	0.01	1.62	S	S	0.54
Iron steel castings forgings unwork	5.02	-0.70 (3.66)	0.82	9.05	S	U	0.41
Copper	4.69	-0.63 (3.34)	1.11	0.08	S	S	0.54
Aluminium	4.29	-0.63 (3.52)	0.25	1.72	S	U	0.24



Finished structural parts and struc	4.29	-0.75 (3.69)	1.98	0.04	S	U	0.29
Metal containers for storage and tr	17.04	-0.97 (7.43)	0.03	3.66	S	S	0.69
Wire products - ex electric - & fen	6.72	-0.93 (4.66)	2.53	3.70	S	S	0.44
Nails, screws, nuts, bolts, rivets and	3.24	-0.56 (3.16)	0.72	0.22	S	S	0.20
Tools for use in the hand or in mac	1.17	-0.27 (2.43)	0.03	0.13	S	S	0.36
Manufactures of metal, nes	2.72	-0.33 (2.61)	0.13	2.84	S	S	0.25
Power generating machinery, other t	7.71	-1.03 (5.03)	0.08	0.12	S	S	0.66
Agricultural machinery and implemen	3.79	-0.59 (3.40)	0.01	2.81	S	S	0.23
Office machines	2.05	-0.09 (0.82)	0.36	0.000038	S	S	0.68
Metalworking machinery	5.28	-0.75 (3.78)	1.16	0.95	S	U	0.60
Textile and leather machinery	3.97	-0.54 (3.38)	1.16	0.72	S	U	0.25
Machines for special industries	5.98	-0.49 (3.40)	0.05	2.19	S	S	0.41
Machinery and appliances-non electr	3.37	-0.30 (2.81)	0.01	3.05	S	S	0.24
Electric power machinery and switch	2.36	-0.37 (2.65)	0.02	0.65	S	S	0.20
Telecommunications apparatus	10.41	-1.08 (5.77)	1.09	7.40	S	S	0.52
Domestic electrical equipment	4.46	-0.38 (3.50)	0.19	5.40	S	S	0.60
Other electrical machinery and appa	2.93	-0.20 (1.33)	0.21	3.23	S	S	0.53
Road motor vehicles	5.29	-0.75 (4.04)	1.33	0.33	S	S	0.30
Aircraft	2.82	-0.72 (2.97)	1.15	0.14	S	S	0.21
Sanitary, plumbing, heating & lightin	3.78	-0.61 (3.39)	1.05	2.61	U	U	0.23
Clothing except fur clothing	3.37	-0.64 (3.36)	0.003	2.49	S	U	0.21
Scientific, medical, optical, meas./co	6.56	-0.22 (2.29)	1.18	3.07	S	U	0.45
Photographic and cinematographic su	3.12	-0.44 (2.77)	0.04	1.19	S	S	0.28
Developed cinematographic film	6.12	-0.62 (4.01)	2.40	4.11	S	S	0.46
Musical instruments, sound recorders	2.51	-0.47 (2.58)	4.43	0.05	S	S	0.19
Printed matter	3.04	-0.06 (0.23)	0.04	1.95	S	S	0.41
Articles of artificial plastic mate	3.44	-0.42 (2.84)	0.004	1.64	S	U	0.29
Perambulators, toys, games and sporti	4.01	-0.56 (3.18)	1.56	0.38	U	U	0.24
Office and stationery supplies, nes	9.67	-0.93 (5.59)	0.02	0.95	S	U	0.54
Manufactured articles, nes	0.62	-0.07 (0.64)	1.26	1.77	S	U	0.28

Note: The upper bound critical value of the F test for cointegration is 4.14 at the 10% level of significance. This comes from Pesaran et al. (2001, Table CI, p. 300). Numbers inside parentheses are the absolute value of t-ratios. LM = Lagrange multiplier test of residual serial correlation. It is distributed as  $\chi^2(1)$ . RESET = Ramsey's test for function form. It is distributed as  $\chi^2(1)$ .