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Mohsen Bahmani-Oskooee, and Hanafiah Harvey

Impact of Exchange Rate Volatility and Commodity Trade between U.S. and Singapore[1]

Mohsen Bahmani-Oskooee
The Center for Research on International Economics, and
Department of Economics
The University of Wisconsin-Milwaukee, Milwaukee, WI 53201, U.S.A.
E-mail: bahmani@uwm.edu

Hanafiah Harvey
Department of Economics, Pennsylvania State University, Mont Alto
Mont Alto, PA 17237, U.S.A.
E-mail: hhh10@psu.edu

***A*bstract:** The impact of exchange rate volatility on trade flows still continues to be of great interest. More recent studies have looked that the issue at commodity level. In this paper, we consider the trade between Singapore and her major trading partner, the U.S. and investigate the effects of exchange rate volatility on 141 U.S. exporting industries and 60 U.S. importing industries. We find that exchange rate uncertainty has short-run effects on the trade flows of most industries. However, the short-run effects last into the long run only in 59 exporting industries and in 27 importing industries.

Keywords: The U.S., Singapore, Industry Trade, Exchange Rate Volatility

JEL Classifications: F14, F31, F37

1. Introduction

Since the collapse of Bretton-Woods system of relatively fixed exchange rates there has been substantial interest among economists on the effects of exchange rate volatility on the trade volume. Volatility of exchange rate creates an ambiguity among traders which leads to a higher cost and thus affects the trade flows. Bahmani-Oskooee and Hegerty (2007) provide a detail theoretical and empirical review of the topic. It has been pointed out that the results could be affected by the level of data aggregation. Therefore, more recent studies that have used data at commodity level and have provided more evidence of the link between exchange rate uncertainty and commodity trade flows relative to aggregate bilateral trade flows between two countries and relative to trade flows between one country and rest of the world. Since this paper is about Singapore trade, a short review is in order.

Bahmani-Oskooee and Payesteh (1993) examined response of aggregate trade flows of a few countries including Singapore and found no significant relation effects. However, when Bahmani-

[1] Valuable comments from two anonymous referees are greatly appreciated. Remaining errors are ours.

Oskooee (1996) used Johansen's cointegration technique the results were different. Poon, *et al*. (2005) considered experiences of Indonesia, Japan, South Korea, Singapore and Thailand. They found that volatility has negative effects on the exports of Japan, South Korea and Singapore but positive effects on the exports of Thailand.

The above studies have used aggregate export and import flows of Singapore with the rest of the world, hence could suffer from aggregation bias problem. To resolve the problem, a common practice is to use trade flows at bilateral level between one country and each of her trading partners. In the absence of any study doing this for Singapore, we consider the major trading partner of Singapore, i.e., the U.S. and disaggregate the two countries trade flows by commodity and investigate the response of 141 U.S. exporting industries to Singapore and 60 U.S. importing industries from Singapore to a measure of real bilateral exchange rate volatility. We outline the models and explain the method in Section 2. Empirical results are discussed in Section 3 and a summary is provided in Section 4. Data sources and variable definitions are cited in an Appendix.

2. Methodology and the Models

In formulating a country's export and import demand models we follow Bahmani-Oskooee and Hegerty (2009) who assessed the impact of exchange rate volatility on the U.S.-Mexico commodity flows and adopt the following long-run specification:

$$LnX_t^{US} = a + bLnY_t^{SG} + cLnREX_t + dLnVOL_t + \varepsilon_t \qquad (1)$$

Since commodity trade data are reported by the U.S., equation (1) is formulated from the U.S. prospective and it shows Singapore's demand for US exports in log linear form. Hence the U.S. exports of commodity *i*, X^{US} is assumed to depend on the level of economic activity in Singapore (Y^{SG}), the real bilateral exchange rate (REX) and volatility of the real bilateral exchange rate (VOL). Since economic growth in Singapore is expected to increase her imports from the U.S., we expect an estimate of b to be positive. As the Appendix shows, the real bilateral exchange rate is defined in a way that a decline signifies a real depreciation of the U.S. dollar. Therefore, if a real depreciation is to boost the U.S. exports of commodity *i*, an estimate of c is expected to be negative. Finally, since exchange rate volatility could affect the exports in either direction, an estimate of d could be negative or positive. Due to uncertainty about future prices, exports may choose to export less. However, to avoid any decline in their future income due to uncertainty, they may choose to maximize their income today by exporting more.[2]

In order to include the short-run adjustment in (1), In order to include the short-run adjustment mechanism in (1) we too follow bounds testing approach (Pesaran *et al*., 2001) and rely upon the following error-correction model:

$$\Delta LnX_t^{US} = c_1 + \sum_{j=1}^{n1} \gamma_j \Delta LnX_{t-j}^{US} + \sum_{j=0}^{n2} \delta_j \Delta LnY_{t-j}^{SG} + \sum_{j=0}^{n3} \kappa_j \Delta LnREX_{t-j} + \sum_{j=0}^{n4} \lambda_j \Delta LnVOL_{t-j}$$

$$+ \alpha_1 LnX_{t-1}^{US} + \alpha_2 LnY_{t-1}^{SG} + \alpha_3 LnREX_{t-1} + \alpha_4 LnVOL_{t-1} + \varepsilon_t \qquad (2)$$

[2] Another body of the literature aims at estimating import and export demand functions without volatility measure to address other trade issues. Examples include King (1993), Charos, et al. (1996), Truett and Truett (2000), Du and Zhu (2001), Love and Chandra (2005), Agbola and Damoense (2005), Narayan and Narayan (2005), and Narayan, et al. (2007).

In this set up, whereas the short-run effects are obtained from the estimates of coefficients attached to first-differenced variables, the long-run effects are judged by the estimates of $\alpha_2 - \alpha_4$ normalized on α_1.

Of course, for long-run estimates not to be spurious, we must establish cointegration. Pesaran *et al.* (2001) propose applying the normal F test for joint significance of lagged level variables in (2) with new critical values that they provide.[3] Since the new critical values do account for integrating properties of all variables in a given model, there is no need for pre-unit root testing and variables could be combination of I(0) or I(1) which is a common property for most macro variables such as those in (2).

Next we turn to formulation of the import demand model. Again, following Bahmani-Oskooee and Hegerty (2009) we assume the U.S. demand for Singapore's commodity *i* (M^{US}) depends on the level of economic activity in the U.S. (Y^{US}), the real bilateral exchange rate (REX), and volatility of the real bilateral exchange rate (VOL) as in equation (3):

$$LnM_t^{US} = g + h\ LnY_t^{US} + jLnREX_t + kLnVOL_t + \varepsilon_t \qquad (3)$$

While it is expected for estimates of h and j to be positive, that of k could be negative or positive. Once again, the error-correction model associated with equation (3) takes the following form:

$$\Delta LnM_t^{US} = c_2 + \sum_{j=1}^{n5} \pi_j \Delta LnM_{t-j}^{US} + \sum_{j=0}^{n6} \phi_j \Delta LnY_{t-j}^{US} + \sum_{j=0}^{n7} \varphi_j \Delta LnREX_{t-j} + \sum_{j=0}^{n8} \vartheta_j \Delta LnVOL_{t-j}$$

$$+ \beta_1 LnM_{t-1}^{US} + \beta_2 LnY_{t-1}^{US} + \beta_3 LnREX_{t-1} + \beta_4 LnVOL_{t-1} + \varepsilon_t \qquad (4)$$

Once again when equation (4) is estimated, short-run effects are obtained from estimates of coefficients attached to first-differenced variables and long-run effects are judged by the estimates of $\beta_2 - \beta_4$ normalized on β_1.[4]

3. Empirical Results

In this section we estimate error-correction models (2) and (4) for 141 U.S. exporting industries and 60 U.S. importing industries. Annual data over the period 1973-2011 are used to carry out the empirical exercise. Following the literature, a maximum of four lags are imposed on each first-differenced variable and Akaike's Information Criterion (AIC) is employed to select an optimum model for each industry. The results from each optimum model is then reported in Tables 1-4 and discussed below.[5]

(Tables 1-4 are about here.)

We fist concentrate on estimates of export demand model that are reported in Tables 1-2. Due to volume of the results while we only report the short-run coefficient estimates associated with exchange rate volatility, we report the long-run coefficient estimates for all three determinants.

[3] Note that while Pesaran *et al.* (2001) provide critical values for large samples, Narayan (2005) provides it for small samples which we use in this paper.

[4] For other applications of this approach see Halicioglu, F., (2007), Narayan et al. (2007), Tang (2007), Mohammadi et al. (2008), Wong and Tang (2008), De Vita and Kyaw (2008), Payne (2008), Bahmani-Oskooee and Gelan (2009), Chen and Chen (2012), and Wong (2013).

[5] Note that due to the Asian Financial Crisis in 1997, we have included a dummy variable which takes 0 for the period before 1997 and 1 thereafter.

From the short-run coefficient estimates we gather that at the 10% significance level, there is at least one significant short-run coefficient in 87 out of 141 industries, implying that exchange rate uncertainty has short-run effects on 62% of industries that export from the U.S. to Singapore. Furthermore, while in some industries like the one coded 12, the effects are positive, in some others like 22, they are negative. Do these short-run effects last into the long run?

From the long-run coefficient estimates we gather that at the 10% level of significance, the measure of exchange rate volatility carries significant coefficient in 59 industries. Furthermore, in 47 out of 59 industries the effect is negative, implying that exchange rate uncertainty has adverse effects on majority of the U.S. exports to Singapore. The industries in which the effect is significantly positive are coded as 13, 22, 51, 53, 73, 91, 263, 571, 629, 678, 729, and 897. It appears that almost all affected industries are small as measured by their trade shares also reported in Table 1. The large industries, i.e., Petroleum Products coded 332 with 15.77% export share, Plastic Materials coded 581 with 5.52% market share, Chemical Materials and Products coded 599 with 3.56% share, Machinery and Appliances coded 719 with 9.32% share, Scientific, and medical means coded 861 with 5.29% share, and Special transactions coded 931 with 15.4% of exports shares are not affected. These large industries all together export close to 55% of the U.S. goods to Singapore. From the long run results it is also clear that Singapore's income carries a significant coefficient in 84 industries and in all but seven, the coefficient is positive supporting income effect.[6] As Singapore grows, she imports more from the U.S. goods. Finally, the real exchange rate carries a significant coefficient in 53 cases and in most of them the estimated coefficient is negative, implying that a real depreciation of the U.S. dollar will increase the U.S. exports to Singapore.

The above long-run estimates and analysis will only be valid if we establish joint significance of lagged level variables in each optimum model as a sign of cointegration among the variables. To that end, we consider the results of the F test reported in Table 2 along with a few other diagnostic statistics. Given the upper bound critical value of 4.10, we gather that our calculated F statistic is higher than the critical value in 93 industries supporting cointegration.[7] In some industries in which at least one long-run coefficient was significant but the F test is insignificant (e.g. industry coded 48) we rely upon an alternative test. That is, we use the normalized long-run estimates and equation (1) and generate the error term, *ECM*. We then replace the lagged level variables in (2) by ECM_{t-1} and estimate each model at the same optimum lags. A significantly negative coefficient obtained for ECM_{t-1}will support convergence toward long run which is the case in almost all industries. The size of the coefficient itself measures the speed of adjustment. For example, -0.31 coefficient in industry coded 11 implies that 31% of adjustment takes place within one year since the data are quarterly and –1.29 in industry coded 44 implies that almost 65% of adjustment takes place within six months.

Several other statistics are also reported in Table 2. To make sure residuals in each optimum model are free from autocorrelation we report the Lagrange Multiplier (LM) statistic which is distributed as χ^2 with one degree of freedom. Given its 5% critical value of 3.84, the LM statistic is insignificant in most models (to be exact in 110 out of 141 models) supporting autocorrelation free residuals in most optimum models. Ramsey's RESET statistic is also reported to check for misspecification of each optimum model. This statistic is also distributed as χ^2 with one degree of freedom. As can be seen from the results, this statistic is also insignificant in most optimum models (indeed in 113 models), implying that most optimum models are correctly specified. Finally, to test

[6] The negative income elasticity implies that as Singapore economy grows, it produces more of substitute goods and therefore imports less of these goods (Bahmani-Oskooee, 1986).

[7] This 10% critical value for small samples like ours with 38 observations and three exogenous variables comes from Narayan (2005, p. 1988).

for stability of short-run and long-run coefficient estimates we apply the CUSUM and CUSUMSQ tests to the residuals of each optimum model and indicate the stable models by "s" and unstable ones by "us".[8] Clearly, almost all coefficients are stable.

Next we turn to import demand model (4) and follow the same procedure as above and report the results in Tables 3 and 4. Note that there are only 60 US industries that import from Singapore. From the short-run coefficient estimates we gather that there are 43 industries in which there is at least one short-run coefficient that is significant at least at the 10% level. From the long-run results it is clear that the short-run effects last into the long run only in 27 industries. Furthermore, while in 17 industries the long-run effects of exchange rate volatility is negative, in 10 industries it is positive. While the first two largest industries, i.e., industries coded 512 and 714 with 21.62% and 20.06% of import shares respectively are not affected, the next four largest industries, i.e., 541 with 8.01% import share; 729 with 11.68% trade share, 861 with 5.68% import share; and 931 with 11.31% import share are affected, mostly adversely. As for the U.S. income, it carries significant coefficient in 28 cases and in most industries the coefficient is positive supporting the income effect. Only in five cases the coefficient is negative (i.e., industries coded 231, 292, 551, 693, and 698 supporting substitution effect. Finally, the real exchange rate carries a significant coefficient in 21 cases and in most industries the coefficient is positive, implying that a real depreciation of the dollar will reduce the U.S. imports of these goods from Singapore.

Once again the long-run estimates will only be meaningful if we establish cointegration. From the diagnostics reported in Table 4, cointegration is confirmed at least by either the F-test or the coefficient estimate of ECM_{t-1} in all industries except those coded 512, 891, and 897. Furthermore, the LM test supports lack of autocorrelation in most models and the RESET test supports correctly specified optimum model in most cases. Finally, the application of CUSUM and CUSUMSQ tests supports stability of all estimated coefficients in almost all models.

4. Conclusion

Exchange rate volatility and its impact on trade flows still continue to be of an interest to policy makers. Faced with uncertain future prices, some traders could chose to trade less today. However, faced with uncertain future contracts, some can chose to maximize their current income by trading more. Hence, exchange rate uncertainty is said to affect the trade flows in either direction. Earlier studies concentrated on using trade flows between one country and rest of the world or between two countries. They are criticized for suffering from aggregation bias. Today, the trend is to concentrate on two trading partners and disaggregate their trade flows by commodity.[9]

In this paper we consider the impact of exchange rate volatility on the trade flows between Singapore and her major partner, the U.S. Unlike previous studies on Singapore-U.S. trade, we disaggregate their trade flows by commodity and consider 141 industries that export from U.S. to Singapore and 60 U.S. industries that import from Singapore. We find that exchange rate volatility has short-run effects on majority of the industries that trade between the two countries. The short-run effects last into the long run only in 59 U.S. exporting industries and in 27 U.S. importing industries and in most industries the effect is negative.

[8] For a graphical presentation of these two tests see Bahmani-Oskooee *et al.* (2005).

[9] For this relatively new tradition see Bahmani-Oskooee and Wang (2007), Bahmani-Oskooee and Mitra (2008), Bahmani-Oskooee and Kovyryolova (2008), Bahmani-Oskooee and Hegerty (2008), Bahmani-Oskooee and Harvey (2011), Bahmani-Oskooee and Bolhasani (2012), and Bahmani-Oskooee et al. (2012).

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Table 1. Short-Run and Long-Run Coefficient Estimates of Export Demand Model (2)

			Short-Run Estimates				Long-Run Estimates			
Code	**Industries**	**T. Share**	**Δ In VOL$_t$**	**Δ In *VOL*$_{t-1}$**	**Δ In VOL$_{t-2}$**	**Δ InVOL$_{t-3}$**	***Constant***	**Ln Y_{SG}**	**Ln REX**	**Ln VOL**
1	Live Animals	0.003%	-0.08(0.26)				90.75(1.92)	-3.50(1.77)	-5.97(1.18)	-0.26(2.45)
11	Meat, fresh, chilled or frozen	0.34%	0.10(0.91)				10.73(0.78)	-0.08(0.13)	-0.59(0.39)	0.84(1.19)
12	Other meat and edible meat offal, fresh, chilled or frozen	0.01%	0.43(2.43)	0.58(2.12)	0.43(2.17)		-34.65(5.15)	1.46(5.16)	-4.11(3.57)	-0.46(1.09)
13	Meat in airtight containers n.e.s &	0.02%	0.17(1.91)				-42.79(10.79)	1.87(11.37)	0.55(1.16)	0.17(1.91)
22	Milk & cream	0.14%	-0.04(0.27)	-0.67(2.52)	-0.31(1.67)		4.09(0.66)	0.01(0.04)	2.35(2.71)	0.86(2.02)
24	Cheese and curd	0.02%	-0.22(1.12)	0.24(0.71)	0.12(0.47)	-0.18(1.23)	-18.35(3.31)	0.68(2.58)	-1.92(2.30)	-0.86(1.86)
31	Fish, fresh & simply preserved	0.06%	0.19(1.57)				-15.14(2.49)	0.79(3.37)	-1.96(1.78)	0.28(1.55)
32	Fish, in airtight containers, n.e.s	0.01%	-0.25(0.90)	-0.34(0.56)	-0.78(1.80)	-0.71(3.16)	-6.29(0.66)	0.23(0.55)	6.57(2.87)	-0.34(0.47)
41	Wheat (including spelt) and meslin, unmil	0.10%	-0.32(1.74)				27.42(3.71)	-0.96(3.19)	-1.27(1.37)	-0.32(1.74)
44	Maize (not including sweet corn), unmil	0.001%	0.90(1.44)	2.39(2.83)	1.97(3.21)		-5.06(0.36)	-0.67(0.12)	-2.34(1.19)	-2.53(2.42)
47	Meal & flour of cereals, except whe	0.001%	0.09(0.28)				-10.44(1.05)	0.41(1.02)	0.89(0.56)	0.09(0.28)
48	Cereal preps & preps of flour of fr	0.09%	-0.03(0.44)				-31.00(4.01)	1.37(4.36)	-0.66(0.54)	-0.11(0.44)
51	Fruit, fresh, and nuts excl. Oil n	0.22%	-0.48(0.01)				1.99(0.45)	0.25(1.63)	-0.23(0.38)	0.69(1.70)
52	Dried Fruit including artificially	0.03%	0.09(1.22)				-2.29(0.08)	0.37(0.32)	-10.00(0.80)	-0.40(0.29)
53	Fruit, preserved and fruit preparat	0.06%	0.05(0.69)	0.24(1.72)	0.19(2.15)		15.79(2.59)	0.74(0.88)	-0.24(0.33)	0.71(1.86)
54	Vegetables, roots & tubers, fresh o	0.12%	0.68(0.01)				16.97(8.35)	0.87(10.57)	-0.97(2.99)	0.68(0.01)
55	Vegetables, roots & tubers pres or	0.04%	-0.05(0.56)	0.70(4.55)	0.33(4.10)		-41.70(13.17)	1.64(11.66)	-0.74(1.47)	-1.31(5.26)
61	Sugar and honey	0.07%	0.28(1.92)				274.67(0.04)	-123.94(0.04)	385.35(0.04)	-54.62(0.04)
62	Sugar confectionery, sugar preps. E	0.02%	-0.41(1.30)	-0.71(2.77)	-0.41(2.73)		0.72(0.13)	0.01(0.04)	-2.37(2.80)	-0.47(1.07)
71	Coffee	0.06%	0.06(0.39)				20.59(1.07)	-0.59(0.77)	-2.18(0.71)	0.23(0.42)
73	Chocolate and other food preparations containing cocoa, n.e.s.	0.07%	0.34(3.36)	-0.12(0.79)	0.16(1.42)		-27.39(3.01)	1.38(4.02)	0.74(0.56)	1.06(1.85)
75	Spices	0.002%	-0.44(2.36)				1.06(0.13)	-0.07(0.23)	-2.18(2.31)	-0.69(2.57)
81	Feed. Stuff for animals excl. unmil	0.07%	-0.17(1.12)				4.75(0.99)	0.35(1.78)	-2.63(3.47)	-0.18(1.16)
91	Margarine and shortening	0.05%	0.23(0.79)	-2.64(4.91)	-1.49(3.34)	-0.45(1.88)	-32.34(4.28)	1.90(6.38)	4.42(3.79)	3.72(5.90)
99	Food preparations, n.e.s.	0.28%	0.09(2.02)	0.21(2.94)	0.18(3.49)		-21.06(6.58)	0.99(7.40)	-0.06(0.14)	-0.52(2.55)
111	Non alcoholic beverages, n.e.s.	0.01%	-0.10(0.65)				29.88(1.52)	-1.04(1.28)	-13.18(4.41)	-0.23(0.64)
112	Alcoholic beverages	0.12%	0.07(0.68)	0.59(3.50)	0.39(3.43)		-39.06(11.22)	1.59(10.69)	-0.26(0.60)	-0.76(2.82)
122	Tobacco manufactures	0.002%	0.22(1.14)	1.16(2.46)	0.82(2.41)	0.44(2.70)	118.65(0.27)	-7.11(0.31)	-43.39(0.33)	-33.64(0.43)
221	Oil seeds, oil nuts and oil kernels	0.004%	-0.63(1.25)				-10.88(0.17)	0.31(0.12)	-1.73(0.31)	-1.35(1.12)
231	Crude rubber incl. synthetic & recl	0.23%	0.10(0.94)				-35.40(8.37)	1.61(9.12)	0.99(1.44)	0.13(0.92)
242	Wood in the rough or roughly square	0.001%	0.16(0.37)	1.38(1.84)	0.79(1.39)	0.71(1.97)	-38.45(0.93)	1.43(0.82)	-4.66(1.09)	-1.89(1.17)
251	Pulp & waste paper	0.01%	-0.17(0.76)	1.64(3.57)	0.88(2.49)	0.39(2.14)	-21.99(3.57)	0.68(2.56)	-0.30(0.34)	-2.56(4.38)
263	Cotton	0.005%	0.63(2.03)	0.58(1.94)			43.30(8.81)	-1.40(6.94)	-2.43(3.09)	1.04(2.58)
266	Synthetic and regenerated artificial	0.06%	0.55(1.79)	0.78(1.29)	0.42(0.81)	0.50(1.94)	-9.36(0.98)	0.50(1.41)	-0.54(0.39)	-0.43(0.62)
267	Waste materials from textile fabric	0.001%	0.09(0.39)	0.91(2.14)	0.72(2.17)	0.26(1.38)	9.89(0.42)	-0.48(0.56)	-4.88(1.28)	-2.41(1.39)
273	Stone, sand and gravel	0.01%	0.09(0.75)				-39.69(2.34)	1.84(0.69)	-7.29(2.25)	0.27(0.74)
275	Natural abrasives incl. industrial	0.01%	0.18(1.58)				-50.64(5.48)	0.16(5.76)	-2.11(1.76)	-0.03(0.10)

276	Other crude minerals	0.04%	-0.18(1.24)	0.85(3.53)	0.41(2.24)	0.19(1.83)	1.83(0.41)	-0.07(0.37)	-0.48(0.79)	-1.16(3.43)
284	Non ferrous metal scrap	0.004%	0.67(1.52)	2.39(3.24)	1.61(2.96)	0.56(1.82)	-40.44(1.22)	1.17(0.77)	0.93(0.25)	-4.26(1.54)
291	Crude animal materials, n.e.s.	0.003%	0.52(1.68)	0.97(1.33)	0.86(1.51)	0.68(2.31)	-60.95(7.45)	2.41(6.65)	3.08(2.81)	-0.78(1.23)
292	Crude vegetable materials, n.e.s.	0.02%	-0.02(0.15)				-8.47(1.80)	0.48(2.48)	-0.24(0.36)	-0.02(0.15)
321	Coal, coke & briquettes	0.001%	0.13(1.67)	1.73(3.05)			12.34(1.05)	-0.82(1.63)	1.53(0.90)	-2.36(2.46)
332	Petroleum products	15.77%	0.22(0.65)	0.75(1.17)	0.75(1.41)	0.73(2.57)	-25.23(1.41)	1.29(1.72)	2.50(1.62)	-0.18(0.17)
411	Animal oils and fats	0.003%	0.25(0.53)	1.22(1.38)	1.34(2.30)	0.76(2.68)	30.42(0.38)	-13.41(0.37)	4.24(0.43)	-7.63(0.26)
422	Other fixed vegetable oils	0.001%	-0.66(1.74)				-54.57(1.72)	2.01(1.54)	1.35(0.28)	-1.61(1.38)
431	Anim./veg. Oils & fats, processed,	0.02%	1.01(2.63)	2.18(2.56)	2.06(2.88)	0.73(1.76)	-27.84(3.29)	1.16(3.13)	-2.99(2.76)	-1.02(1.78)
512	Organic chemicals	3.08%	-0.09(1.83)	0.32(4.48)	0.16(3.12)		-23.71(11.65)	1.14(13.35)	0.65(2.73)	-0.63(5.37)
513	Inorg. chemicals elems., oxides, ha	0.85%	-0.08.(0.78)				27.54(5.82)	1.27(6.63)	-0.39(0.57)	-0.11(0.79)
514	Other inorganic chemicals	0.28%	-0.06(0.51)				10.27(1.15)	-0.19(0.51)	-2.62(1.77)	-0.12(0.54)
515	Radioactive and associated material	0.03%	0.21(1.32)	0.76(2.05)	0.48(1.56)	0.29(1.72)	-28.73(6.37)	1.26(6.26)	-3.27(5.70)	-0.43(1.29)
531	Synth. organic dyestuffs, natural i	0.03%	-0.20(1.23)				-12.23(0.81)	0.49(0.80)	1.24(0.53)	-0.63(1.27)
532	Dyeing & tanning extracts, synth. t	0.01%	-0.38(1.56)				-54.02(41.1)	1.87(3.61)	-1.34(0.66)	-2.19(2.65)
533	Pigments, paints, varnishes & relat	0.85%	-0.14(1.81)	0.27(2.22)	0.16(2.07)		-16.00(2.96)	0.68(2.55)	1.19(1.46)	-1.07(2.07)
541	Medicinal & pharmaceutical products	0.74%	-0.02(0.23)				-27.98(6.89)	1.30(7.97)	1.12(1.79)	-0.03(0.23)
551	Essential oils, perfume and flavour	0.11%	-0.15(1.75)				-26.94(9.61)	1.18(10.30)	-0.82(2.07)	-0.30(2.39)
553	Perfumery, cosmetics, dentifrices,	0.52%	-0.01(0.21)				-31.43(11.33)	1.48(13.18)	-0.72(1.64)	-0.02(0.21)
554	Soaps, cleansing & polishing prepar	0.29%	-0.03(0.33)				-1.19(0.29)	0.27(1.54)	-0.66(1.13)	0.17(1.29)
571	Explosives and pyrotechnic products	0.06%	-0.07(0.47)	-0.02(0.07)	-0.002(0.10)	0.31(2.70)	-9.34(1.68)	0.61(2.71)	0.96(1.19)	0.72(1.74)
581	Plastic materials, regenerd. Cellul	5.52%	-0.07(0.97)				-27.15(5.75)	1.37(7.13)	-1.24(1.68)	-0.15(0.97)
599	Chemical materials and products, n.	3.56%	-0.08(1.96)				26.89(0.77)	-0.82(0.58)	-1.89(0.89)	-0.42(1.03)
611	Leather	0.003%	0.002(0.01)	1.54(3.60)	0.93(2.79)	0.39(2.31)	-3.24(0.56)	-0.004(0.02)	-4.34(4.92)	-1.93(4.29)
612	Manuf. of leather or of artif. or r	0.002%	-0.11(0.43)				-61.49(1.48)	2.93(1.61)	-27.54(1.33)	-0.50(0.44)
621	Materials of rubber	0.12%	-0.19(2.22)	0.03(0.17)	-0.09(0.57)	-0.14(1.82)	-7.88(1.59)	0.36(1.57)	0.62(0.87)	-0.56(1.28)
629	Articles of rubber, n.e.s.	0.33%	-0.05(0.44)	-0.38(2.74)	-0.18(1.80)		18.24(4.09)	1.01(5.75)	0.05(0.07)	0.62(1.76)
631	Veneers, plywood boards & other woo	0.01%	0.01(0.06)	1.47(2.22)	0.85(1.78)	0.87(2.74)	26.79(0.31)	-1.41(0.39)	-8.71(0.84)	-5.20(1.59)
632	Wood manufactures, n.e.s.	0.03%	0.01(0.04)				-77.37(9.29)	3.26(9.31)	-4.14(3.42)	0.01(0.04)
633	Cork manufactures	0.001%	-0.41(1.06)				20.85(2.18)	-0.80(2.04)	-1.67(1.54)	0.34(1.07)
641	Paper and paperboard	0.15%	-0.06(0.73)	0.21(2.55)			-17.55(1.13)	0.66(0.91)	0.46(0.25)	-1.79(1.49)
642	Articles of paper, pulp, paperboard	0.08%	0.12(2.01)	0.54(4.46)	0.37(4.11)	0.10(2.33)	-19.26(3.56)	0.80(3.72)	-6.40(2.62)	-2.13(4.45)
651	Textile yarn and thread	0.03%	-0.15(0.56)				-111.99(2.88)	4.27(2.83)	3.09(0.90)	-2.16(1.96)
652	Cotton fabrics, woven ex. narrow or	0.01%	-0.30(1.11)	-0.09(0.42)	-0.20(1.65)		-36.17(1.59)	1.53(1.61)	4.39(1.05)	-0.02(0.01)
653	Text fabrics woven ex narrow, spec,	0.03%	-0.19(2.27)				-12.07(1.31)	0.44(1.16)	-0.49(0.37)	-1.47(2.64)
654	Tulle, lace, embroidery, ribbons, t	0.002%	-0.21(0.96)	1.12(2.88)	0.59(1.98)	0.45(2.78)	-36.92(2.81)	1.22(2.12)	1.09(0.69)	-2.38(2.65)
655	Special textile fabrics and related	0.13%	0.04(0.51)	0.17(1.90)			-25.43(3.01)	1.14(0.36)	-2.57(1.94)	-0.86(1.39)
656	Made up articles, wholly or chiefly	0.02%	-0.003(0.04)				9.92(2.01)	-0.24(1.18)	0.06(0.10)	-0.01(0.04)
657	Floor coverings, tapestries, etc.	0.04%	-0.06(0.57)				3.74(0.14)	-0.15(0.13)	0.92(0.36)	-1.05(1.22)
661	Lime, cement & fabr. bldg.mat. Ex g	0.005%	0.11(0.53)				-8.76(1.25)	0.49(1.73)	-3.01(3.03)	0.11(0.53)
662	Clay and refractory construction ma	0.01%	0.01(0.03)				-30.74(3.19)	1.34(3.46)	-0.73(0.46)	-0.01(0.03)
663	Mineral manufactures, n.e.s.	0.31%	0.25(2.72)	0.29(2.09)	0.46(4.12)	0.09(3.97)	-23.87(12.13)	1.16(14.46)	-0.56(1.81)	-0.03(0.19)
664	Glass	0.17%	0.09(0.70)				14.02(1.70)	0.85(2.55)	-1.91(1.12)	0.55(0.93)
665	Glassware	0.08%	0.10(1.22)	0.11(1.31)			5.54(1.32)	-0.13(0.68)	-3.01(5.44)	-0.52(1.98)
666	Pottery	0.00%	0.30(1.17)	1.88(3.29)	1.48(3.22)	0.77(3.21)	-31.58(2.41)	0.97(1.89)	1.27(0.76)	-3.19(3.64)

667	Pearls and precious and semi precio	0.03%	0.18(0.62)	0.58(1.21)	0.67(1.93)	0.54(2.72)	56.85(2.31)	-2.22(1.97)	2.86(1.69)	-0.47(0.36)
671	Pig iron, spiegeleisen, sponge iron	0.004%	0.28(0.88)				-32.94(1.92)	1.48(2.06)	-12.88(4.81)	-0.34(0.86)
673	Iron and steel bars, rods, angles,	0.13%	0.27(1.17)	0.92(2.28)	0.54(1.74)	0.35(1.98)	-7.16(0.77)	0.40(1.02)	1.47(1.42)	-0.08(0.13)
674	Universals, plates and sheets of ir	0.04%	-0.56(3.55)				7.68(1.24)	-0.27(1.08)	-1.28(1.62)	-0.56(3.55)
677	Iron and steel wire, excluding wire	0.004%	-0.68(3.24)	0.25(1.27)			-14.73(3.18)	0.55(2.77)	-0.77(1.14)	-0.78(3.09)
678	Tubes, pipes and fittings of iron o	0.35%	-0.26(2.90)	-0.59(3.89)	-0.30(3.09)		9.99(2.55)	-0.06(0.38)	-2.24(4.56)	1.07(4.24)
679	Iron steel castings forgings unwork	0.07%	0.45(1.55)	1.05(2.22)	0.98(2.68)	0.84(3.93)	28.73(3.01)	-0.99(2.42)	0.93(0.89)	0.16(0.28)
681	Silver and platinum group metals	0.23%	-0.05(0.25)				-96.95(9.76)	4.04(10.17)	-2.00(1.26)	-0.08(0.26)
682	Copper	0.07%	0.13(0.86)				-56.89(5.72)	2.47(5.98)	1.01(0.85)	0.19(0.83)
683	Nickel	0.17%	0.03(0.23)				-46.52(2.97)	1.95(3.03)	2.39(0.96)	0.10(0.23)
684	Aluminium	0.12%	-0.08(0.52)				-15.75(2.05)	0.79(2.54)	-0.76(0.64)	-0.13(0.52)
685	Lead	0.00%	-0.62(1.66)	0.67(1.95)			-14.94(0.46)	-0.01(0.01)	-1.28(0.25)	-4.65(2.00)
686	Zinc	0.0002%	0.29(0.89)	2.73(3.89)	1.86(3.29)	1.02(3.45)	-52.84(4.47)	1.74(3.34)	-0.87(0.55)	-3.61(4.14)
689	Miscell.non ferrous base metals	0.121%	-0.47(2.41)	-0.77(1.99)	-0.81(2.57)	-0.69(4.35)	-20.34(2.35)	0.96(2.62)	-2.44(2.44)	0.22(0.39)
691	Finished structural parts and struc	0.11%	0.14(0.84)	0.92(2.62)	0.71(2.92)	0.68(5.83)	-1.80(0.22)	0.18(0.45)	-0.93(1.22)	-0.62(0.89)
692	Metal containers for storage and tr	0.06%	-0.11(0.87)				-29.31(8.28)	1.30(0.99)	-0.99(7.79)	-0.12(0.80)
693	Wire products ex electric & fenc	0.08%	0.13(0.84)	0.51(2.38)	0.30(2.15)		6.81(0.63)	-0.35(0.69)	-0.49(0.35)	-1.46(1.43)
694	Nails, screws, nuts, bolts, rivets	0.30%	-0.06(0.58)	0.67(4.03)	0.53(3.11)		-63.81(4.25)	2.29(4.42)	-0.47(0.28)	-3.69(1.67)
695	Tools for use in the hand or in mac	0.68%	0.01(0.15)	0.27(1.33)	0.22(1.46)	0.22(2.86)	19.19(1.14)	-0.59(0.75)	-0.91(0.83)	-0.35(0.33)
696	Cutlery	0.01%	0.22(0.70)	2.90(3.97)	2.01(3.45)	0.87(3.02)	-61.97(4.53)	1.92(3.08)	-2.55(1.57)	-5.68(4.11)
697	Household equipment of base metals	0.02%	0.44(2.04)	-0.06(0.19)	-0.39(1.88)		-15.91(1.68)	0.85(2.15)	-2.00(1.71)	0.35(0.61)
698	Manufactures of metal, n.e.s.	0.58%	0.19(1.23)	1.29(3.89)	0.98(3.74)	0.36(2.63)	-16.99(2.85)	0.67(2.44)	-2.61(1.04)	-2.24(2.09)
711	Power generating machinery, other t	2.68%	-0.33(4.03)	0.22(2.68)			-17.64(5.81)	0.87(6.59)	2.06(5.20)	-0.77(3.32)
712	Agricultural machinery and implemen	0.25%	0.09(0.54)	-0.34(1.76)			24.25(2.74)	-0.70(1.85)	-3.33(2.67)	0.37(0.73)
714	Office machines	3.28%	0.08(1.03)	0.61(3.29)	0.47(3.48)	0.15(2.20)	-32.87(2.37)	1.30(2.35)	1.18(0.64)	-3.12(3.52)
715	Metalworking machinery	0.12%	-0.34(1.55)	1.14(2.67)	0.78(2.29)	0.45(2.57)	-6.99(0.07)	3.52(0.24)	29.65(0.21)	28.75(0.19)
717	Textile and leather machinery	0.03%	-0.12(0.87)	0.42(1.78)	0.23(1.29)	0.22(2.11)	-24.64(2.49)	1.09(2.56)	-2.97(2.22)	-0.84(1.57)
718	Machines for special industries	3.18%	-0.09(1.03)				20.79(2.16)	-0.55(1.35)	1.34(1.16)	-0.21(0.97)
719	Machinery and appliances non electr	9.32%	-0.08(1.86)	-0.14(1.82)	-0.07(1.41)		-15.09(5.38)	0.98(8.21)	-1.58(4.10)	0.09(0.48)
722	Electric power machinery and switch	2.28%	0.15(1.51)	0.61(2.91)	0.54(3.21)	0.26(2.90)	-44.51(5.32)	1.88(5.01)	3.29(2.03)	-1.55(2.22)
723	Equipment for distributing electric	0.36%	-0.02(0.29)	0.42(3.67)	0.15(1.78)		-27.92(8.68)	1.26(9.07)	-2.01(4.36)	-0.65(2.62)
724	Telecommunications apparatus	1.79%	-0.03(0.45)	0.17(1.30)	-0.17(1.94)	-0.15(3.31)	-71.63(0.64)	3.17(0.68)	-0.23(0.07)	-0.03(0.14)
725	Domestic electrical equipment	0.12%	0.02(0.46)				-2.13(0.90)	0.31(3.25)	-1.07(4.14)	0.02(0.46)
726	Elec. apparatus for medic.purp., ra	0.72%	0.19(2.24)				-39.39(7.45)	1.83(8.62)	1.42(2.64)	0.26(2.34)
729	Other electrical machinery and appa	9.13%	-0.07(0.97)	0.13(1.65)			27.58(4.56)	1.40(5.53)	-2.08(2.38)	-0.69(2.27)
731	Railway vehicles	0.10%	-0.58(2.25)	-0.66(2.54)			-24.42(2.41)	0.86(2.09)	-4.09(2.47)	-1.64(2.19)
732	Road motor vehicles	1.62%	-0.04(0.52)	0.11(1.31)			11.41(3.20)	-0.17(1.11)	-1.20(3.24)	-0.07(0.36)
733	Road vehicles other than motor vehi	0.05%	-0.28(2.01)				-26.07(4.49)	1.13(4.71)	-1.07(1.22)	-0.39(1.83)
734	Aircraft	1.10%	-0.80(2.45)	-0.61(0.91)	-1.10(2.06)	-0.49(1.85)	-31.91(1.95)	1.49(2.01)	0.59(0.25)	-0.11(0.08)
735	Ships and boats	0.21%	0.76(2.10)	0.74(2.06)			-24.25(2.76)	1.19(3.36)	-0.31(0.22)	-0.17(0.29)
812	Sanitary, plumbing, heating & light	0.06%	0.13(1.40)	0.40(2.45)	0.35(2.82)	0.19(0.67)	-26.21(8.81)	1.18(9.11)	-1.44(3.51)	-0.41(1.82)
821	Furniture	0.11%	0.23(2.12)	1.90(6.63)	1.30(5.89)	0.77(6.59)	-51.05(9.13)	1.93(7.68)	0.83(1.65)	-2.59(6.43)
831	Travel goods, handbags and similar	0.02%	0.28(3.03)	0.07(0.36)	0.06(0.42)	-0.09(1.38)	-5.11(0.69)	0.20(0.68)	-3.27(3.61)	-1.13(1.92)
841	Clothing except fur clothing	0.07%	-0.04(0.49)				-27.98(6.41)	1.29(7.26)	-2.67(4.89)	-0.34(2.55)

851	Footwear	0.03%	0.42(2.84)	1.53(4.56)	1.11(4.18)	0.52(4.01)	-25.94(6.00)	1.02(5.41)	-0.03(0.06)	-1.32(3.55)
861	Scientific, medical, optical, meas.	5.29%	0.17(0.47)				-42.74(4.77)	1.91(5.35)	0.65(0.44)	-0.49(1.41)
862	Photographic and cinematographic su	0.35%	-0.07(0.53)				1.42(0.03)	-0.01(0.01)	6.93(0.73)	-0.43(0.46)
863	Developed cinematographic film	0.00%	-0.02(0.10)				37.10(2.46)	-1.36(2.15)	-4.29(1.50)	-0.03(0.10)
864	Watches and clocks	0.03%	-0.05(0.29)				-22.38(1.17)	0.93(1.23)	-2.89(1.47)	-0.76(1.34)
891	Musical instruments, sound recorder	0.38%	-0.21(2.47)	1.12(6.04)	0.55(4.15)	0.13(2.00)	-35.52(1.16)	-0.39(0.21)	3.06(0.78)	-16.87(2.35)
892	Printed matter	0.59%	-0.16(3.02)	0.11(1.89)			-33.55(15.80)	1.49(16.95)	-0.22(0.88)	-0.59(5.32)
893	Articles of artificial plastic mate	0.51%	-0.11(1.42)				-47.17(4.39)	2.08(4.61)	-2.14(1.41)	-0.34(1.19)
894	Perambulators ,toys, games and spor	0.39%	-0.14(0.18)	0.09(0.90)	0.22(2.78)		-14.93(5.65)	0.79(7.50)	-1.38(3.47)	-0.36(1.85)
895	Office and stationery supplies, n.e	0.02%	-0.09(0.89)				-165.37(0.21)	5.89(0.22)	23.00(0.16)	-2.45(0.19)
896	Works of art, collectors pieces and	0.28%	0.26(0.98)	-0.59(1.77)	-0.40(1.70)		-56.19(7.16)	2.51(8.20)	-1.67(1.46)	0.74(1.33)
897	Jewellery and gold/silver smiths wa	0.47%	-0.16(0.68)	-0.99(3.26)	-0.55(2.21)		-37.94(5.20)	1.89(6.45)	0.70(0.62)	1.50(2.48)
899	Manufactured articles, n.e.s.	0.26%	-0.38(2.34)	0.39(2.40)			-47.93(13.40)	2.01(13.56)	-0.21(0.55)	-0.72(4.01)
931	Special transactions not classd.acc	15.40%	0.26(2.83)	-0.36(4.47)			-160.65(0.47)	4.48(0.56)	-1.83(0.25)	-15.06(0.38)
941	Animals, n.e.s. incl.zoo animals, d	0.003%	-0.22(1.07)				-48.48(7.05)	1.85(6.86)	-2.11(2.06)	-0.70(2.36)

Notes:

1. Number inside the parenthesis next to each coefficient is absolute value of the *t*-ratio.
2. Trade share is defined as the ratio of each industry's exports as a percent of total US exports to Singapore which includes even industries for which no data were available. These shares are only for 2011. For example, the share of first industry, 001- Live Animals 0.003%.
3. A dummy was included in each model to evaluate the financial crisis in 1997. Export Industries that were affected: 012, 013, 022, 024, 032, 041, 055, 062, 099, 111, 231, 251, 267, 273, 275, 291, 321, 431, 514, 515, 533, 541, 551, 553, 554, 621, 632, 633, 654, 655, 663, 665, 666, 674, 677, 678, 679, 681, 682, 686, 689, 692, 693, 696, 712, 714, 718, 719, 726, 731, 732, 735, 812, 821, 831, 851, 891, 896, and 899.
4. n.e.s. = not elsewhere specified.

Table 2. Diagnostic Statistics Associated with Export Demand Model

SITC	*Industry*	*F at opt.lags*	*ECM_{t-1}*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ*	*Adj R^2*
1	Live Animals	2.03	-0.30(1.83)	1.09	0.05	S	S	0.05
11	Meat, fresh, chilled or frozen	4.46	-0.31(2.10)	5.83	2.37	S	S	0.43
12	Other meat and edible meat offal, fresh, chilled or frozen	7.02	-0.96(4.90)	0.44	0.88	S	S	0.53
13	Meat in airtight containers n.e.s &	4.80	-0.77(3.31)	1.22	0.97	S	S	0.29
22	Milk & cream	7.59	-0.98(2.78)	3.19	3.28	S	S	0.43
24	Cheese and curd	4.25	-0.81(4.13)	4.55	0.99	S	S	0.48
31	Fish, fresh & simply preserved	9.23	-0.69(4.07)	0.01	0.003	S	S	0.32
32	Fish, in airtight containers, n.e.s	4.58	-1.09(3.12)	5.62	0.40	S	S	0.42
41	Wheat (including spelt) and meslin, unmil	4.62	-0.89(4.59)	0.05	9.08	S	S	0.45
44	Maize (not including sweet corn), unmil	5.22	-1.29(5.15)	1.89	3.43	S	S	0.29
47	Meal & flour of cereals, except whe	6.96	-1.06(5.99)	0.12	0.64	S	S	0.48
48	Cereal preps & preps of flour of fr	2.23	-0.31(2.29)	7.99	0.86	S	S	-0.01
51	Fruit, fresh, and nuts excl. Oil n	3.21	-0.38(2.74)	0.23	5.07	S	S	0.01
52	Dried Fruit including artificially	3.32	-0.07(0.86)	1.87	2.86	S	S	0.19
53	Fruit, preserved and fruit preparat	3.09	-0.59(2.61)	1.43	0.01	S	S	0.13
54	Vegetables, roots & tubers, fresh o	9.57	-0.36(5.21)	7.24	1.29	S	US	0.41
55	Vegetables, roots & tubers pres or	4.72	-1.08(4.14)	0.05	0.18	S	S	0.26
61	Sugar and honey	3.79	0.01(0.04)	0.12	0.48	S	S	0.27
62	Sugar confectionery, sugar preps. E	4.84	-1.22(6.35)	2.10	1.61	S	S	0.57
71	Coffee	1.41	-0.24(2.34)	1.09	0.27	S	S	-0.13
73	Chocolate and other food preparations containing cocoa, n.e.s.	4.58	-0.39(2.44)	0.20	3.04	S	S	0.27
75	Spices	10.39	0.33(1.25)	11.49	0.09	S	S	0.16
81	Feed. Stuff for animals excl. unmil	2.86	-0.90(3.94)	0.02	0.21	S	S	0.02
91	Margarine and shortening	4.13	0.21(0.65)	2.31	0.09	S	S	0.27
99	Food preparations, n.e.s.	6.10	-0.58(4.83)	0.18	1.29	S	S	0.49
111	Non alcoholic beverages, n.e.s.	11.81	-0.47(5.93)	7.91	0.01	S	S	0.67
112	Alcoholic beverages	3.52	-0.91(4.66)	0.66	4.79	S	S	0.42
122	Tobacco manufactures	5.01	-0.03(0.37)	2.09	5.21	S	US	0.19
221	Oil seeds, oil nuts and oil kernels	9.62	-0.47(1.84)	2.48	0.43	S	S	0.54
231	Crude rubber incl. synthetic & recl	5.31	-0.76(3.950	0.01	6.36	S	S	0.22
242	Wood in the rough or roughly square	3.54	-0.62(3.11)	0.14	2.99	S	S	0.42
251	Pulp & waste paper	7.34	-0.98(4.49)	1.30	0.10	S	S	0.71
263	Cotton	7.65	-1.77(5.66)	3.22	0.83	S	S	0.41
266	Synthetic and regenerated artificial	5.86	-0.96(5.09)	1.61	11.53	S	S	0.46
267	Waste materials from textile fabric	3.80	-0.32(3.52)	1.41	1.10	S	S	0.16
273	Stone, sand and gravel	6.86	-0.36(2.98)	7.55	2.68	S	S	0.43

275	Natural abrasives incl. industrial	4.66	-0.50(3.62)	0.01	1.09	S	S	0.19
276	Other crude minerals	4.39	-0.93(4.59)	0.01	0.63	S	S	0.48
284	Non ferrous metal scrap	2.99	-0.54(2.08)	1.86	1.66	S	S	0.25
291	Crude animal materials, n.e.s.	8.05	-1.39(5.08)	1.97	5.06	S	S	0.42
292	Crude vegetable materials, n.e.s.	5.44	-0.04(0.24)	4.37	0.83	S	US	0.07
321	Coal, coke & briquettes	7.27	-1.47(5.32)	0.01	0.06	S	S	0.30
332	Petroleum products	2.15	-0.71(3.26)	0.18	0.11	S	S	0.09
411	Animal oils and fats	4.38	-0.18(0.34)	0.002	7.72	S	S	0.39
422	Other fixed vegetable oils	4.23	-0.41(2.76)	0.24	3.45	S	S	0.20
431	Anim./veg. Oils & fats, processed,	4.06	-1.55(3.72)	3.45	0.56	S	S	0.56
512	Organic chemicals	7.89	-1.16(5.80)	0.12	0.03	S	S	0.66
513	Inorg. chemicals elems., oxides, ha	2.27	-0.78(3.01)	0.16	0.01	S	S	-0.03
514	Other inorganic chemicals	3.02	-0.52(3.51)	4.95	3.14	S	S	-0.02
515	Radioactive and associated material	3.98	-1.34(4.15)	1.89	0.69	S	S	0.31
531	Synth. organic dyestuffs, natural i	1.32	-0.32(2.38)	3.02	0.74	S	S	0.10
532	Dyeing & tanning extracts, synth. t	8.33	-0.59(3.30)	1.86	2.47	S	US	0.49
533	Pigments, paints, varnishes & relat	5.31	-0.65(3.77)	7.29	0.09	S	US	0.39
541	Medicinal & pharmaceutical products	3.97	-0.74(4.26)	0.76	5.21	S	S	0.07
551	Essential oils, perfume and flavour	4.19	-1.04(4.29)	2.47	0.45	S	S	0.29
553	Perfumery, cosmetics, dentifrices,	4.54	-0.65(4.45)	1.77	10.76	S	S	0.37
554	Soaps, cleansing & polishing prepar	5.33	-0.94(3.90)	0.12	0.22	S	S	0.25
571	Explosives and pyrotechnic products	5.23	-0.78(4.54)	1.32	0.17	S	S	0.27
581	Plastic materials, regenerd. Cellul	3.37	-0.47(3.07)	0.21	0.61	S	S	0.17
599	Chemical materials and products, n.	5.91	-0.19(1.43)	0.69	0.29	S	US	0.11
611	Leather	4.42	-1.01(5.84)	11.47	3.23	S	S	-0.02
612	Manuf. of leather or of artif. or r	8.03	-0.22(1.49)	4.56	2.28	S	S	0.28
621	Materials of rubber	3.49	-0.59(4.04)	1.11	0.35	S	S	0.29
629	Articles of rubber, n.e.s.	3.75	-0.67(4.05)	2.34	0.16	S	US	0.13
631	Veneers, plywood boards & other woo	7.22	-0.24(1.28)	3.68	2.38	S	S	0.36
632	Wood manufactures, n.e.s.	3.86	-1.05(3.84)	0.51	0.02	S	S	0.19
633	Cork manufactures	4.47	-1.65(4.96)	0.16	5.34	S	S	0.20
641	Paper and paperboard	4.13	-0.22(1.45)	3.82	7.25	S	S	0.37
642	Articles of paper, pulp, paperboard	6.92	-0.25(3.29)	10.73	7.63	S	S	0.41
651	Textile yarn and thread	2.73	-0.45(2.28)	2.08	2.33	S	S	0.16
652	Cotton fabrics, woven ex. narrow or	2.32	-0.24(1.98)	0.08	9.01	S	US	0.09
653	Text fabrics woven ex narrow, spec,	11.29	-0.38(3.16)	1.49	1.89	S	US	0.45
654	Tulle, lace, embroidery, ribbons, t	3.41	-0.60(3.83)	1.14	0.82	S	S	0.12
655	Special textile fabrics and related	5.07	-0.31(2.02)	1.02	6.91	S	S	0.44
656	Made up articles, wholly or chiefly	3.06	-0.52(3.18)	0.07	0.08	S	S	0.03
657	Floor coverings, tapestries, etc.	5.59	-0.22(2.10)	8.76	0.01	US	US	0.26

661	Lime, cement & fabr. bldg.mat. Ex g	8.51	-0.98(5.32)	4.45	0.08	S	S	0.56
662	Clay and refractory construction ma	2.89	-0.61(3.72)	1.11	0.94	S	S	-0.02
663	Mineral manufactures, n.e.s.	8.38	-1.18(7.73)	3.30	0.003	S	S	0.38
664	Glass	4.35	-0.47(2.18)	0.62	12.57	S	S	0.26
665	Glassware	16.82	-0.71(5.52)	0.11	0.07	S	S	0.69
666	Pottery	3.06	-0.55(3.95)	0.01	1.33	S	S	0.04
667	Pearls and precious and semi precio	3.13	-0.65(2.49)	6.79	8.65	S	S	0.05
671	Pig iron, spiegeleisen, sponge iron	4.09	-0.82(4.92)	7.63	0.002	S	S	0.10
673	Iron and steel bars, rods, angles,	8.75	-1.13(4.61)	1.24	1.70	S	US	0.61
674	Universals, plates and sheets of ir	7.58	-0.84(2.87)	1.89	8.15	S	S	0.42
677	Iron and steel wire, excluding wire	8.39	-1.69(8.93)	5.07	0.42	S	S	0.44
678	Tubes, pipes and fittings of iron o	8.22	-0.65(3.86)	6.41	8.54	S	S	0.41
679	Iron steel castings forgings unwork	8.55	-1.21(7.28)	7.52	0.06	S	US	0.35
681	Silver and platinum group metals	5.72	-0.69(4.71)	0.34	0.42	S	S	0.31
682	Copper	5.13	-0.65(3.85)	0.17	1.55	S	S	0.22
683	Nickel	3.74	-0.34(2.52)	0.18	4.04	S	S	0.17
684	Aluminium	3.12	-0.63(3.87)	4.33	0.82	S	S	-0.01
685	Lead	2.03	-0.33(2.81)	2.19	0.06	S	US	-0.12
686	Zinc	4.39	-0.99(3.96)	0.13	0.09	S	S	0.56
689	Miscell.non ferrous base metals	4.58	-0.79(4.31)	1.02	0.01	S	S	0.25
691	Finished structural parts and struc	11.29	-0.93(3.67)	1.70	0.23	S	S	0.09
692	Metal containers for storage and tr	32.68	-0.39(1.66)	3.54	0.37	S	S	0.34
693	Wire products ex electric & fenc	4.79	-0.47(3.32)	1.65	2.64	S	US	0.06
694	Nails, screws, nuts, bolts, rivets	3.36	-0.25(1.43)	3.06	4.36	S	S	0.26
695	Tools for use in the hand or in mac	3.98	-0.31(1.93)	1.47	2.86	S	S	2.86
696	Cutlery	4.13	-0.75(4.53)	1.00	0.18	S	S	0.52
697	Household equipment of base metals	7.24	-0.84(3.60)	0.95	1.39	S	S	0.39
698	Manufactures of metal, n.e.s.	3.69	-0.68(1.91)	1.36	0.51	S	S	0.24
711	Power generating machinery, other t	7.00	-0.95(4.32)	6.57	8.25	S	S	0.37
712	Agricultural machinery and implemen	4.21	-0.77(4.42)	2.45	0.01	S	S	0.35
714	Office machines	5.92	-0.21(2.69)	2.88	1.49	S	S	0.24
715	Metalworking machinery	0.57	0.06(0.19)	2.95	4.59	S	S	0.39
717	Textile and leather machinery	2.59	-0.59(3.73)	5.62	1.92	S	S	0.06
718	Machines for special industries	4.17	-0.47(3.71)	0.47	0.24	S	S	0.12
719	Machinery and appliances non electr	9.73	-0.64(4.80)	1.07	0.99	S	S	0.56
722	Electric power machinery and switch	4.07	-0.42(2.29)	7.05	2.19	S	S	0.64
723	Equipment for distributing electric	7.16	-0.88(4.31)	0.02	0.55	S	S	0.54
724	Telecommunications apparatus	4.94	-0.09(0.51)	1.13	0.92	S	S	0.46
725	Domestic electrical equipment	5.33	-1.00(4.89)	1.47	8.79	S	S	0.12
726	Elec. apparatus for medic.purp., ra	6.39	-0.76(5.58)	2.74	0.06	S	US	-0.01

729	Other electrical machinery and appa	5.26	-0.48(3.03)	1.04	3.46	S	S	0.56
731	Railway vehicles	8.78	-0.76(5.65)	5.43	4.53	S	S	0.32
732	Road motor vehicles	8.15	-1.02(3.35)	4.24	0.09	S	S	0.44
733	Road vehicles other than motor vehi	2.97	-0.72(3.97)	4.12	0.42	S	US	0.08
734	Aircraft	4.69	-0.69(2.75)	9.28	8.85	S	US	0.44
735	Ships and boats	3.59	-1.17(4.04)	1.25	2.21	S	S	0.20
812	Sanitary, plumbing, heating & light	6.61	-0.98(4.44)	0.16	0.74	S	S	0.58
821	Furniture	9.15	-0.78(4.99)	0.08	12.71	S	S	0.37
831	Travel goods, handbags and similar	8.47	-0.53(4.47)	2.88	0.31	S	S	0.59
841	Clothing except fur clothing	6.74	-0.89(4.77)	0.46	0.44	S	S	0.22
851	Footwear	3.69	-0.93(4.00)	0.74	0.12	S	S	0.21
861	Scientific, medical, optical, meas.	2.80	-0.26(2.05)	2.29	0.96	S	S	0.11
862	Photographic and cinematographic su	2.42	-0.17(0.98)	1.37	0.04	S	US	0.11
863	Developed cinematographic film	2.36	0.46(2.15)	0.25	0.17	S	S	0.11
864	Watches and clocks	5.48	-0.42(4.08)	1.97	3.02	S	S	0.06
891	Musical instruments, sound recorder	14.27	-12.09(2.01)	6.10	0.21	S	S	0.66
892	Printed matter	0.57	-0.78(3.92)	2.05	0.29	S	S	0.43
893	Articles of artificial plastic mate	2.79	-0.31(2.62)	0.12	2.97	S	S	0.23
894	Perambulators ,toys, games and spor	6.41	-0.85(4.59)	7.35	0.37	S	S	0.33
895	Office and stationery supplies, n.e	4.44	-0.04(0.11)	0.004	2.57	S	S	0.38
896	Works of art, collectors pieces and	6.09	-0.96(4.77)	1.90	0.36	S	S	0.52
897	Jewellery and gold/silver smiths wa	2.50	-0.79(3.16)	0.02	2.69	S	S	0.06
899	Manufactured articles, n.e.s.	6.28	-1.65(4.95)	1.04	0.77	S	S	0.38
931	Special transactions not classd.acc	5.11	0.05(0.37)	3.19	15.35	S	S	0.37
941	Animals, n.e.s. incl.zoo animals, d	5.99	-0.87(4.77)	2.51	0.18	S	US	0.43

Notes:

1. LM: Lagrange multiplier test of residual serial correlation. It is distributed as $\chi^2(1)$.
2. RESET: Ramsey's test for function form. It is distributed as χ^2 (1).
3. CUSUM: Cumulative Sum of Recursive Residuals
4. CUSUMSQ: Cumulative Sum of Squares of Recursive Residuals
5. Number inside the parenthesis next to a coefficient is absolute value of the *t*-ratio.

Table 3. Short-Run and Long-Run Coefficient Estimates of Import Demand Model (4)

			Short-Run Estimates				Long-Run Estimates			
SITC	**Industry**	**T. Share**	**Δ ln VOL_t**	**Δ ln VOL_{t-1}**	**Δ ln VOL_{t-2}**	**Δ ln VOL_{t-3}**	**Constant**	**Ln Y_{US}**	**Ln REX**	**Ln *VOL***
31	Fish, fresh & simply preserved	0.19%	-0.01(0.12)	-0.35(2.13)	-0.30(2.81)	-0.06(1.10)	650.77(0.16)	-19.83(0.16)	6.55(0.15)	20.21(0.18)
32	Fish, in airtight containers, n.e.s	0.01%	-0.20(1.19)				-78.39(3.03)	2.68(3.00)	3.51(2.78)	-0.24(1.11)
48	Cereal preps & preps of flour of fr	0.14%	0.04(0.43)				-237.78(0.76)	8.14(6.99)	-0.89(0.59)	0.11(0.42)
53	Fruit, preserved and fruit preparat	0.001%	-0.36(2.32)	1.02(3.38)	0.42(1.97)		4.99(0.14)	-0.48(0.38)	3.24(2.34)	-3.19(4.35)
55	Vegetables, roots & tubers pres or	0.000%	0.16(0.37)	1.37(2.68)	0.75(2.19)		-161.72(2.01)	4.95(1.85)	5.53(0.84)	-4.11(1.65)
62	Sugar confectionery, sugar preps. E	0.003%	0.84(2.88)				-267.63(4.72)	9.30(4.81)	0.97(0.35)	2.61(2.14)
71	Coffee	0.01%	0.64(1.45)				5.41(0.07)	0.03(0.01)	2.61(0.95)	0.93(1.44)
75	Spices	0.002%	-0.53(3.00)	1.01(3.49)	0.39(1.85)	0.29(2.44)	-5.83(0.18)	-0.16(0.14)	0.60(0.49)	-3.51(5.15
99	Food preparations, n.e.s.	0.05%	-0.05(0.04)				-140.75(5.77)	4.83(5.80)	1.89(1.55)	-0.01(0.04)
231	Crude rubber incl. synthetic & recl	0.04%	-0.45(1.64)	0.43(1.92)			103.59(4.39)	-3.38(4.13)	-1.03(0.85)	-0.68(1.89)
243	Wood, shaped or simply worked	0.002%	-0.02(0.17)	0.46(2.45)	0.26(2.08)		83.17(1.41)	-3.08(1.47)	5.72(2.45)	-2.59(2.41)
292	Crude vegetable materials, n.e.s	0.01%	0.16(1.43)	0.13(0.79)	0.16(1.21)	0.23(2.86)	57.75(3.01)	-1.79(2.78)	0.67(0.73)	0.38(0.83)
332	Petroleum products	0.77%	0.08(0.46)	-0.55(2.32)	0.35(1.89)	-0.15(1.33)	-6.77(0.71)	0.49(1.45)	0.99(2.73)	0.28(1.43)
422	Other fixed vegetable oils	0.003%	0.88(1.85)	-0.79(1.82)			6.48(0.11)	0.17(0.08)	1.24(0.56)	2.79(2.86)
512	Organic chemicals	21.62%	0.28(0.84)				-46.67(0.09)	1.72(0.10)	6.76(0.56)	-1.93(0.58)
541	Medicinal & pharmaceutical products	8.01%	0.94(2.58)				-370.39(5.62)	12.86(5.72)	3.92(1.16)	1.93(2.41)
551	Essential oils, perfume and flavour	0.02%	0.07(0.39)				88.21(2.63)	-2.89(2.52)	2.28(1.66)	0.11(0.38)
581	Plastic materials, regenerd. Cellul	0.90%	0.18(0.51)	1.58(3.14)	0.96(2.54)	0.63(3.13)	-356.49(12.92)	11.94(12.03)	0.29(0.17)	-1.57(1.95)
629	Articles of rubber, n.e.s.	0.03%	-0.39(2.28)	0.87(3.84)	0.28(1.87)		-113.99(5.47)	3.76(5.23)	-0.07(0.08)	1.86(4.99)
631	Veneers, plywood boards & other woo	0.001%	0.52(2.00)	-0.25(1.26)			-251.24(1.23)	9.02(1.22)	-2.31(0.45)	2.99(0.73)
632	Wood manufactures, n.e.s.	0.01%	-0.44(1.61)	0.63(2.58)			53.52(1.10)	-1.95(1.14)	4.16(1.77)	-1.57(2.27)
642	Articles of paper, pulp, paperboard	0.04%	-0.28(1.33)				-155.35(1.64)	5.52(1.72)	0.49(0.11)	1.25(1.25)
651	Textile yarn and thread	0.004%	0.36(1.26)				-5.09(0.11)	0.35(0.22)	2.11(0.97)	0.67(1.44)
653	Text fabrics woven ex narrow, spec,	0.001%	1.18(2.23)				34.41(0.34)	-0.97(0.28)	6.93(1.77)	1.74(1.63)
656	Made up articles, wholly or chiefly	0.002%	0.28(0.69)	-1.38(2.15)	-0.43(0.86)	-0.64(2.36)	23.66(0.57)	-0.51(0.36)	-5.09(2.69)	1.51(1.94)
657	Floor coverings, tapestries, etc.	0.01%	-0.39(1.02)				90.02(1.49)	-3.08(1.49)	4.75(1.57)	-0.68(0.89)
664	Glass	0.005%	-0.10(0.23)	1.13(1.82)	0.80(1.60)	0.84(2.67)	-68.89(1.70)	2.15(1.62)	3.44(1.93)	-1.45(1.45)
666	Pottery	0.0002%	0.03(0.09)	2.11(4.10)	1.04(2.53)	0.68(2.74)	-37.77(1.31)	0.93(0.94)	4.94(3.61)	-2.45(3.41)
667	Pearls and precious and semi precio	0.01%	0.27(0.78)	2.48(4.04)	1.61(3.40)	0.66(2.66)	-133.70(1.93)	4.17(1.69)	-1.08(0.41)	-4.39(2.54)
693	Wire products ex electric & fenc	0.01%	0.89(2.67)				366.03(2.87)	-12.24(2.84)	15.33(3.30)	2.32(1.76)
695	Tools for use in the hand or in mac	0.07%	0.44(3.66)	0.32(1.58)	0.31(2.08)	0.20(2.27)	-187.45(4.76)	6.45(4.76)	0.59(0.30)	0.18(0.24)
697	Household equipment of base metals	0.001%	-0.13(0.37)	-0.61(1.95)			114.79(6.17)	-3.88(6.12)	4.08(5.71)	0.21(0.49)
698	Manufactures of metal, n.e.s.	0.22%	0.23(2.05)				-9.55(0.29)	0.53(0.47)	-0.26(0.14)	0.28(0.60)
711	Power generating machinery, other t	0.99%	0.11(0.86)	0.40(1.73)	0.08(0.44)	0.25(2.05)	-132.72(2.19)	4.59(2.22)	-1.53(1.11)	-0.94(1.24)
714	Office machines	20.06%	0.16(1.34)	0.33(1.71)	0.25(2.31)		-581.12(1.44)	19.65(1.44)	-9.79(0.57)	-8.11(0.68)
715	Metalworking machinery	0.18%	0.38(2.34)	0.92(2.15)	0.32(1.07)	0.26(1.62)	4.85(0.20)	-0.17(0.20)	-0.32(0.51)	-1.36(3.80)
718	Machines for special industries	0.39%	0.39(1.25)				-38.42(0.54)	1.53(0.64)	-0.91(0.28)	0.90(1.25)
719	Machinery and appliances non electr	5.64%	0.05(0.58)	-0.25(2.07)	-0.18(2.38)		-5.35(0.07)	0.67(0.26)	0.43(0.24)	1.96(1.45)
722	Electric power machinery and switch	2.21%	0.19(4.70)				-96.04(7.75)	3.56(8.29)	-1.90(3.43)	0.40(4.05)
723	Equipment for distributing electric	0.04%	0.22(2.64)				-96.64(4.98)	3.44(5.17)	0.72(0.74)	0.54(2.12)
724	Telecommunications apparatus	3.00%	0.14(1.73)	0.41(2.80)	0.30(2.80)	0.14(2.22)	-31.07(1.64)	1.23(1.87)	3.39(4.78)	-0.59(1.87)

725	Domestic electrical equipment	0.003%	0.26(1.50)				-153.66(1.33)	5.68(1.43)	-6.81(1.30)	1.27(1.31)
729	Other electrical machinery and appa	11.68%	0.09(1.44)	0.44(3.47)	0.27(3.07)	0.15(3.19)	-97.28(7.30)	3.54(7.74)	-2.97(4.42)	-0.79(3.19)
732	Road motor vehicles	0.15%	0.17(1.13)	0.74(2.92)	0.47(2.48)	0.21(1.83)	35.17(0.17)	-1.32(0.18)	-4.02(0.77)	-2.88(1.35)
734	Aircraft	0.55%	0.04(0.24)				-33.72(1.01)	1.35(1.19)	0.26(0.21)	0.06(0.25)
735	Ships and boats	0.003%	0.32(0.89)				-79.87(4.19)	2.88(4.41)	1.18(1.37)	0.16(0.89)
812	Sanitary, plumbing, heating & light	0.01%	0.09(0.24)	-1.30(2.94)	-0.66(2.10)		3.37(1.29)	-0.90(0.89)	-0.57(0.39)	2.37(3.22)
821	Furniture	0.09%	0.21(2.12)	0.15(0.96)	0.10(0.78)	0.24(2.79)	13.12(0.33)	-0.28(0.21)	3.06(2.14)	0.001(0.33)
831	Travel goods, handbags and similar	0.004%	0.05(0.33)	1.00(4.24)	0.43(2.42)	0.36(3.57)	-239.33(9.57)	8.03(9.28)	-2.10(2.47)	-1.19(2.88)
841	Clothing except fur clothing	0.17%	0.20(2.52)	-0.01(0.07)	0.14(1.46)	0.14(2.64)	-236.48(2.78)	8.01(2.77)	-2.11(0.78)	-2.63(2.49)
861	Scientific, medical, optical, meas.	5.68%	0.14(2.49)				-163.23(6.04)	5.53(6.17)	-0.83(0.62)	-1.42(1.72)
864	Watches and clocks	0.10%	0.13(0.76)				79.89(1.45)	-2.41(1.27)	-8.07(3.46)	0.35(0.07)
891	Musical instruments, sound recorder	0.22%	0.001(0.01)				325.18(0.35)	-10.61(0.34)	7.87(0.43)	0.03(0.01)
892	Printed matter	0.59%	0.17(3.67)	-0.08(1.68)			144.97(0.05)	-10.16(0.07)	-68.31(0.14)	-51.92(0.14)
893	Articles of artificial plastic mate	0.26%	0.22(2.12)				-252.85(5.58)	8.77(5.64)	1.19(0.88)	0.54(2.07)
894	Perambulators ,toys, games and spor	0.03%	0.01(0.08)	0.40(2.56)			47.53(1.11)	-1.59(1.06)	6.35(3.15)	-0.89(2.01)
896	Works of art, collectors pieces and	0.01%	0.21(0.57)				-184.96(5.22)	6.26(5.22)	2.39(1.24)	-0.44(0.80)
897	Jewellery and gold/silver smiths wa	0.32%	-0.15(0.69)	-1.30(4.05)	-0.80(3.36)	-0.37(2.54)	159.78(0.59)	-4.17(0.48)	15.63(1.17)	11.28(0.99)
899	Manufactured articles, n.e.s.	0.85%	0.06(0.35)				-197.29(2.66)	6.89(2.68)	-7.01(2.04)	0.17(0.34)
931	Special transactions not classd.acc	11.13%	-0.01(0.20)	0.27(2.39)	0.19(2.25)	0.15(2.84)	-92.05(9.24)	3.35(9.66)	-1.04(2.25)	-0.29(1.71)

Notes:

1. Number inside the parenthesis next to each coefficient is absolute value of the *t*-ratio.
2. Trade share is defined as the ratio of each industry's imports as a percent of total US imports from Singapore which includes even industries for which no data were available. These shares are only for 2011. For example, the share of first industry, 031-fish, fresh & simply preserved is 0.19%.
3. A dummy was included in all models to account for the financial crisis of 1997. The U.S. importing industries that were affected are: 032, 053, 332, 541, 581, 629, 651, 693, 695, 697, 722, 723, 724, 725, 729, 735, 821, 831, 893, and 894.
4. n.e.s. = not elsewhere specified.

Table 4. Diagnostic statistics Associated with Import Demand Model (4)

SITC	*Industry*	*F at opt.lags*	*ECM_{t-1}*	*LM*	*RESET*	*CUSUM*	*CUSUMSQ*	*Adj R^2*
31	Fish, fresh & simply preserved	4.09	-0.02(0.19)	1.46	10.47	S	S	0.22
32	Fish, in airtight containers, n.e.s	9.04	-0.83(4.74)	3.96	6.18	S	S	0.57
48	Cereal preps & preps of flour of fr	2.30	-0.34(2.94)	2.75	2.11	S	US	-0.05
53	Fruit, preserved and fruit preparat	4.45	-0.53(3.61)	0.001	4.37	S	S	0.39
55	Vegetables, roots & tubers pres or	3.48	-0.47(2.09)	9.41	4.65	S	S	0.12
62	Sugar confectionery, sugar preps. E	3.88	-0.47(2.97)	1.23	0.03	S	S	0.11
71	Coffee	4.06	-0.68(2.48)	0.69	2.68	S	S	0.43
75	Spices	6.49	-0.61(5.34)	2.82	0.01	S	S	0.41
99	Food preparations, n.e.s.	2.22	-0.47(3.10)	0.49	0.02	S	S	0.05
231	Crude rubber incl. synthetic & recl	7.18	-1.39(4.35)	9.65	0.64	S	S	0.33
243	Wood, shaped or simply worked	7.45	-0.35(2.80)	0.06	0.42	S	S	0.44
292	Crude vegetable materials, n.e.s	4.66	-0.54(4.06)	5.06	6.03	S	S	0.04
332	Petroleum products	7.62	-2.01(5.88)	6.14	2.16	S	S	0.36
422	Other fixed vegetable oils	4.79	-0.88(3.39)	1.28	1.35	S	S	0.54
512	Organic chemicals	2.74	-0.15(1.08)	1.59	4.49	S	S	0.01
541	Medicinal & pharmaceutical products	3.07	-0.48(3.61)	0.29	0.41	S	US	-0.03
551	Essential oils, perfume and flavour	3.30	-0.61(3.44)	0.13	1.07	S	US	-0.01
581	Plastic materials, regenerd. Cellul	5.47	-1.12(4.25)	2.15	0.20	S	S	0.39
629	Articles of rubber, n.e.s.	24.13	-0.79(6.04)	1.89	29.67	S	S	0.65
631	Veneers, plywood boards & other woo	3.84	-0.23(1.46)	0.36	0.18	S	S	0.17
632	Wood manufactures, n.e.s.	3.45	-0.86(4.39)	0.76	5.39	S	S	0.15
642	Articles of paper, pulp, paperboard	3.57	-0.22(2.72)	2.83	2.86	S	S	-0.01
651	Textile yarn and thread	27.46	-1.52(1.83)	0.39	0.32	S	US	-0.06
653	Text fabrics woven ex narrow, spec,	5.28	-0.68(3.29)	1.62	1.39	S	S	0.25
656	Made up articles, wholly or chiefly	6.12	-1.12(5.69)	3.78	0.63	S	S	0.41
657	Floor coverings, tapestries, etc.	3.72	-0.56(3.35)	0.12	1.47	S	S	0.34
664	Glass	2.49	-0.96(3.58)	5.33	1.33	S	S	-0.05
666	Pottery	4.68	-1.07(5.81)	0.21	0.57	S	S	0.58
667	Pearls and precious and semi precio	3.63	-0.67(2.91)	3.91	5.99	S	S	0.09
693	Wire products ex electric & fenc	7.79	-0.56(2.29)	2.22	0.02	S	S	0.40
695	Tools for use in the hand or in mac	7.35	-0.41(2.81)	0.09	0.64	S	S	0.45
697	Household equipment of base metals	5.91	-1.90(5.34)	4.51	1.11	S	S	0.16
698	Manufactures of metal, n.e.s.	2.66	-0.32(2.21)	1.26	0.46	S	S	0.10
711	Power generating machinery, other t	12.35	-0.39(4.71)	6.42	0.02	S	US	0.68
714	Office machines	4.99	-0.04(0.63)	0.89	18.16	S	S	0.46
715	Metalworking machinery	5.92	-1.04(3.09)	10.20	2.74	S	S	0.39
718	Machines for special industries	2.75	-0.43(3.24)	2.99	0.08	S	US	-0.08
719	Machinery and appliances non electr	6.73	-0.20(2.30)	5.34	3.91	S	S	0.17
722	Electric power machinery and switch	9.69	-0.49(5.88)	1.88	0.15	S	S	0.56
723	Equipment for distributing electric	5.35	-0.41(3.93)	0.05	0.19	S	S	0.13
724	Telecommunications apparatus	6.91	-0.56(3.76)	3.84	0.11	S	US	0.14
725	Domestic electrical equipment	4.59	-0.20(2.20)	0.09	3.19	S	US	0.27

729	Other electrical machinery and appa	4.97	-0.62(3.99)	2.04	5.79	S	S	-0.14
732	Road motor vehicles	5.85	-0.20(1.72)	0.17	1.43	S	S	0.70
734	Aircraft	5.14	-0.60(4.52)	17.32	22.78	S	US	0.24
735	Ships and boats	9.14	-1.93(6.95)	0.09	14.27	S	US	0.53
812	Sanitary, plumbing, heating & light	7.58	-0.04(0.12)	1.14	0.90	S	S	-0.17
821	Furniture	7.78	-0.36(4.15)	1.05	2.57	S	S	0.49
831	Travel goods, handbags and similar	8.31	-0.75(4.77)	2.02	0.04	S	S	0.07
841	Clothing except fur clothing	6.63	0.18(1.74)	0.11	2.13	S	S	0.49
861	Scientific, medical, optical, meas.	4.03	0.14(2.49)	0.27	6.59	S	S	0.16
864	Watches and clocks	3.68	-0.38(2.61)	0.92	0.09	S	S	0.03
891	Musical instruments, sound recorder	2.11	-0.04(0.51)	0.36	0.03	US	S	-0.03
892	Printed matter	8.98	0.01(0.14)	6.41	0.14	S	S	0.52
893	Articles of artificial plastic mate	6.58	-0.42(3.29)	0.03	9.14	S	US	0.23
894	Perambulators ,toys, games and spor	6.71	-0.78(4.99)	0.12	5.52	S	US	0.38
896	Works of art, collectors pieces and	3.32	-0.99(3.44)	1.91	6.95	S	S	0.15
897	Jewellery and gold/silver smiths wa	2.94	-0.13(1.06)	7.25	0.43	S	S	-0.18
899	Manufactured articles, n.e.s.	2.48	-0.36(2.90)	0.26	2.06	S	US	0.09
931	Special transactions not classd.acc	3.87	0.94(5.59)	4.73	1.90	S	S	0.16

Notes:

1. LM: Lagrange multiplier test of residual serial correlation; RESET: Ramsey's test for function form. Both are distributed as $\chi^2(1)$.
2. CUSUM: Cumulative Sum of Recursive Residuals; CUSUMSQ: Cumulative Sum of Squares of Recursive Residuals
3. Number inside the parenthesis next to a coefficient is absolute value of the *t*-ratio

Appendix

Data Definition and Sources

All data are annual over the period 1973-2011 and are collected from a. World Bank, or b. International Financial Statistics of the IMF.

Variables:

X_i^{US} = US volume of exports to Singapore for each industry *i*. Export value data in U.S. dollars for each commodity come from source (a). Following Bahmani-Oskooee and Hegerty (2009) and others, in the absence of annual price levels for each commodity, we deflate each industry's trade value by the U.S. export unit value (source b). M_i^{US} = US volume of imports from Singapore for each industry *i*.

Y^{US} = Measure of the United States income. It is proxied by the real GDP. The data come from source b.

Y_{SG} = Measure of Singapore's real income. This variable is measured by Singapore's real GDP. It comes from source b.

REX= Real bilateral exchange rate between US dollar and Singapore dollar. It is defined as $(P_{US} * NEX / P_{SG})$, where P_{US} is US CPI, P_{SG} is Singapore's CPI, and *NEX* is the nominal bilateral exchange rate defined as the number of Singapore dollar per US dollar. Thus, a decline in *REX* is a reflection of real depreciation of the US dollar. Data on NEX, P_{SG}, and P_{US}, all come from source b.

VOL = Volatility measure of the real bilateral exchange rate (*REX*). Following Bahmani-Oskooee, and Hegerty (2009), for each year it is defined as standard deviation of the 12 monthly real exchange rate (*REX*) observations within that year.