Estudios Económicos

Volume 16, Number 2, Julio-Diciembre 2001, Pages 167-183

Intra-Industry Trade Between the United States and Mexico: 1993-98

Don P. Clark, Thomas M. Fullerton, Jr., & Duane Burdorf

Abstract

This paper examines changes in intra-industry trade (IIT) in manufactured goods between the U.S. and Mexico over the first five years of the North American Free Trade Agreement. Most industries experienced large increases in IIT. An examination of various indexes of intra-industry specialization indicates few industries in either country are candidates for significant adjustment problems. These findings should lessen opposition to greater regional economic integration in the Western Hemisphere.

Resumen

Este artículo analiza cambios en patrones de comercio intra-industrial (CII) en bienes manufacturados entre México y Estados Unidos durante los primeros cinco años del Acuerdo de Libre Comercio. La mayoría de las industrias experimentaron incrementos notables en sus volumenes de CII. Un análisis de los distintos indices de especialización intra-industrial indica que pocas industrias en México y Estados Unidos se enfrentarán a riesgos marcados en términos de problemas intensos de ajuste. Estas inferencias deben servir para disminuir presiones en contra de mayor integración económica regional en el hemisferio occidental.

I. Introduction

The North American Free Trade Agreement (NAFTA) went into effect on January 1, 1994, five years after the U.S.-Canada Free Trade Agreement (CFTA) entered into force. NAFTA provides for the gradual elimination of tariffs and nontariff barriers to the flow of goods, services, and investment among the U.S., Canada, and Mexico. More than two-thirds of the value of U.S. imports from Mexico and almost half of U.S. exports to Mexico were accorded duty-free treatment at NAFTA's inception. Remaining tariff and nontariff barrier reductions will occur in equal annual stages over five, ten and fifteen year transition periods.[1]

Regional economic integration schemes like NAFTA are intended to stimulate production and increase trade among member countries. Resulting trade flows can be divided into two components: inter-industry and intra-industry trade. Inter-industry trade is the exchange between countries of totally different products, such as trading apparel for aircraft. Specialization entails shifting resources from one industry to another within each importing nation. Opponents of economic integration between developed and developing countries argue it entails a considerable amount of economic adjustment in each country because it encourages specialization across industries. Adjustment costs are high because productive factors displaced from the contracting industries are not easily absorbed in the expanding ones.

Economic integration is more valuable when it allows countries to achieve greater specialization within the same industry. Intra-industry trade (IIT) is two-way trade in products falling under the same industry classification. Productive resources shift with

[1] See U.S. Bureau of the Census (1993) and Clark et al. (2000) for background information on NAFTA.

minimal internal disruption between segments of the same industry. Specializing in different product lines within the same industry enables producers in each country to enjoy scale economies and realize efficient scale operations. The theoretical underpinning of economic integration is that trade liberalization will facilitate IIT.

Implementation of NAFTA has stimulated interest in U.S.-Mexico trade flows. Fullerton, Sawyer and Sprinkle (1997) estimate both price and income elasticities for U.S. imports from Mexico and U.S. exports to Mexico over the 1981-94 period. Changes in income levels and domestic price levels are found to be important determinants of trade flows. Results suggest NAFTA will stimulate trade between the U.S. and Mexico.

Several studies examine IIT between the U.S. and Mexico before NAFTA entered into force. Esquivel's (1992) analysis of U.S.-Mexico trade flows over the 1981-90 period provides evidence of a marked structural change in manufactured goods trade. Liberalization efforts during the de la Madrid administration are shown to have increased IIT. Numerous segments of Mexican industry successfully penetrated the U.S. market. A detailed analysis of 141 manufacturing product groups suggested 54 sub-sectors could potentially face Heckscher-Ohlin type adjustment problems, but these accounted for only 16 percent of total trade with the United States.

Gonzalez and Velez (1993) found the share of IIT between the U.S. and Mexico doubled over the 1982-90 period. All major industrial categories exhibited large increases in IIT. Globerman (1992) found IIT between the U.S. and Mexico, on a trade weighted basis, increased about 60 percent over the 1980-88 period.

Buitelaar and Padilla (1996) studied Mexico-U.S. trade flows during the first half of the 1990s. Their analysis covers 36 of Mexico's most important trading partners.

Findings were consistent with those of Esquivel (1992). IIT was found to have increased after entry into the General Agreement on Tariffs and Trade and NAFTA. All of these studies suggest trade induced by NAFTA will not have a major disruptive effect on the economies of Mexico and the United States.

This paper examines changes in the shares of IIT in manufactured goods trade between the U.S. and Mexico over the first five years of NAFTA. Attention is focused on U.S.-Mexico trade since the accession of Mexico stimulated considerable political opposition from certain industries and organized labor who argued NAFTA posed a threat of serious injury to U.S. producers and workers. Adjustment implications of trade liberalization will be assessed by determining the extent to which various indicators of intra-industry specialization have changed since the agreement went into effect. A finding that NAFTA did not cause significant adjustment problems could lessen opposition to greater regional integration in the Western Hemisphere by easing fears that entire industries and jobs will disappear.

II. Intra-Industry Trade

The share of intra-industry trade is measured using the Grubel-Lloyd (1975) index expressed as

$$GL_i = 1 - \frac{\left|X_i - M_i\right|}{\left(X_i + M_i\right)} \tag{1}$$

where X_i is exports of industry i , M_i is imports of industry i, $\left|X_i - M_i\right|$ is net trade $\left(X_i + M_i\right)$ is total trade, i = 1,2,...,n, and $0 \le GL_i \le 1$. An index value of 0 indicates complete inter-industry trade. Here, either the value of exports or imports is zero.

Higher index values are associated with greater intra-industry trade as a proportion of total trade, with an index value of 1 indicating equality between exports and imports.[2]

/Enter Table 1/

The traditional Grubel-Lloyd index provides a useful picture of an industry's trade pattern at a point in time. Indexes of IIT in U.S.-Mexico trade are shown in Table 1.[3] Overall, more than 60 percent of 1998 trade in manufactured goods between the U.S. and Mexico consisted of two-way trade within the same industry classification. This figure is extremely high in comparison to shares of IIT in trade between developed and developing countries as well as trade among developed countries.[4] A wide variety of two-digit Standard International Trade Classification (SITC) industries are found to exhibit significant amounts of IIT relative to total trade.[5] Two-way trade in similar goods takes place in all of the broad industrial classifications: chemicals and related products, manufactured goods, machines and transport equipment, and miscellaneous manufactured articles.

Table 1 suggests IIT in U.S.-Mexico trade may have risen since NAFTA went into effect. IIT rose relative to total trade in 20 industries and fell in fifteen industries. The simple average of the GL index rose over the 1993-98 period, while the trade

[2] Balassa (1966) used an index of IIT to show trade liberalization among EC members led to increased intra-industry trade.

[3] Data on U.S.-Mexico trade were compiled by the U.S. Bureau of the Census.

[4] The average share of IIT in manufactured goods trade between developed and developing countries was 15.1 in 1985, while that for trade among industrial nations was 47.1. See Forstner and Ballance (1990), and Balance, Forstner and Sawyer (1992).

[5] A controversy exists regarding what level of product aggregation constitutes a meaningful industrial category. Higher levels of product aggregation result in larger values for the GL index.

weighted average GL index registered a decline.[6] Adjustment implications of dynamic changes in IIT are investigated in the next three sections.

/Enter Figure 1/

III. Industry Trade Box

Figure 1 shows an industry trade box. Dimensions of the box reflect the maximum attainable values of exports and imports. Each point in the box represents a trade point, or combination of exports and imports. The GL index, total trade (TT), net trade (NT), and intra-industry trade (IIT) can be compared for any change in trade points.

The trade box is bisected by a 45 degree line representing combinations of perfectly matched two-way trade (X=M) with GL index values equal to unity. Consider point A with X>M. The line of equi-TT running through point A, perpendicular to the X=M line, shows combinations of trade points with equal total trade levels. Equi-GL lines show combinations of trade for which the share of IIT in TT and the ratio of exports to imports remain constant. Net trade, $|X_i - M_i|$, is constant along equi-NT lines. The equi-IIT line shows trade points that give equal absolute IIT values.

An intertemporal comparison of GL index values may fail to signal potential adjustment problems.[7] If points A and B are symmetrical, the same GL value is obtained at

---

[6] The 1993 trade weighted average GL index is dominated by four industries that accounted for more than half of the total trade. Included here are general industrial machinery (SITC 74), telecommunications equipment (SITC 76), electric machines (SITC 77), and road vehicles (SITC 78). The share of IIT in total trade fell for each of these sectors.

[7] Azhar, Elliott, and Milner (1998) develop the box and use it to evaluate properties of the GL index. Shelburne (1993) warns against using changes in the GL index to infer structural adjustment costs associated with trade liberalization.

either point as well as at any point along either equi-GL ray shown in Figure 1. The movement from point A to B entails a shift in the trade balance from a net exporter to a net importer. This decline in exports and increase in imports is likely to be associated with a fall in production and employment. Such a movement suggests potential adjustment pressures not signaled by any change in the GL index. Care must be exercised when attempting to draw inferences regarding potential adjustment pressures from a comparison of GL index values pertaining to successive trade points. Additional information may be required to identify potential adjustment problems.

IV. Adjustment Implications of Trade Liberalization

Changes in the trade ratio, trade points, and other indicators of intra-industry specialization are used to identify potential adjustment pressures associated with trade liberalization. Each point in the trade box has a trade ratio, r = X/M. The value of IIT relative to TT remains constant along a ray from the origin since all trade points on an equi-GL ray share a common trade ratio. Changes in IIT relative to TT can be analyzed by examining changes in r. For example, with an increase in TT, moving from either point A or B to a point closer to the diagonal in Figure 1 will increase both IIT and IIT/TT.

Analyzing a shift in the direction of the trade balance from a net exporter to a net importer can be facilitated by defining $r = r_x = X/M$ in the net exporter plane, and $r = r_m = M/X$ in the net importer plane.[8] When TT increases, as is generally the case with trade liberalization, changes in the value of the GL-ray, or Δr, may not provide sufficient information to assess potential adjustment problems. Knowledge of trade points may also

[8] When M=0 in the net exporter plane and X=0 in the net importer plane r will be undefined.

be required. Using changes in r in conjunction with changes in trade points as indicators of potential adjustment pressures will avoid some of the pitfalls associated with intertemporal comparisons of GL index values alone.

Factor adjustment implications of changes in trade points can be analyzed using Figure 1. Start at point A. Construct equi-trade component lines. An increase in TT can move the economy into any of the eight regions shown in the figure. Consider a movement from point A to a point in each of these regions. Region I is associated with a decline in IIT absolutely and relative to TT. Exports have increased and imports fallen. Adjustment problems are not expected.

A movement to Region II increases IIT, but reduces IIT/TT. Export growth exceeds import growth. Adjustment problems will not arise. When the economy moves from point A to a point in Region III, r_x is falling. IIT increases absolutely and relative to TT. We do not anticipate adjustment problems associated with this change in trade points.

Trade points in Region IV are also associated with an increase in IIT absolutely and relative to TT. Although r_x falls, a large increase in TT will result in higher export and import levels. A modest increase in TT can be associated with a decline in exports and increase in imports, but these changes will be relatively small. Adjustment problems are not expected.

The remaining regions lie in the net importer plane. Regions V and VI are associated with increases in both IIT and IIT/TT. A movement from point A to a point in either of these regions may give rise to adjustment problems since the country switched from a net exporter to a net importer. However, adjustment concerns can be lessened by a large

increase in TT that results from an increase in exports as well as imports. When TT increases, as is generally the case with trade liberalization, changes in the value of the GL-ray may not provide sufficient information to assess potential adjustment problems. Knowledge of trade points and r may be required.

Movements from point A to Regions VII and VIII imply potential adjustment pressures. IIT rises in Region VII, but falls in Region VIII. Both regions are characterized by a fall in IIT relative to TT.

/Enter Table 2/

V. Adjustment Pressures

Table 2 shows changes in U.S. exports, imports, trade ratios, ΔGL, and Δ IIT over the first five years of NAFTA. Industries are grouped in accordance with various outcomes characterized by changes in TT, the trade balance, and changes in r. The analysis is conducted using two-digit SITC manufacturing industries to keep the table to a reasonable size. Although the analysis focuses on potential adjustment pressures in the U.S., implications for Mexico are also discussed.

The first grouping of industries in Table 2 contains one U.S. industry that remains in the net exporter plane. A decline in the GL index, an increase in IIT, and a rise in r_x suggests leather and leather goods (SITC 61) shifted to Region II of Figure 1. This U.S. industry does not face potential adjustment pressures. Although the r_x increase in the U.S. translates into a rise in r_m for Mexico, the large increase in IIT suggests the industry will not encounter significant adjustment problems in Mexico.

Twelve net exporters experienced reductions in r_x with increases in TT. If r_x values decline with increases in TT, changes in the composition of total trade will consist of

progressive increases in IIT and IIT/TT. Here, trade points remain in the net exporter plane and are in either Region III or IV. Changes in both the GL index and IIT, along with changes in r_x, do not suggest potential adjustment problems will arise in the United States. These sectors accounted for 24 percent of U.S. exports to Mexico and 8 percent of Mexico's exports to the U.S. in 1998. Industries in this group remained in Mexico's net importer plane with r_m falling. Since IIT rose in absolute terms and relative to TT, significant adjustment pressures are not expected in Mexico.

Eleven U.S. industries switched from the net exporter to the net importer plane. IIT rose in absolute terms and relative to TT in seven industries. Four industries experienced absolute increases in IIT with declines in IIT relative to TT. Included here are power generating machines (SITC 71), general industrial machines (SITC 74), office and ADP machines (SITC 75), and scientific equipment (SITC 87). Large increases in IIT serve to lessen concerns regarding potential adjustment pressures.[9] Import growth exceeded that of exports, but exports rose in nine of the industries. Export growth provides some scope for factor reallocation within each of these industries. An intertemporal comparison of trade points, trade ratios, ΔGL, and ΔIIT suggest adjustment pressures in the U.S. will be minimal even with the adverse shift in the trade balance.[10] These industries accounted for 28 percent of U.S. exports to Mexico and 24 percent of Mexico's ex-

[9] The Azhar-Elliott-Milner (1998) methodology holds TT constant and examines changes in two summary indexes and the trade ratio along the equi-TT line in Figure 1. This approach significantly overstates the likelihood of adjustment pressures for industries in the net importer plane. When TT rises, as is generally the case with economic integration, changes in actual trade points must be taken into account to assess potential adjustment pressures.

[10] Not all imports have job displacement effects. Some imports are inputs for expanding activities or are facilitated by coproduction arrangements.

ports to the U.S. in 1998. Industries in this group shifted from the net importer plane to the net exporter plane in Mexico. Adjustment problems are not expected.

The fourth group consists of nine U.S. industries in the net importer plane that experienced increases in r_m with greater TT. These industries accounted for 47 percent of U.S. exports to Mexico and 67 percent of U.S. imports from Mexico in 1998. Import surges served to raise both r_m and concerns over potential adjustment problems in the United States. All but one of these industries moved into Region VII of Figure 1. Prefabricated buildings (SITC 81) moved into Region VIII. Changes in the GL index may not provide enough information to assess potential adjustment problems. Although shares of IIT in TT fell for all of the industries, all but three of these experienced large increases in IIT. Those with the largest increases in IIT had export increases that provided some scope for factor reallocation within industries. Declines in IIT or small increases in IIT signal industries that may have experienced adjustment problems. Included here are prefabricated buildings (SITC 81), travel goods, handbags, etc. (SITC 83), and footwear (SITC 85). Collectively, these industries accounted for less than one percent of U.S. imports from Mexico in 1998. The first of these is in Region VIII of Figure 1, and the remaining two are in Region VII. None of these industries face potential adjustment problems in Mexico since they remained in Mexico's net exporter plane and experienced increases in r_x .

Two U.S. industries remain in the net exporter plane but had declines in total trade. Medicinal products (SITC 54) experienced increases in IIT both in absolute terms and relative to TT. The opposite is true for fertilizer (SITC 56). Here, r_x rose considera-

bly. These export industries will not face potential adjustment pressures in the U.S. even though TT fell.

Mexico's medicinal products (SITC 54) industry will not experience adjustment pressures since r_m declined and IIT rose as TT fell. The fertilizer industry (SITC 56) is a candidate for potential adjustment problems in Mexico since imports and exports both fell. IIT declined in absolute terms and relative to TT.

More than two-thirds of the value of U.S. imports from Mexico and almost half of U.S. exports to Mexico were accorded duty-free treatment at NAFTA's inception. Remaining tariffs are to be phased out in equal annual stages over five, ten, and fifteen year transition periods. Most of the manufactured goods that retained tariff protection in the U.S. after January 1, 1994, fall into the fourth group discussed above. Included here are certain products from non-metallic mineral manufacturing (SITC 66), travel goods, handbags, etc. (SITC 83), clothing and accessories (SITC 84), and footwear (SITC 85). Seven percent of U.S. imports from Mexico are from these industries. These activities should be watched for signs of adjustment pressures as trade liberalization proceeds.

VI. Conclusions

This paper examines changes in IIT in manufactured goods trade between the U.S. and Mexico over the first five years of NAFTA. Opponents of NAFTA argued economic integration between the U.S. and a developing country would entail a considerable amount of economic adjustment in each country by fostering greater specialization across rather than within industries. It is difficult to disentangle NAFTA's impact on intra-industry specialization from that of other events such as Mexico's recession, depreciation

of the Mexican peso, and tariff cuts under the Uruguay Round. However, large changes in IIT were experienced by most industries. Only two industries had declines in IIT. An examination of various indicators of intra-industry specialization shows few industries in either country are candidates for potential structural adjustment problems. We do not expect major adjustment problems will arise from greater integration between the U.S. and Mexico. Results support Esquivel's (1992) prediction that greater economic integration between the U.S. and Mexico will not cause significant adjustment problems for manufacturing activities in Mexico. Findings of the present study should lessen opposition to greater regional integration in the Western Hemisphere by easing fears that entire industries and jobs will disappear.

References

Azhar, A. K. M., R. J. R. Elliott, and C.R. Milner. (1998). Static and Dynamic Measurement of Intra-Industry Trade and Adjustment: A Geometric Reappraisal, *Weltwirtschaftliches Archiv*, vol.134, pp. 404-422.

Balassa, B. (1966). Tariff Reductions and Trade in Manufactures Among the Industrial Countries, *American Economic Review*, vol. 56, pp. 466-473.

Balance, R.H., H. Forstner, and W.C. Sawyer. (1992). An Examination of the Role of Vertical Product Differentiation in North-South Trade, *Weltwirtschaftliches Archiv*, vol. 128, pp. 330-338.

Buitelaar, R. M., and R. Padilla. (1996). El Comercio Intraindustria de Mexico Con Sus Principales Socios Comerciales, *Estudios Económicos*, vol.11, pp. 77-116.

Clark, D. P., W. C. Sawyer, and R. L. Sprinkle. (2000). Tariff Elimination Staging Categories and the North American Free Trade Agreement, *Economia Internazionale*, vol. 53, pp. 141-152

Esquivel, G. (1992). Una Nota Sobre El Comercio Intraindustrial Mexico-Estados Unidos, *Estudios Económicos*, vol. 7, pp. 119-137.

Forstner, H., and R. Balance. (1990). *Competing in a Global Economy: An Empirical Study on Specialization and Trade in Manufactures*, London, Unwin Hyman.

Fullerton, T. M. Jr., W. C. Sawyer, and R. L. Sprinkle. (1997). Functional Form for United States-Mexico Trade Equations, *Estudios Económicos*, vol. 12, pp. 23-35.

Globerman, S. (1992). North American Trade Liberalization and Intra-Industry Trade, *Weltwirtschaftliches Archiv*, vol. 128, pp. 487-497.

Gonzalez, J., and A.Velez. (1993). An Empirical Estimation of the Level of Intra-Industry Trade Between Mexico and the United States, in K. Fatemi (ed.) *North American Free Trade Agreement: Opportunities and Challenges*, New York, St. Martin's Press.

Grubel, H. G., and P. J. Lloyd. (1975). *Intra-Industry Trade: The Theory and Measurement of International Trade in Differentiated Products*, London, Macmillan.

Shelburne, R. C. (1993). Changing Trade Patterns and the Intra-Industry Trade Index: A Note, *Weltwirtschaftliches Archiv,* vol.129, pp. 829-833.

U.S. Bureau of the Census. (1993). *North American Free Trade Agreement: Annex 302.2 Schedule of the United States*, Washington, D.C., U.S. Government Printing Office.

Table 1
Grubel-Lloyd (GL) Indexes of IIT in Manufactures: U.S.-Mexico Trade
1993-1998

		GL Index					
SITC	Industry	1993	1994	1995	1996	1997	1998
51	Organic chemicals	0.40	0.60	0.72	0.47	0.53	0.64
52	Inorganic chemicals	0.82	0.89	0.91	0.91	0.94	0.84
53	Dyes, colouring materials	0.27	0.47	0.49	0.74	0.84	0.88
54	Medicinal, pharm. products	0.28	0.38	0.50	0.64	0.61	0.76
55	Essential oils, perfume, etc.	0.47	0.73	0.90	0.87	0.95	0.89
56	Fertilizer	0.21	0.03	0.11	0.06	0.14	0.11
57	Plastics in primary form	0.22	0.79	0.76	0.60	0.65	0.41
58	Plastic, non-primary form	0.24	0.71	0.68	0.67	0.58	0.72
59	Chemical materials nes.	0.28	0.53	0.64	0.71	0.75	0.66
61	Leather, leather goods	0.80	0.60	0.86	0.73	0.69	0.56
62	Rubber manufactures, nes.	0.38	0.74	0.72	0.67	0.80	0.95
63	Cork, wood manufactures	0.70	0.98	0.76	0.72	0.67	0.72
64	Paper, paperboard, etc.	0.21	0.59	0.64	0.60	0.74	0.77
65	Textile yarn, fabric, etc.	0.69	0.93	0.91	0.86	0.74	0.86
66	Non-metal mineral manfct.	0.79	0.61	0.55	0.57	0.47	0.52
67	Iron and steel	0.71	0.88	0.98	0.91	0.85	0.87
68	Non-ferrous metals	0.78	0.88	0.86	0.94	0.91	0.94
69	Metal manufactures, nes.	0.69	0.97	0.91	0.77	1.00	0.96
71	Power generating machines	0.84	0.79	0.70	0.61	0.72	0.69
72	Special industrial machinery	0.26	0.63	0.96	0.67	0.75	0.99
73	Metalworking machinery	0.07	0.46	0.39	0.53	0.51	0.45
74	General industrial mach. nes.	0.75	0.62	0.65	0.65	0.76	0.72
75	Office, ADP machines	0.80	0.83	0.73	0.73	0.71	0.55
76	Telecomm. sound equip. etc.	0.75	0.36	0.29	0.28	0.40	0.28
77	Electric machines appar, parts, nes.	0.99	0.81	0.87	0.90	0.90	0.91
78	Road vehicles	0.80	0.29	0.41	0.44	0.35	0.37
79	Other transport equipment	0.15	0.56	0.70	0.94	0.85	0.98
81	Prefab buildings, fttng etc	0.79	0.78	0.59	0.39	0.51	0.37
82	Furniture, bedding, etc.	0.87	0.74	0.63	0.55	0.56	0.60
83	Travel goods, handbags, etc.	0.49	0.49	0.31	0.28	0.38	0.40
84	Clothing and accessories	0.77	0.76	0.66	0.65	0.60	0.58
85	Footwear	0.67	0.68	0.52	0.52	0.48	0.61
87	Scientific equipment, nes.	0.82	0.84	0.67	0.62	0.68	0.63
88	Photo apparat., nes; clocks	0.84	0.98	0.95	0.88	0.67	0.89
89	Misc. manufctrd goods, nes.	0.75	0.99	0.96	0.96	0.98	0.97
	Simple average	0.58	0.66	0.68	0.66	0.68	0.69
	Trade weighted average	0.76	0.59	0.66	0.64	0.64	0.63

Table 2
Indexes of Intra-Industry Specialization for the United States

		1993				1998					
SITC	Industry	X	M	r_x	r_m	X	M	r_x	r_m	ΔGL	ΔIIT
$\Delta TT>0$, $X>M$, $r_x\uparrow$											
61	Leather, leather goods	93.4	62.5	1.49		242.3	94.3	2.57		-0.24	63.7
$\Delta TT>0$, $X>M$, $r_x\downarrow$											
51	Organic chemicals	858.0	213.3	4.02		744.6	350.5	2.12		0.24	274.4
52	Inorganic chemicals	250.4	177.5	1.41		449.3	327.0	1.37		0.01	299.0
53	Dyes, colouring materials	173.5	27.3	6.35		377.6	299.0	1.26		0.61	543.4
55	Essential oils, perfume,etc.	244.0	74.7	3.26		338.7	272.8	1.24		0.42	396.2
57	Plastics in primary form	747.9	93.6	7.99		1917.7	496.9	3.85		0.19	806.6
58	Plastic, nonprimary form	528.5	73.7	7.17		1049.1	595.5	1.76		0.48	1043.6
59	Chemical materials nec.	391.5	64.9	6.03		770.4	384.5	2.00		0.38	639.2
64	Paper, paperboard, etc.	1063.4	124.1	8.57		1665.8	1047.5	1.59		0.56	1846.8
69	Metal manufactures, nes.	1388.4	735.8	1.89		2630.7	2448.6	1.07		0.27	3425.6
73	Metalworking machinery	287.9	11.5	25.03		590.2	173.7	3.40		0.38	432.4
88	Photo apparat., nes; clocks	276.2	199.2	1.39		499.8	398.4	1.25		0.05	398.4
89	Misc. manufactrd goods, nes.	1862.8	1121.0	1.66		3211.3	3007.6	1.07		0.22	3773.2
$\Delta TT>0$, $r_x \rightarrow r_m$											
62	Rubber manufactures, nes.	348.5	81.8	4.26		1053.6	1163.1		1.10	0.57	1943.6
63	Cork, wood manufactures	207.0	112.2	1.84		165.7	295.2		1.78	0.02	107.0
65	Textile yarn, fabric, etc.	794.5	418.5	1.90		1813.4	2390.4		1.32	0.17	2789.8
67	Iron and steel	703.6	387.3	1.82		1115.7	1456.8		1.30	0.16	1456.8
68	Non-ferrous metals	603.4	388.2	1.55		1167.1	1310.9		1.12	0.16	1557.8
71	Power generating machines	1527.8	1119.0	1.36		2402.0	4521.9		1.88	-0.15	2566.0
72	Special industrial machinery	1189.0	179.3	6.63		2111.1	2132.5		1.01	0.73	3863.8
74	General industrial mach. nes.	1974.3	1183.8	1.67		3599.2	6453.6		1.79	-0.03	4830.8
75	Office, ADP machines	1629.3	1087.6	1.50		1868.4	4890.4		2.62	-0.25	1561.6

Table 2
Continued

		1993				1998					
SITC	Industry	*X*	*M*	r_x	r_m	*X*	*M*	r_x	r_m	ΔGL	ΔIIT
Δ*TT*>0, $r_x \rightarrow r_m$ (cont.)											
79	Other transport equipment	560.6	45.8	12.24		364.9	378.2		1.04	0.83	638.2
87	Scientific equipment	1383.0	966.8	1.43		1500.5	3289.3		2.19	-0.19	1067.4
Δ*TT*>0, *M*>*X*, $r_m \uparrow$											
66	Non-metal mineral manfct	326.5	503.1		1.54	570.4	1615.3		2.83	-0.26	487.8
76	Telecomm sound equip etc.	1978.3	3261.1		1.65	2825.6	16962.2		6.00	-0.47	1694.7
77	Elec. mach. appar, parts, nes.	6031.9	6175.8		1.02	13582.0	16173.7		1.19	-0.07	15100.2
78	Road vehicles	4580.6	6846.9		1.49	7542.7	32770.9		4.34	-0.43	5924.2
81	Prefab.buildings, fttng, etc.	149.1	229.1		1.53	141.3	617.7		4.37	-0.42	-15.6
82	Furniture, bedding,etc.	679.7	882.2		1.30	977.8	2300.2		2.35	-0.27	596.2
83	Travel goods, handbags,etc.	22.1	67.6		3.05	36.7	147.4		4.02	-0.09	29.2
84	Clothing and accessories	879.3	1413.8		1.61	2609.2	6348.9		2.43	-0.19	3459.8
85	Footwear	108.2	214.9		1.99	128.2	289.6		2.26	-0.06	40.0
Δ*TT*<0, *X*>*M*, $r_x \downarrow$											
54	Medicinal, pharm. products	158.2	25.6	6.18		104.5	63.7	1.64		0.48	76.2
Δ*TT*<0, *X*>*M*, $r_x \uparrow$											
56	Fertilizer	117.8	14.1	8.35		72.0	4.1	17.57		-0.10	-20.0

Note – Trade figures for U.S. exports (X), imports (M), and ΔIIT are in millions of U.S. dollars. r_x = X/M and r_m = M/X.
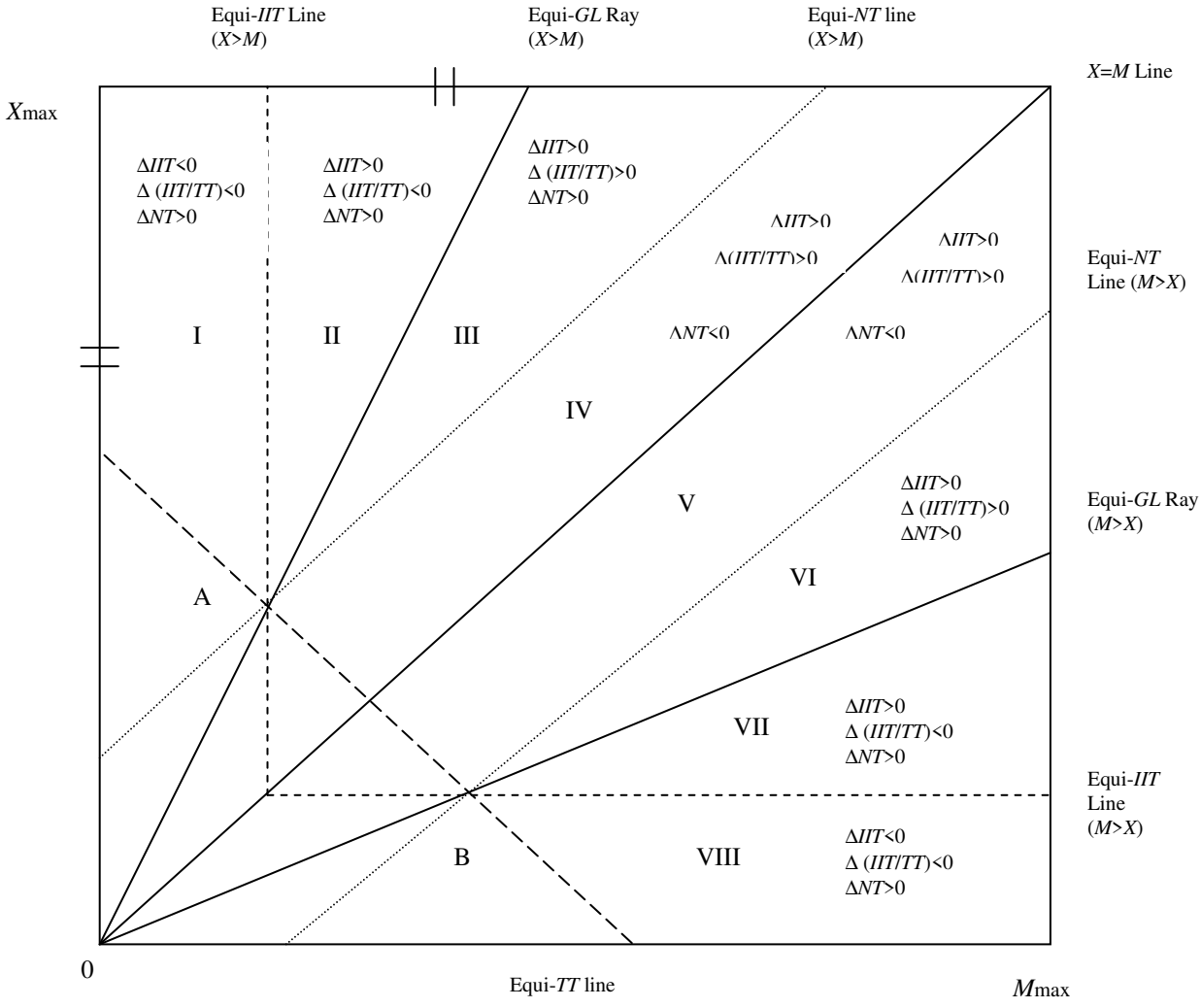
Figure 1
Industry Trade Box