Intra Industry Trade In Textile And Clothing Industry: The Case Of Turkey

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In recent decades, IIT has become a striking characteristic of the international trade regime, especially in the manufacturing industry. As in many other developing countries, the TAC industries have played an important role in the industrialization process of Turkey. The aim of this paper is to investigate the level of Intra Industry Trade at the TAC industry in Turkey. For this purpose static and dynamic IIT indices have been calculated. The analysis is based on the annual time series data on TAC exports and imports, extracted from the TUIK data bank. TAC data is at the three digit level of the Standard International Trade Classification (SITC) in U.S. dollars. Grubel-Lloyd (GL) and adjusted Grubel-Lloyd (C) indices have been calculated at SITC, 3 digit levels over the 1989-2008. And also MIIT has been calculated for three periods, 1989-1996, 1996-2001, 2001-2008.

JEL Codes: F12,F14
Keywords: Trade, Turkey, Intra Industry Trade, Marginal Intra Industry Trade

1. Introduction

In the classical trade theories each country is specialized in goods which they have comparative advantages. But normally, these goods were in a different industry, for example wheat and cloth. With an increase exceeding the goods production, today's trade is so complex that it can't be explained by using traditional trade theories. Today countries also exchange their products which belong to the same industry and total world trade increases enormously. Intra-industry trade (IIT) draws attention among the new trade theories to explain today's trade. IIT deals with the causes of both export and import of the goods in the same industry by countries. In recent decades, IIT has become a striking characteristic of the international trade regime, especially in the manufacturing industry. TAC has a significant portion in manufacturing industry. Industrialization began with TAC industry in 19th century. Since then, TAC has transformed into a large industry. With the assistance of technological changes, products are differentiated within the same industry. Depending on this situation countries simultaneously export and import processed products increasingly.

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Similar with other developing countries TAC industry has crucial importance in Turkey. The industry contributes to around 10 percent of GDP. In spite of decreases, over two and a half million people are employed in TAC industry. However, unregistered employment rate is very high and especially in clothing industry, firms are mostly small and medium size enterprises. Table 1 and table 3 shows leading exporters of textiles and clothing. Turkey is the one of the leading exporters in TAC industry. Exports and imports have risen since 1980. Turkey has the same share, 3.8, in exportation of the clothing and textile products in the world. The most forcible competitor has been Chine in both clothing and textile. Table 2 indicates that Turkey is also a great importer country in textile industry.

Table 1. Leading exporters of textiles, 2008

Exporters	Value	Share in world exports			
	2008	1980	1990	2000	2008
European Union (27)	80.21	-	-	36.1	32.1
China	65.26	4.6	6.9	10.3	26.1
United States	12.50	6.8	4.8	7.0	5.0
Hong Kong, China	12.26	-	-	-	-
Korea, Republic of	10.37	4.0	5.8	8.1.	4.1
India	10.27	2.4	2.1	3.5	4.1.
Turkey	9.40	0.6	1.4	2.3	3.8
Taipei, Chinese	9.22	3.2	5.9	7.6	3.7

Source: World Trade Organization

Table 2. Leading importers of textiles, 2008

Importers	Value	Share in world imports			
	2008	1980	1990	2000	2008
European Union (27)	83.96	-	-	34.3	31.9
United States	23.13	4.5	6.2.	9.5	8.8
China	16.23	1.9	4.9	7.7	6.2
Hong Kong, China	12.31	-	-	-	-
Japan	6.95	3.0	3.8	0.9	0.2
Viet Nam	6.05	-	-	0.8	2.3
Turkey	5.65	0.1	0.5	1.3	2.1
Russian Federation	5.51	-	-	0.8	2.1

Source: World Trade Organization

Table 3. Leading exporters of clothing, 2008

Exporters	Value	Share in world exports			
	2008	1980	1990	2000	2008
China	120	4.0	8.9	18.2	33.2
European Union (27)	112.4	-	-	28.4	31.1
Hong Kong, China	27.9	-	-	-	-
Turkey	13.6	0.3	3.1	3.3	3.8
Bangladesh	10.9	0.0	0.6	2.6	3.0
India	10.9	1.7	2.3	3.0	3.0
Viet Nam	9. 0	-	-	0.9	2.5
Indonesia	6.3	0.2	1.5	2.4	1.7

Source: World Trade Organization

This paper provides a detailed examination of trends in intra industry trade in TAC products between Turkey and her trading partners between 1989-2008 period. Calculations are performed at the three digit Standard Industrial Trade Classification (SITC) level of industry aggregation. SITC 26 includes textile fibres (other than wool tops and other combed wool) and their wastes (not manufactured in to yarn or fabric), SITC 65 includes textile yarn, fabrics, made up articles, n.e.s., and related products, and at last, SITC 84 includes articles of apparel and clothing accessories. 65 and 84 SITC groups widely used in comparing countries trade performances mainly because these SITC groups are in manufacturing industry. This paper investigates Turkish TAC trade, particularly focusing on different aspects of intra-industry trade (IIT).

2. Theoretical Framework of Intra Industry Trade

*2.*1. Standard measure of intra-industry trade: The Grubel-Lloyd Index

The most widely used measure of IIT is the Grubel and Lloyd (1975) index. Grubel and Lloyd used the figures originated from their observations of simultaneous imports and exports for similar SITC categories in Australia. IIT is defined as the value of exports of an industry which is exactly matched by the imports of the same industry according to the Grubel-Lloyd, that is,

$$Ri = (Xi + Mi) - |Xi - Mi|$$

where Xi and Mi are the value of the exports and imports of industry valued in the home countries currency and i= 1,...n, where n is the number of studies at a chosen level of aggregation (Grubel-Lloyd, 1975). Grubel-Lloyd, to facilitate comparisons of these measures for different industries, express them as a percentage of each industry's combined exports and imports,

$$GL = \left[1 - \frac{|Xi - Mi|}{(Xi + Mi)}\right].100 \quad (1)$$

Grubel-Lloyd used relative size of exports plus imports of each industry as weights and at the same level of aggregation the industry indices:

$$\overline{GL} = \frac{\sum_i^n Bi(Xi + Mi)}{\sum_i^n (Xi + Mi)}.100 = \frac{\sum_i^n (Xi + Mi) - \sum_i^n |Xi - Mi|}{\sum_i^n (Xi + Mi)}.100 \quad (2)$$

Both measures vary between 0 and 100. When the exports are exactly equal to the imports of an industry all trade is IIT and the indices is 100. İf there is no IIT, GL takes the value of 100. Equation 2 measures average IIT as a percentage of the total trade. Grubel- Lloyd indicates that this equation also equals to the sum of the IIT for the industries as a percentage of the total export plus import trade of the n industries:

$$\overline{GL} = \frac{\sum_i^n (Xi + Mi) - |Xi - Mi|}{\sum_i^n (Xi + Mi)}.100 \quad (3)$$

Adjusted Grubel-Lloyd indices are used for if there is a total trade imbalance in a country:

$$Ci = \frac{\sum_i^n (Xi + Mi) - \sum_i^n |Xi - Mi|}{\sum_i^n (Xi + Mi) - \left|\sum_i^n Xi - \sum_i^n Mi\right|}.100 \quad (4)$$

It is also argued that Grubel- Lloyd index is a static measure only captures the trade patterns at one time and doesn't change over time. For a dynamic measurement Marginal Intra Industry Trade is used.

2.2. Marginal Intra Industry Trade

Marginal Intra Industry Trade (MIIT) is important for measuring dynamic phenomena and recent theoretical developments use (MIIT) in the context of trade liberalization and adjustment costs (Hamilton and Kniest, 1991; Greenaway et al., 1994; Brulhart, 1994, 1999 and 2000; Thom–McDowell, 1999). In traditional IIT index can remain constant even as the volume of IIT expands. MIIT index shows us how much of the change in the volume of trade between two periods is IIT. There are several indices

for MIIT. But Brulhart (1994) index is most commonly used in recent empirical studies.

$$B = \frac{\Delta X - \Delta M}{|\Delta X| + |\Delta M|} * 100 \qquad (5)$$

This coefficient can take values ranging between –100 and 100. It is two-dimensional, containing information about both the proportion of MIIT and country-specific sectoral performance. First, the closer *B* is to zero, the higher is MIIT, whereas at both –100 and 100 it represents marginal trade as being entirely of the inter-industry type. Second, sectoral performance is defined as the change in exports and imports in relation to each other. When $B > 0$, ΔX was > ΔM, the opposite holds for $B < 0$. Unlike the *A* index, *B* cannot be meaningfully aggregated across industries. Therefore, *B* cannot be used for summary statistics resulting from calculations on a disaggregated level. Its applicability is thus confined to the industry-by-industry assessment of MIIT and performance.

Trade performance is particularly relevant where MIIT is low, that is, where inter-industry change dominates. We say that the marginal intra-industry trade measured using *B* index can reflect a country's specialization "*into*" or "*out of*" a particular industry. If, in a certain industry, exports expand faster (or contract more slowly) than imports, this means that the country specializes in this particular activity. Accordingly, a country specializes in other industries when the opposite composition of trade exists (Brülhart, 1999).

3. 3. Turkish Intra Industry Trade In Tac Products: Empirical Results

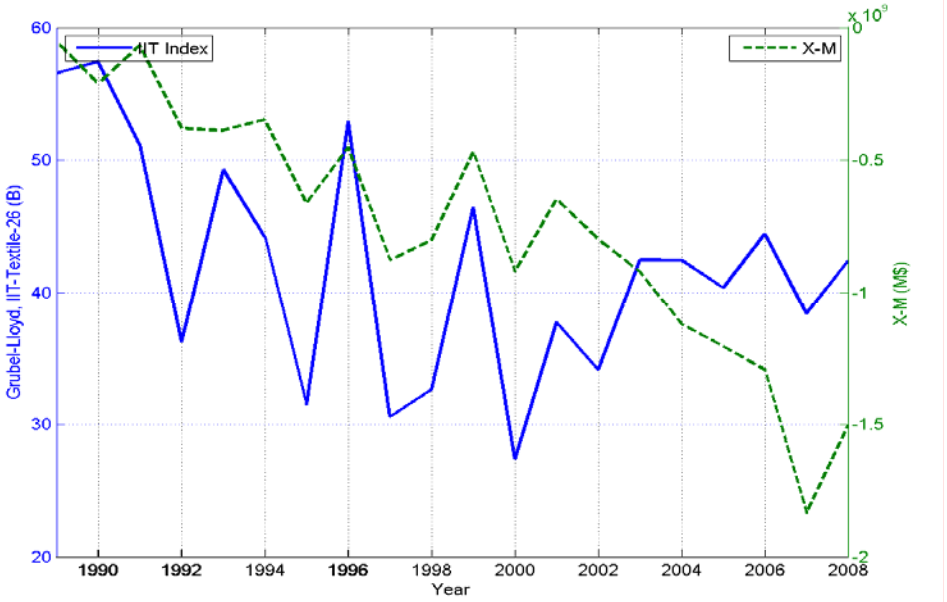
As analyzing our IIT figures we take into account the following cases:
• In 1989, liberalization is mainly finalized in many areas in Turkey
• In 1996 , Turkey joined European Customs Union,
• In November 2000 and February 2001, Turkey experienced two severe economic crisis.

3.1. The Grubel Lloyd IIT Results:

The analysis of Turkish IIT in TAC products is based on Grubel-Lloyd (GL) and adjusted Grubel-Lloyd (C) indices, calculated at SITC, 3 digit levels. These subgroups are SITC-26 which is made up of textile fibers (other than wool tops) and their wastes, SITC-65 made up of textile yarn, fabrics, made up articles, n.e.s related products and SITC-84 made up of apparel and clothing accessories. GL indices of IIT for Turkish TAC trade were calculated by:

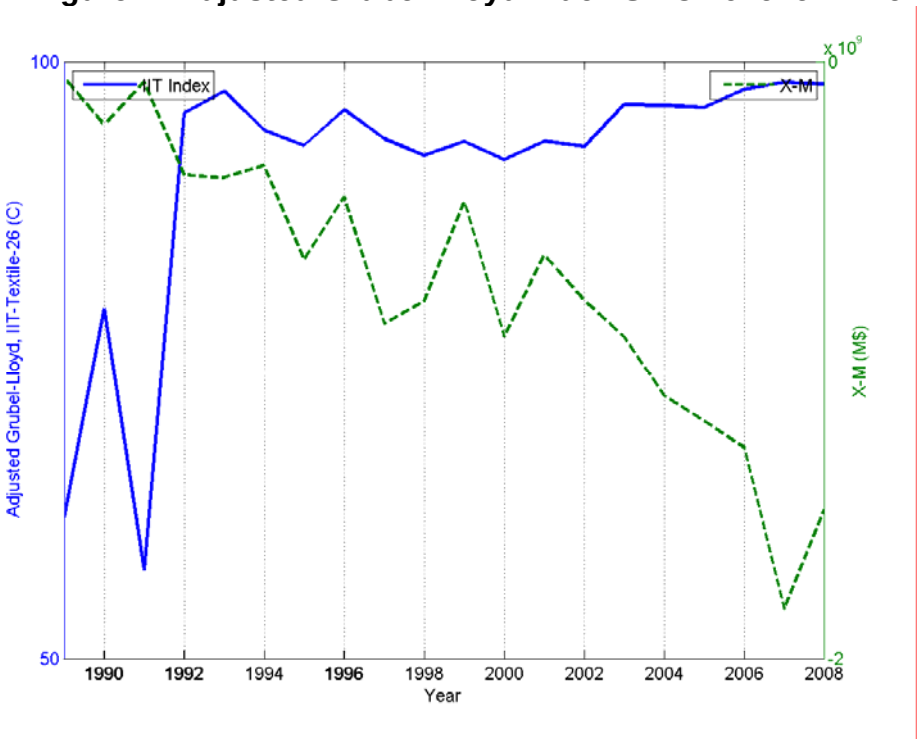
a) IIT between Turkey and the world in total TAC industry,
b) GL index per SITC category between 1989-2008 years.

Figure 1: Grubel-Lloyd index SITC 26 level in Textile industry



Source: Own calculations based on TUIK database

Figure 2: Adjusted Grubel-Lloyd index SITC 26 level in Textile Industry



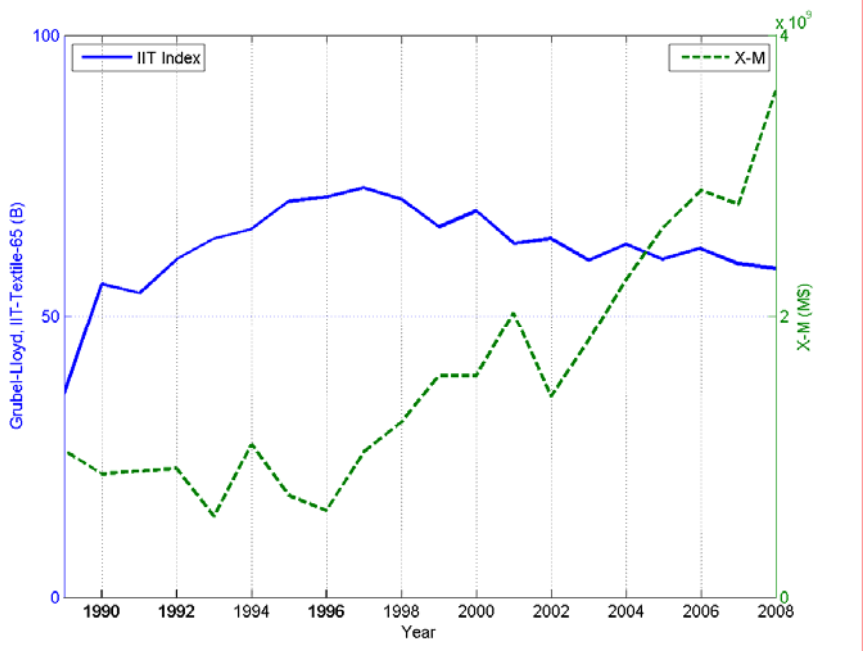
Source: Own calculations based on TUIK database

SITC 26 product groups include these three digit groups.

- 261 - Silk
- 263 - Cotton
- 264 - Jute and other textile bast fibres, n.e.s., raw or processed but not spun; tow and waste of these fibres (including yarn waste and garnetted stock)
- 265 - Vegetable textile fibres (other than cotton and jute), raw or processed but not spun; waste of these fibres
- 266 - Synthetic fibres suitable for spinning
- 267 - Other man-made fibres suitable for spinning; waste of man-made fibres
- 268 - Wool and other animal hair (including wool tops)
- 269 - Worn clothing and other worn textile articles; rags

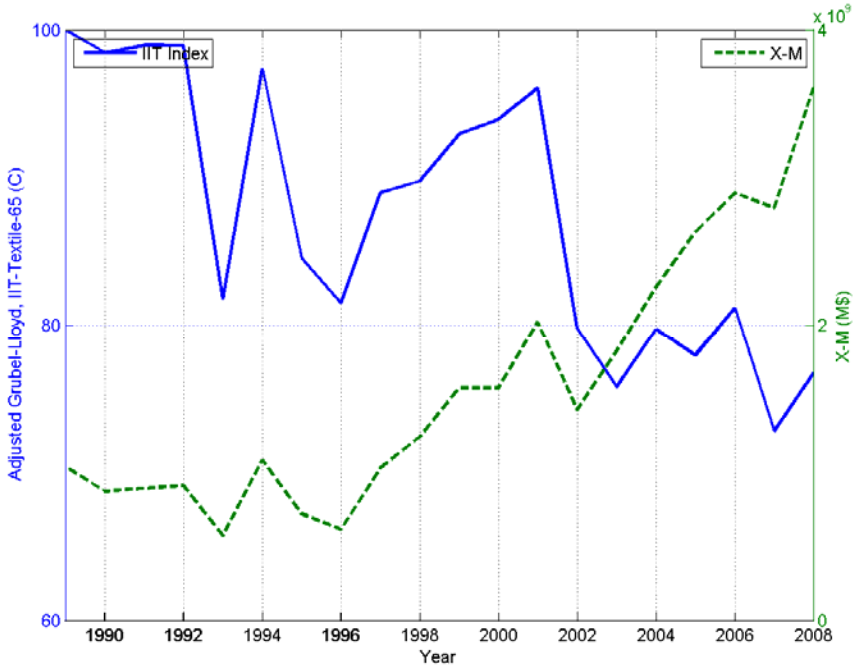
The difference between GL and Adjusted GL indexes can be seen at Figure 1 and Figure 2 clearly. Adjusted GL reduced fluctuations comparing with GL in Figure 2 and Adjusted GL values are higher than GL values. Adjusted GL oscillated around 90. There has been trade gap in this level since 1989. As depicted in Table 1 highest GL index is 98.8 in the SITC 266 group.

Figure 3: Grubel-Lloyd index SITC 65 level in Textile industry



Source: Own calculations based on TUIK database

Figure 4: Adjusted Grubel-Lloyd index SITC 65 level in Textile industry



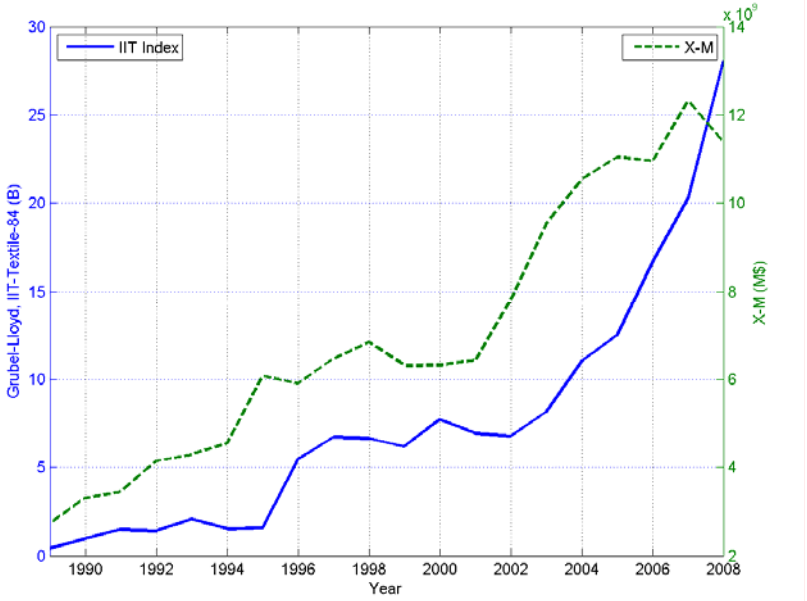
Source: Own calculations based on TUIK database

SITC 65 product groups include these three digit groups:

- 651 - Textile yarn
- 652 - Cotton fabrics, woven (not including narrow or special fabrics)
- 653 - Fabrics, woven, of man-made textile materials (not including narrow or special fabrics)
- 654 - Other textile fabrics, woven
- 655 - Knitted or crocheted fabrics (including tubular knit fabrics, n.e.s., pile fabrics and openwork fabrics), n.e.s.
- 656 - Tulles, lace, embroidery, ribbons, trimmings and other smallwares
- 657 - Special yarns, special textile fabrics and related products
- 658 - Made-up articles, wholly or chiefly of textile materials, n.e.s.
- 659 - Floor coverings, etc.

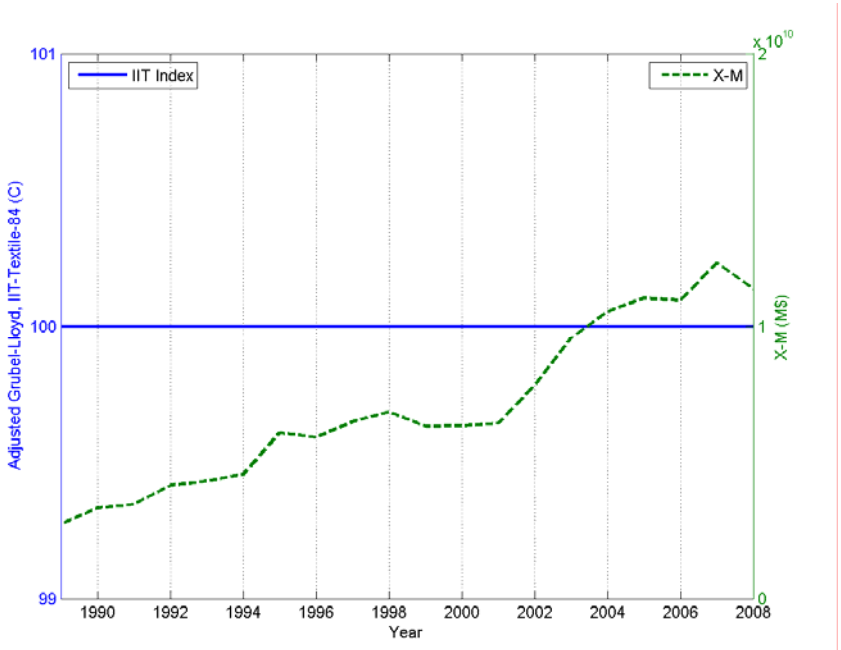
Both GL and Adjusted GL indexes have been decreased since 1989. The reason for that trade surplus has been increased continuously. As depicted in Table 1 highest GL index is 99.7 in the SITC 653 group.

Figure 5: Grubel-Lloyd index SITC 84 level in Clothing Industry



Source: Own calculations based on TUIK database

Figure 6: Adjusted Grubel-Lloyd index SITC 84 level in Clothing Industry



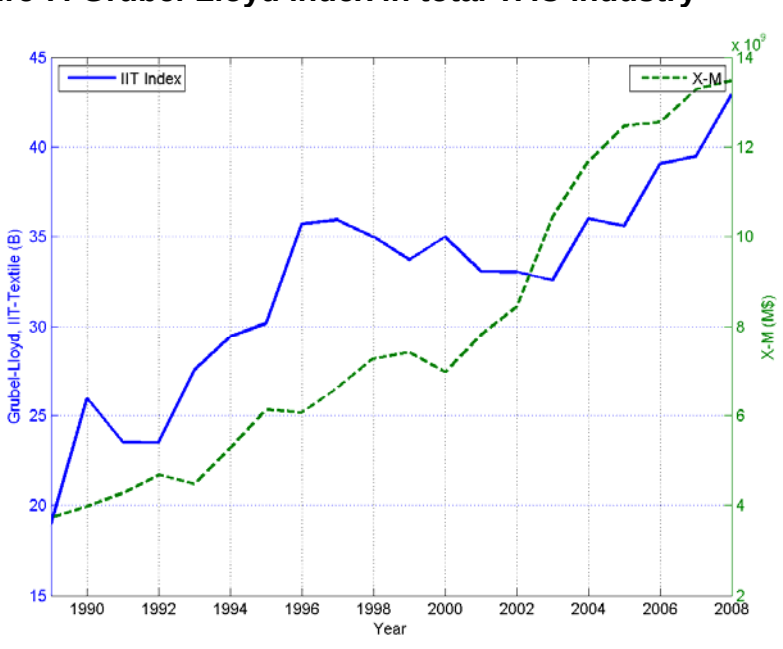
Source: Own calculations based on TUIK database

SITC 84 product groups include these three digit groups.

- 841 - Men's or boys' coats, capes, jackets, suits, blazers, trousers, shorts, shirts, underwear, nightwear and similar articles of textile fabrics, not knitted or crocheted (other than those of subgroup 845.2)
- 842 - Women's or girls' coats, capes, jackets, suits, trousers, shorts, shirts, dresses and skirts, underwear, nightwear and similar articles of textile fabrics, not knitted or crocheted (other than those of subgroup 842.2)
- 843 - Men's or boys' coats, capes, jackets, suits, blazers, trousers, shorts, shirts, underwear, nightwear and similar articles of textile fabrics, knitted or crocheted (other than those of subgroup 845.2)
- 844 - Women's or girls' coats, capes, jackets, suits, trousers, shorts, shirts, dresses and skirts, underwear, nightwear and similar articles of textile fabrics, knitted or crocheted (other than those of subgroup 845.2)
- 845 - Articles of apparel, of textile fabrics, whether or not knitted or crocheted, n.e.s.
- 846 - Clothing accessories, of textile fabrics, whether or not knitted or crocheted (other than those for babies)
- 848 - Articles of apparel and clothing accessories of other than textile fabrics; headgear of all materials

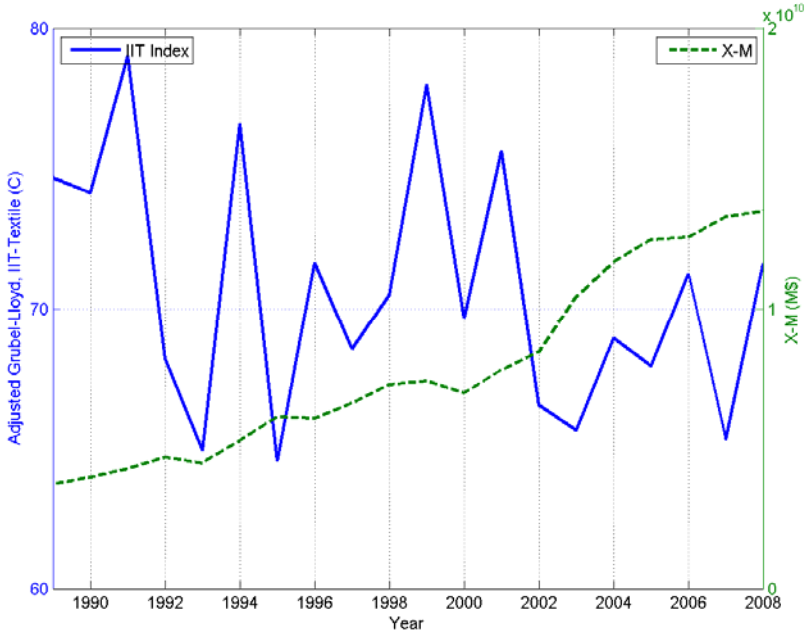
GL index has increased over time and it became maximum 28. We have reduced trade imbalance with the assistance of adjusted GL index. There is a great difference between two indexes in SITC 84. There has been trade surplus in this level since 1989. As depicted in Table 1 highest GL index is 67.9 in the SITC 843 group.

Figure 7: Grubel-Lloyd index in total TAC industry



Source: Own calculations based on TUIK database

Figure 8: Adjusted Grubel-Lloyd index in total TAC industry



Source: Own calculations based on TUIK database

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
261	23,2	21,7	26,9	80,4	0,9	41,0	7,2	16,9	5,0	1,0	11,7	17,5	0,9	0,7	20,8	10,6	16,8	14,4		0,2
263	77,0	83,7	59,0	48,5	78,5	38,1	22,2	72,1	27,5	28,6	51,9	19,2	27,7	26,3	37,9	27,7	20,6	26,4	24,3	31,2
264	2,3	2,1	0,0		0,1	0,7	2,0	21,6	19,1	55,7	1,0		86,9	38,4	49,9	29,0	66,4	5,7	80,0	87,0
265	19,8	1,4	1,1	1,1	0,6	1,4	0,6	20,3	29,5	9,3	13,4	5,9	4,3	10,5	45,6	5,2	3,6	4,7	9,2	22,9
266	72,0	76,7	92,4	61,6	36,1	96,2	92,2	83,9	72,1	79,7	85,8	70,6	88,5	67,7	77,9	94,3	94,4	98,8	95,3	90,9
267	2,2	2,0	1,4	1,8	1,6	1,8	2,6	1,6	1,3	2,2	1,4	4,8	5,7	3,8	2,0	1,8	1,9	2,6	1,7	4,3
268	29,1	7,1	16,6	5,5	3,5	19,0	6,7	13,6	23,0	18,6	20,7	16,2	25,1	27,4	23,3	33,0	26,3	23,8	28,1	28,3
269	6,9	1,3	3,1	9,6	8,7	6,8	6,9	14,9	7,1	3,6	2,1	3,7	3,4	6,1	10,3	9,6	14,4	26,3	41,0	29,8
651	56,8	79,2	75,8	90,4	81,3	86,3	80,9	82,0	90,9	95,5	92,5	98,4	89,6	82,0	77,9	83,2	79,5	80,1	63,9	70,7
652	30,3	57,3	51,9	52,3	77,7	66,7	91,6	86,4	87,5	82,3	80,2	85,2	85,1	89,7	87,4	91,6	92,4	97,5	94,2	89,4
653	30,8	67,3	80,4	78,6	87,1	81,3	87,2	96,2	99,7	98,9	91,1	87,8	75,5	83,3	75,9	78,8	71,6	70,3	70,3	63,3
654	70,7	77,0	85,0	94,6	86,8	96,1	96,3	70,9	68,7	72,1	84,6	88,0	82,7	73,4	68,0	57,7	62,1	63,2	70,1	73,4
655	14,3	24,2	24,7	43,0	69,8	78,4	86,3	90,1	74,3	71,1	50,6	58,6	47,4	56,0	58,3	57,5	46,0	38,2	36,2	34,9
656	23,7	70,1	60,0	68,3	57,7	41,6	45,0	62,4	60,3	56,0	35,5	39,2	27,6	33,9	35,1	32,9	36,5	48,7	49,3	52,4
657	48,3	76,5	94,1	97,2	91,5	85,9	85,4	83,5	90,0	74,7	74,3	81,0	90,0	83,5	83,4	87,6	83,9	89,8	86,6	84,2
658	1,6	3,7	2,4	5,4	5,8	3,9	6,3	7,8	6,4	5,2	4,9	4,9	4,9	3,9	4,2	4,8	6,3	8,4	10,8	11,6
659	1,4	6,5	5,1	4,4	5,0	3,9	6,3	25,5	27,9	27,5	28,8	35,3	32,9	33,7	31,3	36,2	35,6	36,9	50,3	47,8
841	0,3	0,5	2,1	1,7	3,0	2,1	2,1	6,7	6,9	7,7	6,9	8,3	8,7	8,8	11,0	15,7	16,4	20,9	26,5	35,9
842	0,1	0,5	1,2	1,5	1,9	1,7	1,7	5,8	7,1	7,4	5,5	6,2	5,5	6,1	8,6	10,1	12,8	17,9	21,3	31,5
843	0,6	0,9	1,1	1,2	1,9	0,7	0,9	4,5	4,8	4,8	5,3	7,4	5,8	3,2	5,7	6,7	6,8	8,9	10,8	17,0
844	0,1	0,4	0,4	0,4	0,4	0,3	0,3	2,2	2,7	3,2	3,3	4,5	2,7	3,3	3,2	6,3	5,2	6,7	8,6	12,8
845	0,2	1,1	1,6	1,3	1,6	0,9	1,2	4,0	6,5	4,9	5,1	7,4	5,9	5,5	6,5	8,6	9,8	13,7	17,8	24,2

846	7,8	8,9	6,8	8,0	11,3	6,9	6,3	12,8	14,3	14,1	11,5	12,6	10,8	9,7	10,9	14,2	13,9	18,4	21,6	27,5
848	0,3	0,9	1,2	1,6	3,0	2,7	3,0	14,1	13,0	18,3	18,3	17,5	19,9	20,5	22,2	31,5	42,2	52,5	57,7	67,9

Table 1: Grubell-Lloyd indices in SITC three-digit product groups in TAC industry

Source: Own calculations based on TUIK database

3.2 Marginal Intra Industry Trade Results

The data are supplied by the TUIK at the two digit level of the Standard International Trade Classification (SITC) in U.S. dollars. We calculate MIIT for three periods, 1989-1996, 1996-2001, 2001-2008. By this way we can see the influance of liberalization, European Customs Union and economic crisis on IIT. In 1989-1996 period 652, 653, 654, 655, 656, 657, 659 SITC product groups IIT index rates are between -50 and 50. In 1996-2001, 261, 265, 652, 848 SITC groups shows IIT nature. In 2001-2008, 264, 266, 652, 653, 654, 656, 657, 659, 841, 842 MIIT absolute values are low and in these sectors trade structure is in Intra Industry Trade type.

Table 2. MIIT in TAC industry

SITC Groups	1989-1996	1996-2001	2001-2008
Total	0,329991	0,986997	0,286607
261 Silk	0,592027	-0,27017	0,980456
263 Cotton	-0,89416	-1	-0,65429
264 Jute and other textile bast fibres, n.e.s., raw or processed but not spun; tow and waste of these fibres (including yarn waste and garnetted stock)	1	0,803507	0,126703
265 Vegetable textile fibres (other than cotton and jute), raw or processed but not spun; waste of these fibres	-0,7916	0,313635	1
266 Synthetic fibres suitable for spinning	-1	0,082113	-0,07928
267 Other man-made fibres suitable for spinning; waste of man-made fibres	-0,98915	1	-0,9626
268- Wool and other animal hair (including wool tops)	-1	1	-0,69064
269- Worn clothing and other worn textile articles; rags	0,811443	1	-1
652 Cotton fabrics, woven (not including narrow or special fabrics)	-0,06686	0,18882	0,073593
653 Fabrics, woven, of man-made textile materials (not including narrow or special fabrics)	-0,17407	1	0,449744
654 Other textile fabrics, woven	-0,38112	1	-0,32799
655 Knitted or crocheted fabrics (including tubular knit fabrics, n.e.s., pile fabrics and openwork fabrics), n.e.s.	-0,11236	1	0,688218
656 Tulles, lace, embroidery, ribbons, trimmings and other smallwares	0,31062	0,959052	0,208013
657 Special yarns, special textile fabrics and related products	-0,49056	1	-0,18723
658 Made-up articles, wholly or chiefly of textile materials, n.e.s.	0,890162	0,993653	0,82171
659 Floor coverings, etc.	0,512568	-1	0,484075
841 Men's or boys' coats, capes, jackets, suits, blazers, trousers, shorts, shirts, underwear, nightwear and similar articles of textile fabrics, not knitted or crocheted (other than those of subgroup 845.2)	0,874798	0,797671	0,48293
842 Women's or girls' coats, capes, jackets, suits, trousers, shorts, shirts, dresses and skirts, underwear, nightwear and similar articles of textile fabrics, not knitted or crocheted (other than those of subgroup 842.2)	0,89675	0,953786	0,452471
843 Men's or boys' coats, capes, jackets, suits, blazers, trousers, shorts, shirts, underwear, nightwear and similar articles of textile fabrics, knitted or crocheted (other than those of subgroup 845.2)	0,947418	-0,9891	0,764663
844 Women's or girls' coats, capes, jackets, suits, trousers, shorts, shirts, dresses and skirts, underwear, nightwear and similar articles of textile fabrics, knitted or crocheted (other than those of subgroup 845.2)	0,968482	-0,99483	0,802763
845 Articles of apparel, of textile fabrics, whether or not knitted or crocheted, n.e.s.	0,93674	0,800126	0,602251
846 Clothing accessories, of textile fabrics, whether or not knitted or crocheted (other than those for babies)	0,85517	0,973222	0,637731
848 Articles of apparel and clothing accessories of other than textile fabrics; headgear of all materials	-1	0,288508	-0,53286

Source: Own calculations based on TUIK database

4. Conclusions

TAC industry is very important for Turkey because industrialization began with this industry in Turkey. Between 1980 and 1990, TAC industry opened to the foreign markets. In 1990's TAC industry has made high export performance. The sector after 1995 European Customs Union agreement allowed free access to EU market. After the cancellation of the all restrictions with the Agreement on Textiles and Clothing in TAC products on January 1, 2005, China strengthened its position in the market. We can see the affects of China especially in raw materials, SITC 26. In conclusion of our analysis in TAC industry has a trade structure in accordance with intra-industry trade. MIIT is calculated for three periods, 1989-1996, 1996-2001, and 2001-2008. In 1989-1996 period 7 product groups; in 1996-2001 period, 2 product groups; 2001-2008 period 7 product groups shows IIT nature. In 1989-1996 period 14, 1996-2001 period 19, 2001-2008 period 16 product groups shows good export performance. 1996, joining European Customs Union and 2001, economic crisis increased intra industry trade.

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