

# An Analysis of Bilateral Trade between Iran and D-8 Countries

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## Abstract

This paper investigates intra-trade and welfare effects for Iran and D-8 countries preferential trade agreement by reviewing the possibility of comprehensive trade liberalization through expanding coverage of preferential tariff reduction. A quantitative analysis is applied for economic effects of a free trade arrangement between Iran and other contracting countries. An important objective of this research is to appraise evidence of significant gains in intra-trade and welfare amongst Iran and D-8 countries when tariff barriers and enhancement measures are dismantled. Therefore, this study uses indices in international trade as an input into the process of evidence-based policymaking in the area of trade policy for D-8 countries.

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*Index terms*— D-8 countries, Trade Liberalization, Preferential Trade Arrangement, Economic Integration.

## 1 INTRODUCTION

The Developing 8 (D-8) countries consists of Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan and Turkey. D-8 countries are an alliance of developing Muslim countries who are members of the Organization of Islamic Conference (OIC), which is established as an economic association. This group of countries was set up on June 15, 1997 after a declaration in Istanbul Turkey. The declaration included a plan to progressively diminish tariffs on particular goods between member-states, with supervision of the process by a supervisory committee. The purpose of this association of countries is a reduction of barriers to enable free trade between member countries, and to encourage inter-state cooperation. Despite the importance of D-8 countries, empirical literature analyzing D-8 member's countries trade with each other is limited. Thus, it is of interest to investigate trade among member countries exhaustively by reviewing trade relations and calculating trade indices such as Trade Intensity Index, Trade Complementarity Index, Trade Bias Index, Trade Creation and Diversion Index. Such indices can be used to give insights into the effects of regional trading arrangements among member countries. It can also explain as well as evaluate trade relationships and trade patterns of D-8 countries. Such indices can be used as D-8 countries monitors trade flows and trends among member countries.

In an economic integration study on the effects of trade flows, the methodology employed is a descriptive scheme. This method depends on a static frame work and the results are dependent on the level of aggregation. A study done by Drysdale and Garnaut (1982) initiated applying indices to analyze bilateral trade flows. This was followed by many other research studies whereby indices were applied to study bilateral trade patterns. For instance, Hill (1985) studies the pattern of international trade between Australia and the Philippines for two decades from the years 1962-1981 using three indices to analyze and clarify patterns, composition and trends. Similarly, Zhang (1997) examine the potency of trade relations between China and Japan during the years from 1965-1993 by employing three indices. Bano (2002) used Intensity indices to measure modification among New Zealand and its main trading partners' trade relationship for the years 1981-1999. In relation to other methods, Ng and Yeates (2003) applied Intensity index to analyze and measure East Asian intra-regional trade that explained Distance Adjusted Trade Intensity Index. Creamer (2003) measured open regionalism in Andean communities' effect on inter-region and intra-region trade for the years 1990-2000 by using a Trade Intensity Index. Furthermore, Trade Intensity Index is used by Bhattacharya and Bhattacharyay (2007) to evaluate the

45 trade potential between China and India. These studies used a variety of indicators to determine regional trade  
46 relationship between countries.

47 **2 II.**

48 **3 METHODOLOGY**

49 The composition of trade determines the degree of bilateral matching of commodities of an exporter with the  
50 demands of an importer. The gravity model does not explicitly show commodity matching of an importer and  
51 exporter. As an alternative, this paper applies Trade Intensity Index to explain commodity compositions' effects  
52 on bilateral trade. According to Rysdale (1967), by employing a decomposition method, this paper intends to  
53 demonstrate the quantity of effects on trade volume is caused by complementarity and country bias.

54 **4 a) Export Intensity Index**

55 Trade Intensity Index explains whether a county T be used as a uniform export share. The statistics are  
56 comparable across countries, and during the period of consideration are not influenced by any 'size' bias.  
57  $TI_{ij} = \frac{X_{ij}}{X_i} \cdot \frac{M_j}{M_w}$  (1)

58 Where  $X_{ij}$  : country i's export to country j  $X_i$  : country i's total export  $M_j$  : country j's total import  $M_w$   
59  $M_w$  : world's import  $M_i$  : country i's import Trade Intensity Index lies on the range 0 and +∞. Values more  
60 than 1 indicate an 'intense' in trade flows. b) Import Intensity Index Import Intensity Index explains whether  
61 a county imports more from a particular region compared to the world on average. Similar to Export Intensity  
62 Index, Import Intensity Index is interpreted by using the same approach by approximating standardized import  
63 share. The statistics are comparable across countries, and for the period of consideration are not influenced by  
64 any 'size' bias.  $II_{ij} = \frac{M_{ij}}{M_i} \cdot \frac{X_j}{X_w}$  (2)

65 Where  $M_{ij}$  : country i's import from country j  $M_i$  : country i's total import  $M_w$  : world's import  
66  $X_j$  : country j's total export  $X_w$  : world export  $X_i$  : country i's total export c) Trade  
67 Complimentarity Index

68 Trade Complimentarity Index evaluates the level of export patterns of one country matches the import pattern  
69 of another country. In other words, the Complimentarity Index measures the degree of overlap between the  
70 export profile of the source and the import profile of the destination. Trade Complimentarity Index is considered  
71 as overlap indices. High level of this index is implicit in a successful trade arrangement signifying favorable  
72 prospects. The index trend during the consideration period describes whether trade profiles are becoming more  
73 or less compatible. The Complimentarity Index is converted to percentage. This index gets a value between "0"  
74 and "100". A "100" value explains a "perfect overlap" and "0" values indicating "no overlap" in trade flows. i.

75 **5 Export Complimentarity Index**

76 This index evaluates the level of export pattern of one region (country) matches the import pattern of another  
77 region (country).  $XC_{ij} = \frac{X_{ij}}{X_i} \cdot \frac{M_j}{M_w}$  (3)

78  $XC_{ij}$  : Export complimentarity index country i to j  $X_{ik}$  : Exports of commodity k by i country  $X_i$  :  
79 total export of country i  $M_w$  : the total world's import flow  $M_i$  : country i's total import  $M_{wk}$  : Imports  
80 of commodity k by world  $M_{jk}$  : Imports of commodity k by j country  $M_{ik}$  : Imports of commodity k by i  
81 country  $M_j$  : country i's total import  
82 ii.

83 **6 Import Complimentarity Index**

84 This index evaluates the level of import patterns of one region matches the export pattern of another region.  
85  $MC_{ij} = \frac{M_{ij}}{M_i} \cdot \frac{X_j}{X_w}$  (4)

86  $MC_{ij}$  : Import complimentarity index country i from j  $X_{ik}$  : Exports of commodity k by j country  $X_i$  : total  
87 export of country i  $X_w$  : total world's export flow  $M_i$  : country i's total import  $X_{wk}$  : Exports of commodity  
88 k by world  $M_{ik}$  Imports of commodity k by i country  $X_{jk}$  : Total exports of commodity k by j country  $X_j$  :  
89 country i's total export d) Trade Bias Index

90 Trade Bias Index indicates the degree of resistance to i's trade with j relative to the average degree of resistance  
91 in i's other bilateral trading relationship.  $TBI_{ij} = \frac{XC_{ij}}{XC_{ik}}$  (5)

92 Where  $X_{ij}$  : Country i's export to j  $X_{ik}$  : Exports of commodity k by i country  $M_{jk}$  : Imports of commodity  
93 k by j country  $M_{wk}$  : Imports of commodity k by world  $M_{ik}$  : Imports of commodity k by i country When  
94 the Trade Bias Index is less than one, trade policies will provide incentives for import substitution. On the other  
95 hand, if B is greater than one, then trade policies will promote exports. For a special case of where the Trade Bias  
96 Index is equal to one, trade policies is said to be neutral and the economy operates at close to free trade. Jagdish  
97 Bhagwati (1993) If  $CIR > tIR$  : Trade diversion will be positive ( $TD > 0$ ). In this situation, trade creation and  
98 intra regional trade will increase.

99 But if  $CIR < tIR$  : Trade diversion will be negative ( $TD < 0$ ). Then intra regional trade declines and in this  
100 situation trade diversion will appear.

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## 7 III.

## 8 RESULT AND DISCUSSION

In this section, we attempt to measure the effects of regional trading arrangements among member countries by explaining and evaluating the state of trade relationship and trade patterns of D-8 countries and monitoring trade flows and trends or across member countries by applying trade indices.

Bilateral trade data, to calculate the TII, was gathered from IMF Trade Statistics, 2010, with trade intensity indices calculated for the years 1998-2008.

By using the equation (1) we try to assess the intensity of export among the economies of D-8 countries. The results are shown in the Table 1. For estimating of DT in four different conditions, by reducing 10 percent, 20 percent, 30 percent and 40 percent respectively, we use the following equations:  $1 = \frac{E_{ij}}{E_{i0}} \frac{E_{j0}}{E_{j1}}$  (8)  $2 = \frac{E_{ij}}{E_{i0}} \frac{E_{j0}}{E_{j2}}$  (9)  $3 = \frac{E_{ij}}{E_{i0}} \frac{E_{j0}}{E_{j3}}$  (10)  $4 = \frac{E_{ij}}{E_{i0}} \frac{E_{j0}}{E_{j4}}$  (11)

Trade creation index for Iran in period of 1998-2007 by considering four possibilities to be calculated and the result are shown in Table 6. The results show that there is an increasing common external tariff from 10 percent to 40 percent for the years 1998-2007 leading to a positive trade diversion (TD>0). Therefore, it is concluded that trade creation occurred. With a reduction of common external tariffs trade diversion that is negative, intra regional trade declines but external regional trade increased. With a 10 percent reduction of common external tariffs, it is observed in the period of study, trade diversion is negative and intra regional trade declined. But in the other three conditions of 20 percent, 30 percent and 40 percent reduction in common external tariffs, trade creation occurred and intra regional trade increased.

### 9 a) State Of Iran's Trade With Other D-8 Member Countries

The findings show that the index is greater than one, for Iran's export to Turkey and Pakistan therefore, this could be regarded as highly intense. It is correct to say that intensity has improved from the time the agreement was signed in 1997. Iran and Turkey's bilateral trade surged from year 2003 onwards but Export Intensity Index for Iran and Pakistan declined from year 2000 whereas the index increased for Pakistan's export to Iran. This means that Iran's tendency to import from Pakistan has increased.

The findings also show Iran's exports to Turkey and Pakistan is more than Iran's imports from the world. In other words, trade share between Iran and Turkey and Iran and Pakistan is more than their shares in world's trade. In contrast, the index was high even before the time the agreement was signed in 1997. This could be attributed to geographic proximity and relative isolation from other markets.

The index is shown to be lower than one, for Iran's export to other D-8 countries (Indonesia, Malaysia, Egypt, Nigeria and Bangladesh) indicating that the share of Iran's trade with these countries is less than a proportion of Iran's share of world trade. This implies Iran's export to other D-8 countries is low. Import Intensity Index indicates the share of Iran's imports from Turkey, Pakistan and Bangladesh is more than a percentage of their share of world trade. The index trends shows from year 2003, share of Iran's import from Turkey and Turkey's import from Iran is becoming higher. This further implies that the tendency of bi-lateral trade between the two countries has increased.

From year 2000, Import Intensity Index of Iran from Pakistan has risen, while Index decreased for import of Pakistan from Iran. This result shows that only Iran's tendency to import from Pakistan has increased.

Since the index is greater than one, for Iran's import from Bangladesh, this relationship could be considered as highly intense. But since year 2000, the trend is descending; reflecting a tendency of imports from Bangladesh to be declining. It should be noted Export Intensity Index for the two countries that is Iran and Bangladesh, is less than one, indicating that Iran's export to Bangladesh is not significant.

According to table 7, Import Intensity Index for Iran and other D-8 countries (Egypt, Indonesia, Malaysia and Nigeria) is less than one, emphasizing the share of Iran's import from these countries is less than a proportion of their share of world trade.

Comparing Indices Export Intensity Index and Export Complimentarity Index between Iran and Turkey shows a considerable difference that is; Export Complimentarity Index is less than Export Intensity Index. This means despite Iran and Turkey's export is more than a proportion of share of world trade, but the small difference of Trade Complimentarity Index explains export patterns of Iran do not match the import patterns of Turkey.

Furthermore, investigations in Export Intensity Index and Export Complimentarity Index trends for the years 1998-2006, shows Export Intensity Index trend is ascending but the Export Complimentarity Index trend is descending. In other words, in spite of the increasing tendencies of trade between Iran and Turkey, the export ebruary F An Analysis of Bilateral Trade between Iran and D-8 Countries pattern of Iran does not match the import patterns of Turkey.

By observing indices that is Export Intensity and Export Complimentarity Index between Iran and Pakistan shows a difference; but the difference of these two indices is smaller than for indices for Iran and Turkey. Therefore, Trade Complimentarity Index for Iran and Pakistan is higher than Iran and Turkey's. This implies export pattern of Iran matches the import pattern of Pakistan, in comparison to Turkey's.

## 10 CONCLUSION

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161 The Export Complimentarity Index for Iran and Indonesia is bigger than export intensity in the years 2000  
162 and 2006, indicating although the share of Iran and Indonesia's export is less than a proportion of their share of  
163 world trade, but the export pattern of Iran indicates a match to the import pattern of Indonesia. The Import  
164 Complimentarity Index between these countries also accepts this result. The results also indicate that the Trade  
165 Bias Index for Iran and Turkey for the 3 data points that was tested in this study is less than Trade Bias Index  
166 for Turkey and Iran. This means that Iran's access to Turkey's market is limited and Turkey gets an advantage  
167 of the bilateral trade partnerships and preferential facilities. Although, findings of this study show Turkey has  
168 more freedom to enter Iran's market. Trade Bias Index trend shows a downward decline before year 2000, but  
169 after this period the trend shows a pattern that is surging upwards. This would explain Iran's access to Turkey's  
170 market has become more restricted. The results show a similar issue occurring between Iran and Pakistan. Trade  
171 Bias Index for Iran and Pakistan is less than the Trade Bias Index for Pakistan and Iran. In other words, despite  
172 the liberal access by Pakistan to Iran's market, this is not reciprocal as Iran's access to Pakistan's market is quite  
173 limited.

174 IV.

## 175 10 CONCLUSION

176 In summary, the findings indicate that while D-8 countries intra-trade is expected to increase substantially, but  
177 not all countries will experience a welfare gain under a free trade arrangement. Likewise, impact on economic  
178 sectors differs substantially across countries.

179 The findings of this paper may serve as recommendations for policy makers to improve bilateral trade flows  
180 amongst D-8 countries, and signify the importance of trading partners. The purpose of this paper is to use indices  
181 in international trade as an input into the process of evidence-based policymaking in the area of trade policy for  
D-8 countries. <sup>1</sup>



1234

Figure 1: Figure 1 :FFigure 2 :Figure 3 :Figure 4 :

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(?? (7)  
 ????  
 ???  
 ????)  
 1+??  
 ????  
 R :

e) Trade Creation Index

Economist's who adhere to Jacob Viner's (1950) classic study, have argued that static and dynamic distortions are produced through preferential trade agreements (PTA's). Discussions on trade creation taking place when member countries substitute domestically less efficient producers with efficient, low-cost imports from member countries.

???? ?? 1+?? ??

(6)

Figure 2:

1

Year	Bangladesh	Egypt	Indonesia	Malaysia	Nigeria	Pakistan	Turkey
1998	0	0	0	0.65	0	2.99	4.58
1999	0	0	0	0.18	0	3.04	4.93
2000	0.48	0	0.49	0.27	0.01	6.38	3.19
2001	0.3	0.2	1.03	0.49	0.02	5.18	4.91
2002	0.27	0.19	0.46	0.35	0.05	3.88	3.96
2003	0.4	0.25	0.51	0.25	0.01	4.79	5.87
2004	0.27	0.27	0.27	0.47	0.01	2.93	3.93
2005	0.27	0.2	0.19	0.49	0.01	2.33	5.7
2006	0.47	0.27	0.21	0.78	0.01	2.7	7.44
2007	0.33	0.23	0.14	0.47	0.01	2.86	6.38
2008	0.36	0.23	0.18	0.58	0.01	2.63	6.51

Figure 3: Table 1 :

2

Year	Bangladesh	Egypt	Indonesia	Malaysia	Nigeria	Pakistan	Turkey
1998	0	0	0	0.5		0	0 3.83
1999	0	0	0	0.5		0	0 3.63
2000	2.2	1.24	1.01	0.53		0	1.91 3.55
2001	2.35	0.52	0.49	0.63		0	2.15 2.88
2002	1.95	0.71	0.49	0.55		0	1.92 2.64
2003	1.35	0.2	0.49	0.65		0	2.07 2.58
2004	1.18	0.22	0.5	0.62		0	1.71 2.92
2005	1.35	0.26	0.58	0.58		0	2.04 3.03
2006	0.87	0.19	0.44	0.55		0	2.4 2.53
2007	1.29	0.54	0.57	0.73		0	2.77 3.42
2008	1.19	0.33	0.53	0.62		0	2.52 3.16

We conducted our empirical investigation on Export and Import Complimentarity Index (equation 3 and 4) using annual bilateral manufacturers exports data from the U.N. Commodity Trade Statistics Database (COMTRADE) for Iran and the other developing eight countries at three data points, i.e. year 2000, year 2006 and year 2008. The estimation results are shown in Table 3 and Table 4.

It should be noted that we disaggregated individual trading products to 5 groups based on Standard International Trade Classification (SITC). Food products (codes number 22, 10), agriculture (code 2-codes number 27,22, 28), Ores and minerals (codes 28, 27, 68), Minerals (code 3) and manufactured goods (codes 5 to 8).

Figure 4: Table 2 :

3

Country	Bangladesh	Egypt	Indonesia	Iran	Malaysia	Nigeria	Pakistan	Turkey
Iran								
2000	0.719	0.891	1.507	0.558	0.219	3.212	1.391	
2006	0.916	1.169	1.594	0.698	0.708	1.674	0.407	
2008	0.846	1.207	1.576	0.653	0.474	2.330	1.152	

Figure 5: Table 3 :

4

Country	Bangladesh	Egypt	Indonesia	Iran	Malaysia	Nigeria	Pakistan	Turkey
Iran								
2000	0.964	1.208	0.79	0.91	0.797	0.908	0.834	
2006	0.207	0.198	0.183	0.204	0.156	0.224	0.117	
2008	0.462	0.521	0.165	0.621	0.403	0.573	0.472	

Figure 6: Table 4 :

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**5**

Country	Bangladesh	Egypt	Indonesia	Iran	Malaysia	Nigeria	Pakistan	Turkey
Iran								
2000	0.66	0	0.33		0.49	0.03	1.99	2.29
2006	0.52	0.23	0.13		1.12	0.1	1.61	18.28
2008	0.58	0.16	0.14		0.87	0.04	1.78	12.63

Figure 7: Table 5 :

**6**

Year	10%	20%	30%	40%
1998	11.3	22.6	33.9	45.2
1999	19.87	39.73	59.6	79.46
2000	22.53	45.06	67.6	90.13
2001	26.21	52.43	78.64	104.85
2002	37.35	74.7	112.05	149.4
2003	65.63	131.26	196.89	262.53
2004	89.14	178.29	267.43	356.58
2005	108.79	217.58	326.36	435.15
2006	148.47	296.65	445.15	593.51
2007	192.71	384.05	577.09	769.43

Figure 8: Table 6 :



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