Impact of Trade Agreements on Intra Industry Trade: A Case of Pakistan

Samreen Gillani*

University of Central Punjab, Pakistan

Abstract

The study investigates the effects of Preferential Trade Agreement on Intra Industry trade for over the period 1990-2015. This paper addresses and resolves econometric problems by employing proper specification of gravity model of trade with panel data, taking into account for self- selection. Results show that trade agreements of Pakistan increases its intra industry trade, although there are exceptions. The differences in performances may be related to the design and enforcement mechanism of trade agreements.

Keywords: Trade agreements • Intra industry trade • Gravity model

Introduction

Trade agreements have become a vital instrument in expanding a country's trade with other nation and, to improve trade policies of a country. From mid 90's to 2017 over 400 trade agreements have been enforced all over the world trade. Through these agreements, economies intensify their trade and investment relations. Classical economists assert that trade is a key for economies to unlock their growth and development potentials [1].

In the past, trade has been observed by economists only in inter industry (trade between different industries). Indeed, in 1979 Paul Krugman conceived a new theory, known as intra industry trade. Intra industry trade is a main component of monopolistic competition model. Monopolistic competition is a market with large number of firms, each one producing a differentiated good, within same industry, with freedom of entry and exit. According to this model, generally trade expands in similar (in terms of common language, common border, common taste, economic size etc) countries. With trade liberalization policy, intra industry trade is increased between even dis- similar countries. Intra industry trade is getting attention of researchers recently and it has become a crucial part of international trade. Due to intra industry trade, consumers are capable to satisfy their multiple demands at relatively lower prices and at the same time, help producers to achieve economies of scale and more profit. But these trade gains are confined in different tariff to non tariff trade barriers or simply trade cost. To minimize or remove these cost, trade agreements is an important policy instruments. Due to these agreements developing countries can also expand their trade in almost every sector. And this expansion of trade leads economies towards growth and development [2-4].

In 1958, European Economic Community (EEC) was the first formation to take place in order to enhance trade integration between members. Free trade agreements are now an essential part of regional integration. Trade agreements can be categorized according to the level of incorporation of member countries, such as Free Trade Agreement (FTA), Preferential Trade Agreement (PTA), Common Market (CM) and Custom Union (CU).

***Address for Correspondence:** Samreen Gillani, Associate Researcher, University of Central Punjab, Pakistan, Tel: +92 42 35880007; E-mail: samreengillani5@ gmail.com*

Every agreement has its own terms and conditions, depending on trade relations and trade structure of its partner countries [5,6].

Contribution of free trade agreements in intra industry trade of developing countries has a question mark. For example, Foster and Stehrer examine that under a large panel of countries, preferential trade agreements have significant impact on intra industry trade especially between the developed countries. Mohr examines that developing countries are positively affected by the increase in free trade agreements. On the other hand Macphee and Sattayanuwat conclude that free trade agreements have negative impact on developing countries due to existence of non tariff barriers. Another finding asserts that free trade agreements have different effects on different region, mostly for Middle East North Africa (MENA) countries. Many studies conclude that different regional and bilateral agreements between countries have significant positive impact on their intra-regional intra industry trade i.e., ASEAN, SAARC, NAFTA, Indo-Lanka and ANZCERTA [7-15].

Pakistan is going through relatively weak and unstable economic conditions from years. Despite of this Pakistan is a member of 18 trade and investment agreements, in which 10 are in force and remaining are at negotiation stage. Out of these, 6 agreements are bilateral (with Sri Lanka, China, Indonesia, Malaysia, Mauritius) and 4 are regional (SAFTA, PTAR, ECOTA, MERCOSUR). In 2017 Pakistan has also become a part of Shanghai Cooperation Organization (SCO). The effects of these agreements have mostly been analyzed on trade flows but merely on intra industry trade in case of Pakistan. A few studies among these analyze trade agreements of Pakistan. Akhter and Ghani examine only South Asian regional integration and its effects on Pakistan's aggregate trade flows (and not intra industry trade) whereas Akram and Mahmood analyze only determinants of intra industry trade among SAARC countries. Few studies examine preferential trade agreements and their effects on intra industry trade but not in case of Pakistan Menon and Dixon). Current study fills this literature gap by including Pakistan's significant trade agreements and their effect on intra industry trade rather than trade flows with its member countries. Therefore the main purpose of this paper is to analyze the impact of Pakistan's trade agreements on its intra industry trade. Rest of the paper is structured into 3 sections. Section 2 presents the suitable methodology and data for empirical estimations. Section 3 reports results and discussion. Section 4 draws conclusions and policy recommendations from estimated results [7,10,16,17].

Methodology and Data

Current study employs gravity model, typically used for assessment of preferential trade agreements in measuring trade flows. Country-pair fixed effects is employed for take into account self selection a source of

endogeneity. Following Anderson and van Wincoop, study also incorporates multilateral price resistance terms in trade equation by employing country pair fixed effects as well as country and time fixed effects in panel data. Fixed effects control omitted variables bias. Basically it captures time invariant unobservable factors on trade flows. Fixed effects are a better methodology than instrumental variable, applied in order to remove the biasness of results, associated with endogeneity. Further time fixed effects are employed to capture the trend [18-21].

CGLI (Computed Grubel and Lloyd Index) is used, as dependent variable to measure the intensity of IIT. Due to the differences in motivation in signing bilateral and regional agreements, we incorporated regional and bilateral agreement trade policy variables. The study uses Trade agreement "TA" as main independent dummy variable. Many studies have used these dummies while studying the impact of economic integration on trade flows as well as on intra industry trade. This paper uses gravity co-variates such as GDP and distance along with different control variables as contiguity, common colony, and common language in gravity model of trade as independent variables. The following econometric models are used to analyze the impact of regional and bilateral trade agreements on intra industry trade [3,9,11,17,22-24].

$$CGLI_{ijt} = \alpha + \beta_1 \ln PRDGDP_{ijt} + \beta_2 l \left(Dist_{ij} \right) + \beta_3 Contig_{ij} + \beta_4 Comlang_{ij} +$$
$$\beta_5 Comcol_{ij} + \beta_6 SAFTA_{ijt} + \beta_7 PTAR_{ijt} + \beta_8 ECOTA_{ijt} + \beta_9 PakChn_{ijt} + \beta_{10} PakIdn_{ijt} +$$
$$\beta_{11} PakMly_{ijt} + \beta_{12} PakSlk_{ijt} + \beta_{13} PakMus_{ijt} + \beta_{14} PakUS_{ijt} +_{ij} \varnothing_t + \mu_{ijt} \tag{1}$$

Further the model also employs country and time fixed effects as:

$$CGLI_{ijt} = \alpha + \beta_1 \ln PRDGDP_{ijt} + \beta_2 \ln Dist_{ij} + \beta_3 Contig_{ij} + \beta_4 Comlang_{ij} +$$
$$\beta_5 Comcol_{ij} + \beta_6 SAFTA_{ijt} + \beta_7 PTAR_{ijt} + \beta_8 ECOTA_{ijt} + \beta_9 PakChn_{ijt} + \beta_{10} PakIdn_{ijt} +$$
$$\beta_{11} PakMlt_{ijt} + \beta_{12} PakSlk_{ijt} + \beta_{13} PakMus_{ijt} + \beta_{14} PakUS_{ijt} + \delta_i + \delta_j + \theta_t + \mu_{ijt} \tag{2}$$

Brief introduction of variables are stated below.

CGLI=intra industry trade index, α= constant PRDGDP=Product of GDPs of exporter and importer country (aggregate GDP of countries). It is positively related to trade [25].

Dist=Weighted distance in miles between countries. More distance means less trade because it increase different costs associated with trade [26].

Contig, Comcol, Comlng=1 if common between two countries or 0 if not TRDAGR, SAFTA, PTAR, ECOTA=Dummies, 1 if agreement is formed or 0 if not

PakChn, PakIdn, PakMly, PakSlk, PakMus, PakUS=Dummies for bilateral trade agreement between Pakistan and its different partner countries.

γ=Country pair fixed effects, δ=Country fixed effects, θ and ϕ are the time fixed effects.

μ=error term. Where subscripts of variables show: i=exporter country, j=importer country, t=time.

Data

The panel dataset is arranged by country-pair and year for the period 1990 to 2015. Data to be used is undirected dyadic for intra industry trade, obtained from UN COMTrade Database at1- digit level for SITC-0 to SITC-9.4 Following Grubel and Lloyd index (CGLI, ranges 0 to 1) is used to compute the values of intra industry trade. Adjusted index is used to deal with trade imbalances.

$$CGLI_{ijt} = \frac{2 \times min \exp orts_{ij} [imports_{ijkt}]}{\exp orts_{kijkt} + imports_{kijkt} - \exp orts_{kijkt} - imports_{kijkt}}$$

Where exports=total exports, Imports=total imports, i=exporter country, j=importer country And k=number of industries (o......9), t=year.

Results of Country-Pair Fixed Effects Gravity Model

Table 1 shows the estimations, controlling for bilateral (country pair) fixed effects and time fixed effects. This is done to account self-selection as mentioned earlier. In column (1) the coefficients of trade agreement show negative sign but however, insignificant. SAFTA, PTAR and ECOTA have positive but insignificant coefficients. A possible analysis of these results may be that, in SAFTA, Pakistan and India are two largest economies, are least integrated due to the differences in their religious, cultural, military and political structure, which may attract trade. The border disputes always result in excessive regulations which create hurdles in implementation of economic integration, it should be resolved with positive vision and strategies. According to the Ramay and Abbas all big countries in South Asian region are taking more interest in trade with other big or developed countries than trade with their border-sharing countries especially, in SAPTA and SAFTA. Agreements of PTAR and ECOTA are quite recent as the Central Asian countries are not much integrated economically. The coefficient of Pak-China agreement indicates that, this agreement has significantly increased intra industry trade between them. The coefficient sign of Pak-China shows that intra industry trade between the two has increased by 53% at 5% level of significance. The coefficient of Pak-Mauritius agreement is negative but highly significant at 1% level. The negative sign of coefficient can be interpreted that trade structure between Pakistan and Mauritius is inter industry and not intra industry and the share of inter industry trade is 53%. It suggests that trade potential exists between Pakistan and Mauritius but it needs attention on giving rise to intra industry trade. Column (2) shows results of only regional agreements, which are

Table 1. Results for Country-pair fixed effects gravity model.

Dependent Variable; CGLI	(1)	(2)	(3)	(4)
Trade agreements	-0.13	-0.07	-0.07	-0.09
	-0.15	-0.11	-0.09	-0.08
SAFTA	0.05	-0.01		
	-0.21	-0.18		
PTAR	0.1	0.1		
	-0.1	-0.14		
ECOTA	0.12	0.06		
	-0.2	-0.17		
Pak-China	0.43**		0.34***	0.36***
	-0.2		-0.08	-0.07
Pak-Indonesia	0.18		0.18**	0.20**
	-0.16		-0.08	-0.08
Pak-Malaysia	0.14		0.11	0.14*
	-0.18		-0.08	-0.08
Pak-Mauritius	-0.43**		-0.52***	
	-0.19		-0.07	
Pak-Sri Lanka	0.01		-0.03	-0.01
	-0.13		-0.07	-0.07
Pak-US	0.16		0.08	
	-0.19		-0.07	
PRDGDP (logged)	0	0.01	0	0.01
	-0.02	-0.03	-0.03	-0.03
Constant	-0.18	-0.19	-0.16	-0.17
	0.61	0.35	0.6	0.47
	-0.53	-0.62	-0.55	-0.54
Observations	524	524	524	524
R-squared	0.114	0.059	0.11	0.074
Number of pair	22	22	22	22

Standard errors are in parentheses. ***, **, * show levels of significance at 1%, 5% and 10% respectively. The variables of contiguity, common language, common colony and distance were included in estimation but omitted due to collinearity. Time dummies are included in all estimation but not reported.

consistent with the column (1), that regional agreements are statistically insignificant [27,28].

Estimation (3) presents the results for only bilateral agreements. Again, signs of coefficient are consistent with column (1). But now the coefficient of Pak-Indonesia agreement has become positive with 5% level of significance. It indicates that intra industry trade between Pak-Indonesia has increased significantly to 19%. The share of intra industry trade in case of Pak-China agreement has decreased from 53% to 43%. But in case of Pak-Mauritius the share of inter industry trade has increased from 53% to 68%.The last column has estimated only Asian bilateral agreements which include China, Indonesia, Malaysia and Sri Lanka. Results are consistent with column (3) but now Pak-Malaysia agreement has also become positive and significant at 5% level. It indicates that intra industry trade between these two is increased by 15%. The share of intra industry trade between Pakistan and Indonesia is increased from 19% to 22%. From the results of trade agreements it is evident that Pak-China agreement promotes IIT of Pakistan which is quite reliable because of their friendly relations since 70 years. Keeping this in mind we summarize that political relations do matter in boosting up countries IIT. Aggarwal and Urata argue that large benefits of trade agreements, demand more political efforts. But in case of Pakistan and India, in SAFTA, symmetrically political will are not there. Pak-Mauritius agreement encourage inter and not intra industry trade. It seems that trade potential exists between these two countries however; steps should be taken in order to encourage intra industry trade as well. Financial sector of Pakistan is establishing in Mauritius which is a good sign for facilitating trade also. It is also marked from results that with the segregation of regional agreements, results of bilateral become more considerable as Pak-Indonesia agreement has also promoted trade towards intra industry [4,29-31].

Results of Country and Time Fixed Effects Gravity Model

Results of gravity model with country and time fixed effects have reported in Table 2. Results are to some extent dissimilar with Table 1 regarding magnitudes and significance level. In column (1) the coefficient signs of regional agreement are insignificant to explain the trade structure. The coefficient sign of Pak-China agreement has positive and significant impact on intra industry trade at 1%. Pak-Mauritius agreement is negative but significant at 1% level, encourages inter industry trade not intra industry trade as examined in Table 1. The share of intra industry trade for Pak-China has decreased from 53% to 44%, from column (1) to column (4). The share of inter industry trade for Pak-Mauritius agreement is increased from 66% to 75%. Coefficients of Pak-Indonesia agreement and Pak-Malaysia agreements have become insignificant in column (2) and column (3) respectively. It suggests that controlling for the country specificity; trade agreements expose some different impacts on trade structure between partners. Difference in results can be ascribed to control variables, omitted in fixed effects model But, affecting country and time fixed effect model like common colony (col. 1 and 2) and common language (col. 3).

Robust Analysis

Year effects

Table 3 reports the results for trade agreements from, 2000 to 2010. The reason for choosing this sample period is that after 2000, consistent with the other countries of the world, Pakistan has signed most of its trade agreements however, results are contradicted from basic estimations. Results of column (1) suggest that regional and bilateral agreements look unimportant to determine the trade structure between countries except Pak-China agreement, which is positive and significant at 5% level. The coefficient of Pak-China agreement shows that intra industry trade increased by 36% over the sample period. Results of estimation (2) are consistent with estimation (1).

Table 2. Results of Country and time fixed effects gravity model.

Dependent Variable; CGLI	Country-pair fixed effects	Country and time fixed effects
	(1)	**(2)**
Trade agreements	-0.12	-0.12
	(0.16)	(0.17)
SAFTA	0.08	0.08
	-0.21	-0.22
ECOTA	0.05	0.05
	-0.06	-0.06
Pak-China	0.31**	0.31**
	-0.14	-0.15
Pak-Malaysia	0.22	0.22
	-0.16	-0.17
Pak-Mauritius	-0.01	-0.01
	-0.17	-0.18
Pak-Sri-Lanka	0.04	0.04
	-0.12	-0.12
Pak-US	0.14	0.14
	(0.20)	(0.21)
Contiguity		0.18*
		-0.1
Common language		-0.38
		-0.31
Common colony		0.02
		-0.46
Distance (logged)		0.17
		-0.38
PRGDP (logged)	-0.06	-0.06
	-0.12	-0.12
Constant	2.01	0.68
	-2.49	-0.88
Observations	241	241
R-squared	0.072	0.46
Number of pair	22	22

Standard errors are in parentheses. ***, **, * show levels of significance at 1%, 5% and 10% respectively. Pak-Indonesia and PTAR are omitted due to collinearity, because Pak-Indonesia is in forced, in 2013 and PTAR is in forced, in 2011 and our years are for the period 2000-2010. Time and country dummies are included in estimation but not reported.

Lagged effects

Table 3 shows the results of lagged effects. The date of signing agreement and its full implementation is generally not the same and takes some time. Vicard argue that, generally trade agreements take 5 to 10 years for its full implementation. Due to this, the lagged effects should be analyzed. Therefore, we take five years lag of variables representing the trade agreements. Both columns show insignificant impact of regional and bilateral agreements on intra industry trade. It suggests that lagged trade agreements are not strong enough to show their significant impact on IIT of Pakistan [32-35].

Conclusion

Since years, free trade agreements are formed usually between the industrial economies which are closer in terms of economic size, physical distance, accessibility of resources and technology. But with the trade liberalization, emerging countries are also becoming a member of these agreements.

This study analyzes the impact of trade agreements on intra industry

Table 3. Robustness test: Between 2000-2010.

	Dependent Variable; CGLI (1) (2) (3) (4)			
Trade agreements	-0.09	-0.07	-0.05	-0.09
	-0.11	-0.07	-0.06	-0.06
SAFTA	-0.01	-0.01		
	-0.13	-0.07		
PTAR	0.08	0.1		
	-0.09	-0.07		
ECOTA	0.12	0.07		
	-0.12	-0.08		
Pak-China	0.43***		0.36***	0.37***
	-0.16		-0.12	-0.13
Pak-Indonesia	0.15		0.17	0.2
	-0.19		-0.18	-0.18
Pakistan-Malaysia	0.09		0.08	0.13
	-0.16		-0.13	-0.13
Pak-Mauritius	-0.51***		-0.56***	
	-0.17		-0.13	
Pak-Sri Lanka	0.01		-0.05	-0.01
	-0.13		-0.12	-0.12
Pak-US	0.06		0.02	
	-0.17		-0.13	
Contiguity	0.07	0.04	0.1	0.09
	-0.13	-0.13	-0.13	-0.13
Common language	-0.76	-0.19	-0.73*	-0.41
	-0.46	-0.44	-0.44	-0.44
Common colony	0.62**	0.29	0.55*	0.35
	-0.29	-0.29	-0.28	-0.28
Distance (logged)	0.1	-0.13	0.09	-0.03
	-0.19	-0.18	-0.18	-0.18
PRDGDP (logged)	-0.08	0	-0.06	-0.01
	-0.06	-0.05	-0.05	-0.05
Constant	1.46*	1.62**	1.09	1.08
Observations	524	524	524	524
R-squared Number of pairs	0.343	0.299	0.338	0.31
	22	22	22	22

Standard errors are in parentheses. ***, **, * show levels of significance at 1%, 5% and 10% respectively. The variables of contiguity, common language, common colony and distance were included in estimation are omitted due to collinearity. Time dummies are included in all estimation but not reported

trade (IIT) of Pakistan. By using country-pair fixed effects and country and time fixed effects, for taking into account self- selection, overall results recommend that free trade agreements are contributing in expansion of IIT of Pakistan. Among Asian agreements, three agreements out of four are promoting IIT, which are Pak-Malaysia, Pak-China and Pak-Indonesia agreement.

Insignificant results of trade agreements suggest that there is need for renegotiation and political will. Results also suggest that there is a need to analyze the specific provisions, negotiated in trade agreements. Pakistan and other developing countries can boost up intra industry trade to its potential level with better trade policies, improved infrastructure, and removal of non-tariff barriers, improved conditions of law and order and renegotiations on trade agreements. Countries should take into above elements seriously as much as accounting for tariff barriers. As long as infrastructure is concerned, China-Pakistan Economic Corridor (CPEC) is a great step to promote trade and investment opportunities between these two countries. This signifies that the trade agreement between China-Pakistan could be strengthen by incorporating the provision related to investment.

Despite of using country-pair fixed effects methodology to account for self-selection, results of current study may still suffer from problem of endogeneity. Also some data for export and import values are missed

regarding countries and industries. The present study has taken only 1-digit level product to analyze intra industry trade in Pakistan. However it can be analyzed on more disaggregated data. Future research should take into account these dimensions. The study shows a general picture of free trade agreements which will be helpful in analyzing their trade impact in case of Pakistan. There is need to examine whether there is proper implementation of trade agreements concluded by Pakistan?

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