

Exploring Recent Developments in Determinants of Intra Industry Trade in Pakistan: A Case Study of Pakistan

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Abstract

The present study explores the key determinants of intra industry trade in Pakistan by collecting time series data from 1972 to 2014. By utilizing log – log form of the model, the ARDL bound testing approach finalizes long run relationship among all the variables. The long run results reveals that roads, vehicles, gross capital formation, national saving, exchange rate and tax revenue are positively associated with Intra Industry Trade of Pakistan while broad money is negatively related with Intra Industry trade.

Keywords: Roads, Vehicles, Gross Capital Formation, Broad Money, National Saving, Exchange Rate, Tax Revenue, Intra Industry Trade

1. Introduction

Technological progress and structural transformation have changed production and consumption in the world that has been a significant cause of trade expansion between industrialized countries and it basically evolved a new idea of Intra Industry Trade. Intra Industry Trade is referred to as trade among differentiated goods and services in the world which are closely substitutable among each other (Grubel and Lloyd, 1975). Many theoretical and empirical researchers have focused on the issue of Intra Industry Trade that has raised its importance in international trade theories.

Intra Industry trade has various determinants which may be divided into two categories. First, country specific determinants which are related to trading partners and second are industry specific determinants which are related to products. In Intra Industry Trade, a country can trade with other nations among the goods and services in which nations do not have any comparative advantage. H – O – S theory also explains the concept of Intra Industry Trade. There is found inconsistency between Intra Industry Trade and H – O – S theory according to Lipsey (1976) and Pomfret (1979). If one of the basic assumptions are relaxed, Intra Industry trade may be explained in context with H – O – S theory [Balassa (1979), Grubel and Lloyd (1975), and Krugman (1981)]. This assumption is the linear homogeneous production function of the first degree, i.e., constant returns to scale. If the assumption of constant returns to scale is relaxed, the inconsistency between real world and basic H – O – S theory may be ignored [Grubel (1981)].

Davis (1995) and Bernhofen (1999) attempted to reconcile Intra Industry Trade with theory of comparative advantage. Davis (1995) has demonstrated that IIT could also be explained in the context of the H-O-S theory or Heckscher-Ohlin-Ricardian (H-O-R) theory of constant return to scale and perfect competition. Krugman (1981) gave an idea of new trade theories which introduced monopolistic competition with product differentiation and economies of scale as contributor of Intra Industry Trade. Helpman (1984) and Markusen and Venables (1998, 2000) introduced new trade theories which included foreign direct investment in insurance services having positive relationship between Intra Industry trade and foreign direct investment. Intra Industry Trade was affected by economies of scale and product differentiation. This idea is provided by Hughes (1993), Lee and Lee (1993), Cooper et al. (1993), Greenaway et al. (1994), and Bernhofen (1999) but they did not take into account the significant role of FDI in generating Intra Industry Trade. The studies conducted in 1980s and 1990s did not utilize foreign direct investment as a key factor of Intra industry trade. Many other studies also did not consider trade intensity as a major contributor of Intra Industry trade among countries.

Intra Industry trade has much increased in European countries as indicated in previous literature. Previously, many studies are conducted keeping the objective to find out country specific determinants of intra industry trade. These determinants are income levels, endowments, economic dimension and foreign direct investment. There are three issues discussed in a research related to Intra Industry Trade. First, many researchers

focused on to conclude intra industry trade as real phenomenon [Grubel and Lloyd, 1975; Hesse, 1974; Aquino, 1978]. Secondly, various economists refined Intra Industry Trade theory [Balassa, 1967; Grubel, 1970; Gray, 1973; 1978; Grubel and Lloyd, 1975; Krugman, 1978]. Third, several researchers just empirically analyze the theories of Intra Industry Trade [Gregory and Tearle, 1973; Pagoulatos and Sorensen, 1975; Finger and DeRosa, 1979].

The concept of globalization has emerged the many new cheap methods of production through reliable transportation and communication tools. Due to globalization, it is very easy to outsource the production of goods and services towards efficient and cheap countries to have more comparative advantage. There may be vertical as well as horizontal differentiation among goods and services. Horizontal differentiation is referred to exchange of different varieties of goods of same nature like automobiles of similar class and price range as they may be perfect substitute to each other. Vertical differentiation is referred to dealing in similar kinds of goods of different qualities like Suzuki, Honda, Toyota, BMW cards. They may not be the perfect substitutes for each other.

The current study is having new dimension of research in itself. The present study investigates the determinants of intra industry trade in Pakistan by considering important variables relating to infrastructure like roads and vehicles. This study also considers few macroeconomic variables such as gross capital formation, broad money, national saving, exchange rate and tax revenues. Apart from introduction in first section, second section provides summary about few previous studies. Data and methodology are elaborated in section three. Forth section discusses results in detail and conclusion is given in fifth section.

2. Literature Review

A number of researchers conducted studies to consider the determinants of intra industry trade. This section discusses reviews from national studies and international studies.

Aturupane et al. (1997) investigated the determinants of intra industry trade. In this study the cross sectional data was used from 1990 -95 and the study used non linear least square method for estimation of results. Labor, foreign direct investment, minimum efficient scale and product differentiation were positively associated with intra industry trade. Trade imbalance, geographical area, market concentration ratio were negatively associated with intra industry trade.

Ekanayake and ledgerwood (2008) examined the U.S intra industry trade with Caribbean countries. The study put special focus on vertical and horizontal intra industry trade in United States with Caribbean countries. In this study, time series data for sixteen years was used and intra industry trade was measured through Grubel-Lloyd (G-L) index. The variables such as per capita income, Trade orientation, trade intensity, product quality were positive and statistically significant with intra industry trade. Difference in per capita income, trade imbalance and industry concentration were negatively related to intra industry trade.

Faustion and leitao (2007) examined the country specific determinants of intra industry trade in Portugal. The study used the unbalance panel data for the period 1995 – 2003. The study discussed the country-specific determinants and industry specific determinants. Difference in per capita income, energy use, school enrolment had positive effect on intra industry trade. The variables like electric power consumption, minimum GDP and maximum GDP were negatively associated with intra industry trade.

Hartman et al. (1993) analyzed a cross sectional analysis of intra industry trade in the U.S. processed food and beverage sectors. The results were estimated by ordinary least square (OLS). Intra industry trade was positively influenced by product differentiation and economies of scope. Intra industry trade was negatively affected by with industry concentration.

Havrylyshyn and Kunzel (1997) examined the intra industry trade of Arab countries that is an indicator of potential competitiveness. The objective of the study was to analyze that how much specialized is the Arab economies relative to other counties. The study concluded that per capita income, export concentration and trade orientation had positive impact on intra industry trade. Trade imbalance had negative impact on intra industry trade.

Sharma (1999) examined the pattern and determinants of intra industry trade in Australia manufacturing industry. The study used the logistic regression for estimation of results. Product differentiation, economics of scale, research and development intensity and close economic integration were positively correlated with intra industry trade. Foreign direct investment and effective rate of assistance were negatively related with intra industry trade.

Clark and Stanley (1999) analyzed the determinants of intra industry trade between developing countries and United States. The researcher used panel data technique to analyze the determinants of intra industry trade between developing countries and the United States. Intra industry trade was positively affected by size of trading partner, advertising intensity, trade orientation, minimum efficient scale, establishment and advertising to scale ratio. Intra industry trade negatively influenced trade imbalance, sector dispersion index and capital to labor ratio.

Li et al. (2003) finalized the determinants of intra industry trade in insurance services. The investigator used cross sectional data to examine the determinants of intra industry trade in insurance services. It was suggested

that intra industry trade positively affected trade intensity, foreign direct investment and market concentration. On the other hand, Intra industry trade turned out to be negative factor for per capita income, trade imbalance, financial market size, services flow and market openness.

Clark and Stanley (2003) explored the determinants of intra industry trade between the United States and industrialized nations. The study used limited dependent variable technique to investigate determinants of intra industry trade through the cross section data. Differences in skilled workers and land – labor endowment nation had significant negative impact on intra industry trade. Capital – labor endowment ratio had significant positive impact on intra industry trade.

Turkcan (2005) analyzed the determinants of intra industry trade in final and intermediate goods between Turkey and selected organization for economic cooperation and development (OECD) countries. In this study, the panel data was used by applying panel regression methods. Plant size, manufactured goods, market size and average GDP were positively related with share of intra industry trade. Difference of per capita GDP and difference in capital to labor ratio were negatively related with share of intra industry trade.

Kocyigit and Sen (2000) examined the extent of intra industry trade between Turkey and the European Union. The data was taken from different websites for the period of 1970 – 2004. In this study, different measurement indexes were used to find out degree of intra industry trade, like the Gruble and Lloyd, the Aquino index, the Balassa index and the Bergstrand method. The results showed higher intra industry trade may be achieved by lowering barriers on trade.

Katrakilidis and Mardas (2010) investigated the intra industry trade in agricultural products on intra European countries level. The objective of the study was to examine the main determinants of intra industry trade in agricultural products. The time series data was used for the period of 1973 – 2005 by using autoregressive and distributed lag model technique. In the context of the price support mechanism and the structural reforms policy of the common agricultural policy, it had an inverse effect on Intra Industry trade to due to structural reforms policy.

Leitao (2011) investigated the intra industry trade in Tourism services. In this study, the researcher analyzed flow of tourism by taking into consideration the indicators of international trade including intra industry trade. The data was taken from the bank of Portugal. The study concluded that per capita gross domestic product and trade orientation had positive impact on intra industry trade.

Turkcan and Ates (2010) explored the structure and determinants of intra industry trade in the U.S. auto industry. The study used four alternative estimation methods and data was collected over the period from 1989 to 2006. Market size, FDI exchange rate and difference of per capita income were positively associated with intra industry trade. Geographical distance, different market size and weighted distance showed negative impact on intra industry trade.

Loertscher and wolter (1980) analyzed the determinants of intra industry trade among countries and across industries. The research focused on three issues. First, it tried to explain difference in intra industry trade intensity among countries and across industries. Secondly, it introduced determinants to examine and thirdly it was based on a sample of bilateral trade. It was analyzed that development level, market size and barriers of trade had positive impact on intra industry trade. Product differentiation and transactional cost had negative impact on intra industry trade.

Leitao and Shahbaz (2012) analyzed the trade liberalization in United States intra industry trade. The study used dynamic panel data. The study examined country level determinants of intra industry trade in U.S trade. It was analyzed that gross domestic product, economic dimension and foreign direct investment were positive related with intra industry trade. Difference in per capita GDP and maximum GDP were negatively associated with intra industry trade.

Sotomayor (2012) explored the patterns and determinants of intra industry trade for the Mexican non-Maquiladora manufacturing industry. The study used generalized linear regression model (GLM) for estimation of results. It was examined that difference in the market size, difference in per capita income, difference in factor endowment, economics of scale, technology intensity and presence of foreign capital were positively linked with intra industry trade. Differentiation of the product and intensity of human capital were negatively associated with intra industry trade.

Akram (2013) investigated the country specific and industry specific determinants of intra industry trade between Pakistan and other south Asian association for regional cooperation (SAARC) countries. This study used panel data for estimation of results. The study found that country specific variables were more important in explaining intra industry trade relative to industry specific variables.

3. Data and Methodology

This section is the most important among all other sections. It discusses the data description (data type, data range, data source), model specification, definition of variables (definition and hypothesis with justification), and methodological discussion.

3.1. Data Description

The present study utilizes time series data over the period from 1972 to 2014 in case of Pakistan. Data is collected from official sources of Pakistan like Economic survey of Pakistan (2014 – 15), Handbook of Statistics on Pakistan economy 2010, 50 years of Pakistan in Statistics (1947 – 1997) and World Development Indicators. Intra Industry Trade is trade index, roads are measured in kilometers, vehicles are measured in numbers, gross capital formation, broad money, tax revenues, and national savings are measured in Pakistani rupees while exchange rate is Pakistani rupees per dollar. The study uses log – log form of the equation for estimation of elasticities.

3.2. Model Specification

The present study is aimed at determining the determinants of intra industry trade in Pakistan. So the study specifies following model considering some variables;

$$LIIT = B_0 + B_1LROAD + B_2LVEH + B_3LGCF + B_4LBM + B_5LNS + B_6LEXR + B_7LTR + u_i$$

Where,

LIIT	=	log of intra industry trade
LROAD	=	log of Road
LVEH	=	log of vehicle
LGCF	=	log of Real gross capital formation
LBM	=	log of Broad money
LNS	=	log of National saving
LEXR	=	log of Exchange rate
LTR	=	log of Tax revenue

In the above equation, B_0 is intercept B 's are elasticities of Intra Industry Trade with respect to each explanatory variables and u_i is error term.

3.3. Definition of variables

3.3.1 Intra industry trade

The simultaneous export and import of a product within country or a particular industry or a country called intra industry trade. The level of intra industry trade can be measured by the intra industry trade index (T).

$$IIT = 1 - \frac{|X - M|}{(X + M)}$$

In the formula, X denotes export and M shows the value of import. If IIT value is equal to 0, it means that the country only export or import the commodity but if IIT value is equal to 1, it means that country at a same time export as well as import the commodity.

3.3.2 Broad money

Broad money is referred to the money supply. The expected relationship between broad money and intra industry trade is negative. The reason may be that if money supply is increased by state bank then price of goods and services also increases. Higher prices of goods and services may have negative influence on trade of goods and services.

3.3.3 Exchange rate

Exchange rate is price of one country's currency in terms of another country's currency. The expected relationship between exchange rate and intra industry trade is positive. It may be justified as depreciation of currency increases the demand of goods and services by the foreign buyers.

3.3.4 Gross capital formation

Gross capital formation means investment on the production of goods and services. It also tells about the net increase in physical assets. It is expected to be positively related with intra industry trade. The reason may be that higher domestic investment increases the process of industrialization. More industries may be a significant cause of expanded production of goods and services in Pakistan. This investment may be done on production of differentiated goods and services that would be demanded by foreign buyers leading to higher Intra Industry trade.

3.3.5 National saving

National saving includes domestic as well as public savings. Higher saving ultimately means that higher investment in the economy. The expected relationship between intra industry trade and national saving is positive. If saving increases so investments will also increase that would be used for export purposes leading to higher intra industry trade.

3.3.6 Tax revenue

Tax revenue is the income of government that is used to finance various developmental and non developmental projects. The expected relationship between tax revenue and intra industry trade is positive. If government income increases, there would be more investments on developmental projects that enhance process of industrialization. More industries would ultimately increase the production of differentiated goods and services leading to higher intra industry trade.

3.3.7 Roads

Road is expected to have positive impact on intra industry trade in Pakistan. If more roads are constructed from farm to industry, cheap raw material may be available to industries. In response, there may be production of goods and services at lower price that would lead to higher intra industry trade in Pakistan.

3.3.8 Vehicles

Vehicles are used for transporting of people, goods and services in any economy. Vehicles are expected to have positive impact on intra industry trade of Pakistan. If more vehicles are manufactured to more production of goods and services may be moved from industry to markets in time and from Pakistan to other nations as well that may have incentive for intra industry trade in Pakistan.

Table 1: Description of variables

Variables	Description	Unit of measurement	Expected Relationship
LIIT	Intra industry trade	Index	Dependent Variable
LROAD	Roads	Kilometers	positive
LVEH	Vehicle	Numbers	positive
LGCF	Gross capital formation	Pakistani rupee	positive
LBM	Broad money	Pakistani rupee	negative
LTR	Taxes revenues	Pakistani rupee	positive
LEXR	Exchange rate	Rupees per dollar	positive
LNS	National saving	Pakistani rupee	positive

3.4 Methodological Discussion

Analysis in the present study is conducted at two stages; firstly at preliminary level and second at econometric level. At preliminary level, the study uses descriptive statistics and graphical analysis. At econometric level; firstly, unit root test is applied. Then suitable econometric methodology is adopted that is autoregressive and distributed lag model if few variables are stationary at level and few are at 1st difference. The current analysis employs GLS – DF as unit root test. ARDL bound test is applied using following equation;

$$\Delta LIIT = \left[\beta_0 + \sum_{j=1}^u \beta_{1j} \Delta LIIT_{t-j} + \sum_{j=0}^u \beta_{2j} \Delta LRoad_{t-j} + \sum_{j=0}^u \beta_{3j} \Delta Lveh_{t-j} + \sum_{j=0}^u \beta_{4j} \Delta Lgcf_{t-j} \right. \\ \left. + \sum_{j=0}^u \beta_{5j} \Delta Lbm_{t-j} + \sum_{j=0}^u \beta_{6j} \Delta lnNs_{t-j} + \sum_{j=0}^u \beta_{7j} \Delta LEXR_{t-j} + \sum_{j=0}^u \beta_{8j} \Delta LTR_{t-j} + a_0 LIIT_{t-1} \right. \\ \left. + a_1 LRoad_{t-1} + a_2 Lveh_{t-1} + a_3 Lgcf_{t-1} + a_4 Lbm_{t-1} + a_5 LNs_{t-1} + a_6 LEXR_{t-1} \right. \\ \left. + a_7 LTr_{t-1} + \omega_{1t} \right]$$

ARDL long run results are estimated by using this equation;

$$LIIT = \left[d_0 + \sum_{j=1}^m d_1 LIIT_{t-j} \right. \\ \left. + \sum_{j=0}^n d_2 LRoad_{t-j} + \sum_{j=0}^p d_3 Lveh_{t-j} + \sum_{j=0}^q d_4 Lgcf_{t-j} \right. \\ \left. + \sum_{j=0}^r d_5 Lbm_{t-j} + \sum_{j=0}^s d_6 LNs_{t-j} + \sum_{j=0}^t d_7 LEXR_{t-j} + \sum_{j=0}^u d_8 LTr_{t-j} + v_{1t} \right]$$

After examining long run estimates, short run coefficient can also be examined by constructing an error correction model using following forms;

$$\Delta LIIT = \left[h_0 + \sum_{j=1}^m h_1 \Delta LIIT_{t-j} + \sum_{j=0}^n h_2 \Delta Lroad + \sum_{j=0}^p h_3 \Delta Lveh_{t-j} + \sum_{j=0}^q h_4 \Delta Lgcf_{t-j} + \sum_{j=0}^r h_5 \Delta Lbm_{t-j} + \sum_{j=0}^s h_6 \Delta LNs_{t-j} + \sum_{j=0}^t h_7 \Delta LExr_{t-j} + \sum_{j=0}^u h_8 \Delta LTr_{t-j} + \phi_1 ECM_{t-1} + \varepsilon_{1t} \right]$$

4. Results and Discussion

4.1. Preliminary Analysis

At preliminary level, the study uses descriptive statistics and graphical analysis in this section.

4.1.1 Descriptive Statistics

Descriptive statistics are given in table 2. The mean of intra industry trade (LIIT) are 0.66. It is for vehicle (LVEH) is 4 million, gross capital formation (LGCF) is 986 billion, broad money (LBM) is 19100 billion, road (LROAD) is 0.18 million kilometer, tax revenue (LTR) is 4600 billion and exchange rate (LEXR) is 38.36 rupees per dollar. The median value of intra industry trade is 0.69, vehicles is 3.35 million, gross capital formation is 1080 billion, roads is 0.19, tax revenue is 1590 billion and exchange rate is 28.36 rupees per dollar. The standard deviation values of these variables are 0.18, 3.44, 408.00, 26800.00, 0.07, 6760.00 and 28.92 respectively.

The distribution of intra industry trade, gross capital formation and roads are negatively skewed and vehicles, broad money, tax revenue and exchange rate are positively skewed. Intra Industry trade, roads and exchange rate are Platy - Kurtic. On the other hands, vehicles, gross capital formation, broad money and tax revenue are Lepto - Kurtic.

Table 2: Descriptive analysis

	Intra Industry Trade	Vehicle (M)	Gross Capital Formation	Broad Money (B)	Roads (B)	Tax Revenues (B)	Exchange Rate
Mean	0.66	4	98	191000	0.18	46000	38.36
Median	0.69	3.35	108	60900	0.19	15900	28.11
Standard Deviation	0.18	3.44	40.80	268000	0.07	67600	28.92
Skewness	-0.29	1.56	-0.006	16.7	-0.19	18.5	0.73
Kurtosis	1.80	5.35	18.8	48.3	1.36	52.7	2.30

4.1.2 Graphical Analysis

Figure 1 shows the intra industry trade pattern in Pakistan. There are several changes that may be seen in this figure coming in trade of differentiated goods and services. In 1972, the value of intra industry trade (IIT) was 0.6 meaning that country can only import or export the commodity and in 2004 it was 0.9 meanings that the country at a same time can import and also export the commodity. Figure 2 shows that number of vehicles is continuously increased from 1972 to 2014. Figure 3 shows that roads are increased during 1972 to 1998. But this construction is slow down from 1999 to 2014. Figure 4 shows that there are some fluctuations from 1975 to 2000 in gross capital formation but there exists also fluctuation from 2001 to 2014.

Figure 1: Intra industry trade

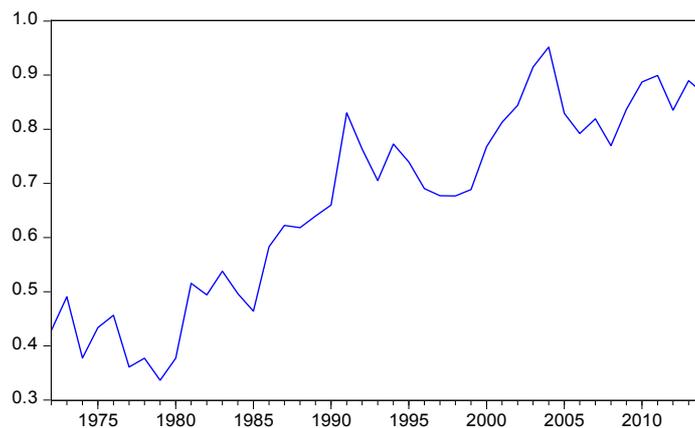


Figure 2: Vehicles

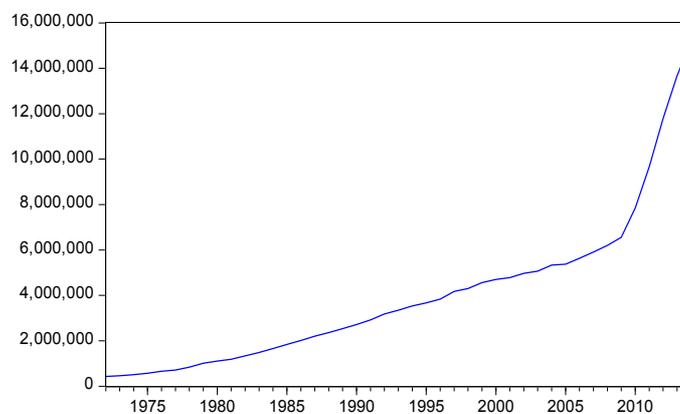


Figure 3: Roads

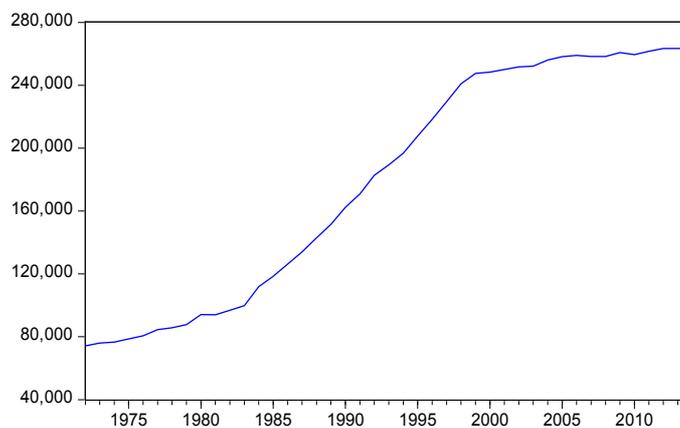


Figure 4: Gross capital formation

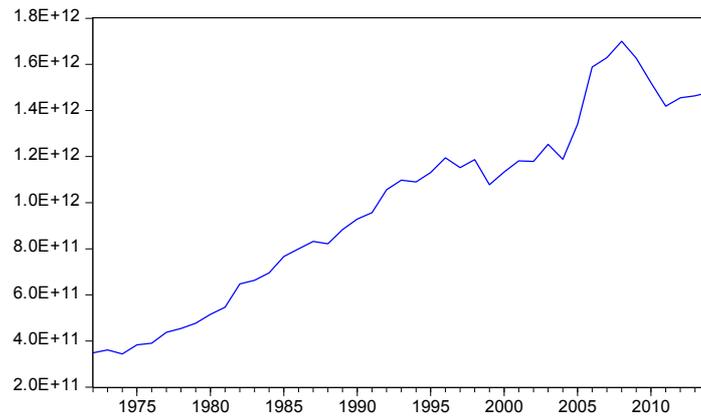


Figure 5: Broad money

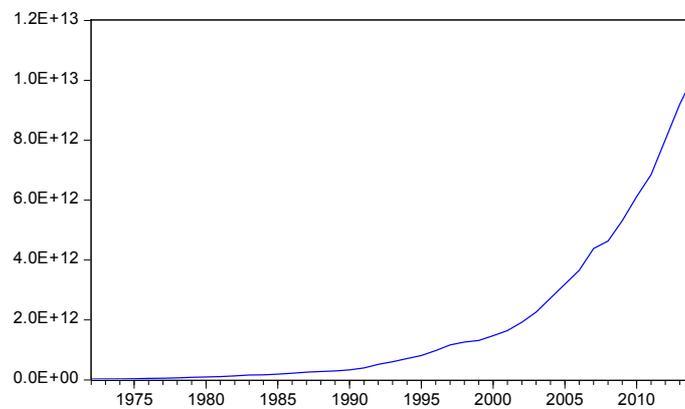


Figure 6: Exchange rate

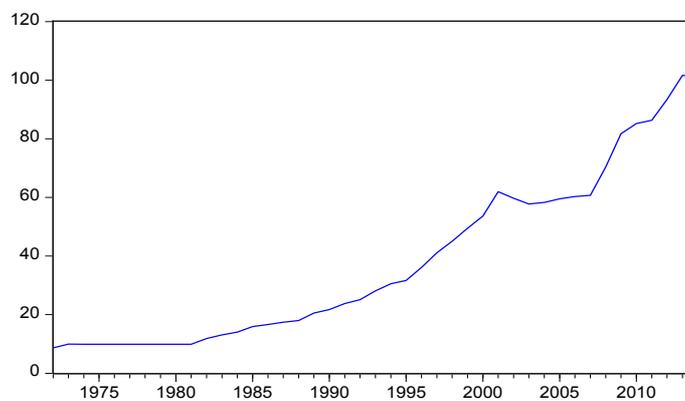
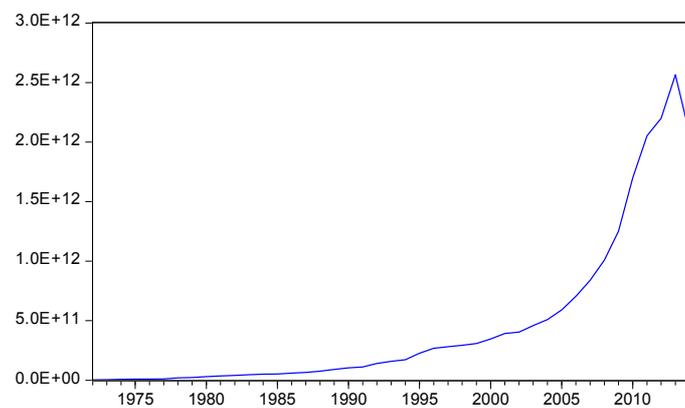


Figure 7: Tax revenue



A positive trend may be seen in broad money of Pakistan during 1972 to 2014 as in figure 5. Similar type of positive trend is analyzed in exchange rate of Pakistan during the same period as indicated in figure 6. Tax revenue is also raised from 1972 to 2014 as reported in figure 7.

4.2. Econometric Analysis

4.2.1 Unit Root Result

The results of Dickey Fuller - GLS unit root test is provided in table 3. All the variables are first tested at level by including intercept. If they are not stationary so these are evaluated at level by including trend and intercept. Still, if they are not stationary so these are checked at 1st difference by including intercept and trend and intercept. The results report that Broad money and National saving are stationary at level while roads, exchange rate, vehicles, gross capital formation, tax revenue and Intra Industry trade are stationary at 1st difference. In a situation, where few variables are stationary at level and few are stationary at 1st difference so autoregressive and distributed lag model (ARDL) is most suitable for long run and short run results.

Table 3: Dickey fuller GLS test for unit root

Variables	Test of unit root	Including in test equation	t - Statistic	Results
Broad money	Level	Intercept	0.41	I(0)
		Trend	-3.016	
Roads	Level	Intercept	-0.23	I(I)
		Trend	-0.59	
	1 st diff	Intercept	-1.68	
Exchange rate	Level	Intercept	0.87	I(I)
		Trend	-1.58	
	1 st diff	Intercept	-3.91	
vehicles	Level	Intercept	0.22	I(I)
		Trend	-2.19	
	1 st diff	Intercept	-2.42	
National Savings	Level	Intercept	-0.27	I(0)
		Trend	-1.62	
Gross Capital Formation	Level	Intercept	0.32	I(I)
		Trend	-0.85	
	1 st diff	Intercept	-5.82	
Tax revenue	Level	Intercept	0.076	I(I)
		Trend	-1.72	
	1 st diff	Intercept	-4.20	
Intra Industry Trade	Level	Intercept	-0.42	I(I)
		Trend	-2.87	
	1 st diff	Intercept	-5.17	

4.2.2 Autoregressive and Distributed Lag (ARDL) Results

Autoregressive and distributed lag (ARDL) long run and short run results are presented in table 4. First column shows names of variables, second column is having values of coefficients, third column reports the values of coefficients, t – statistics are presented in column four, probability values are given in column five. The value of F – statistics in bound testing approach is examined to be 10.61. This value is greater than upper bound value at 1 percent level of significance which confirms the existence of long run relationship among all the variables considered in the present analysis.

Number of Roads has positive impact on intra industry trade. The coefficient is also statistically significant at level 5 percent level of significance. The coefficient may be interpreted as 1 percent more roads in kilometers will enhance intra industry trade by 1.01 percent on the average in the long run. Long run elasticity of intra industry trade with respect to roads is 1.01.

Vehicles are positively related with intra industry trade. The coefficient is statistically insignificant. Gross capital formation turns out to have positive influence on intra industry trade of Pakistan. Its coefficient is statistically significant at level 1 percent level of significance. The coefficient may be interpreted as 1 percent higher gross capital formation in Pakistan may be significant cause of 1.24 percent more Intra Industry trade in the long run on the average. The long run elasticity of intra industry trade with respect to gross capital formation is 1.24.

Broad money has negative impact on intra industry trade of Pakistan in the long run having statistically significant coefficient value at 1 percent level of significance. The coefficient may be interpreted as intra industry trade will be lower by 1.64 percent due to 1 percent additional broad money. The long run elasticity of intra

industry trade with respect to broad money is estimated to be 1.64.

Exchange rate is found to have positive effect on intra industry trade of Pakistan. The value of coefficient is statistically significant at 1 percent level of significance. On the average, 1 percent higher value of exchange rate may rise intra industry trade by 1 percent in the long run. The long run elasticity of intra industry trade with respect to exchange rate is evaluated to be 1.

Tax revenue turns out to be positively associated with intra industry trade (IIT). The value of coefficient is found to be statistically significant at 10 percent level of significance. On the average, intra industry trade is raised by 1.25 percent due to 1 percent higher tax revenue in the long run. The long run elasticity of intra industry trade with respect to tax revenue examined to be 1.25. The coefficient value of error correction mechanism (ECM) is -0.47 which indicates convergence towards long run equilibrium due to any disturbance occurred in the short run.

Table 4: ARDL results

Variable	Coefficient	Standard error	t - statistics	Probability
Long run results				
Road	1.01	0.46	2.17	0.03
Vehicle	0.023	0.28	0.08	0.93
Gross Capital Formation	1.24	0.44	2.81	0.00
Broad money	-1.64	0.43	-3.74	0.00
Exchange rate	1.00	0.32	3.05	0.00
Taxes revenues	1.25	0.42	2.97	0.06
Constant	-13.53	6.90	-1.95	0.06
Short run results				
D(Lroad)	-1.60	0.37	-4.32	0.00
D(Lvehi)	-1.07	0.33	-3.25	0.00
D(LVEHI(-1))	-0.67	0.28	-2.32	0.02
D(LRGCF)	-0.21	0.19	-1.07	0.29
D(LBM)	0.09	0.14	0.64	0.52
D(LEXR)	-0.47	0.17	-2.78	0.01
D(LEXR(-1))	-0.76	0.18	-4.07	0.00
D(LTR)	0.30	0.08	3.55	0.00
D(LTR(-1))	-0.39	0.10	-3.58	0.00
ECM	-0.47	0.04	-10.30	0.00
ARDL bound test				
Test Statistics	10.61	Significance 1%	10 BOUND 2.88	11 BOUND 3.99

Note: dependent variable: Intra Industry Trade

5. Concluding Remarks

Intra Industry trade plays an essential role developing the economy of Pakistan. Keeping in view its importance, the study is intended to observe the factors affecting Intra Industry Trade of Pakistan especially by considering infrastructure and few macroeconomic variables. To fulfill this objective, time series data is collected from economy of Pakistan over the period from 1972 to 2014. The data is collected from few reliable sources like Economy survey of Pakistan, Handbook of statistics on Pakistan economy, 50 years of Pakistan in statistics and world development indicators. For estimation of elasticities, log – log form of the equation is followed.

The analysis is based on preliminary analysis and econometric analysis. In descriptive statistics, it is calculated that means of Intra Industry trade, vehicles, gross capital formation, broad money, roads, tax revenue and exchange rate are respectively 0.66, 4, 98, 191000, 0.18, 46000 and 38.36. The distribution of intra industry trade, gross capital formation and roads are negatively skewed and vehicles, broad money, tax revenue and exchange rate are positively skewed. Intra Industry trade, roads and exchange rate are Platy - Kurtic. On the other hands, vehicles, gross capital formation, broad money and tax revenue are Lepto - Kurtic.

In econometric analysis, first dickey fuller – GLS unit root test is applied for examining stationarity of all the variables and it is concluded that Broad money and National saving are stationary at level while roads, exchange rate, vehicles, gross capital formation, tax revenue and Intra Industry trade are stationary at 1st difference, so autoregressive and distributed lag model (ARDL) is most suitable for long run and short run results. The value of F – statistics in bound testing approach is greater than upper bound value which confirms the existence of long run relationship among all the variables considered in the present analysis. The ARDL long run results propose that roads, vehicle, gross capital formation, exchange rate and tax revenue are enhancing factors for Intra Industry Trade while broad money is exhibited to be negative for Intra Industry trade in the longrun. The coefficient value

of error correction mechanism indicates convergence towards long run equilibrium due to any disturbance occurred in the short run.

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