DOES COMPARATIVE ADVANTAGE AFFECT ECONOMIC GROWTH: A CASE OF PAKISTAN WITH ASIAN, OECD AND LATIN AMERICAN ECONOMIES 1982-2011

IJAZ HUSSAIN BOKHARI[*]

Ph.D. Scholar, Arogsy University Chicago, USA

SHAFAQAT MEHMOOD

Ph.D. Scholar, University of Central Punjab, Pakistan

KHURRAM SULTAN

Ph.D. Scholar, Universiti Utara Malaysia, Malaysia

ABSTRACT

Present study endeavours to assess the comparative advantage of Pakistan's exports to selected regional economies around the world namely Asian, OECD, and Latin American economies. Revealed comparative advantage Balassa Index (1965) and trade complementary indices of Pakistan over the sample of 70 economies have been checked at aggregated and disaggregated level classification of UN-Com Traderevision-2. Results revealed that Pakistan has a comparative advantage in 57 sectors on average per year, coefficient of variation is 0.68, standard deviation is 0.57 at the aggregated and disaggregated level over the period of time, and trade complementary indices reported that exports of Pakistan and imports of sample economies having the positive and strong relationship. Long-term relationship has been tested using co-integration mechanism; speed of adjustment has been gauged through vector error correction model and feedback relationship has been measured using granger causality on total exports and economic growth. Results revealed that there is positive and significant relationship between total exports and economic growth and there is a feedback causal relationship.

* Corresponding author E-mail: bokhari.ijaz@gmail.com

INTRODUCTION

"An organization's ability to learn, and translate that learning into action rapidly, is the ultimate comparative advantage, leads to economic growth" (Jack Welch, n.d.). Generally, comparative advantage is an important concept for explaining pattern of international trade. Emergences of new theories about international trade have been unsuccessful in reducing the significance of comparative advantage in the area of international trade; however, with the emergence of international economies this concept converted from static to a dynamic one. Dynamic theories on comparative advantage mainly support of Heckscher-Ohlin-1991 model and put great emphasis on fluctuation in production (supply side). These prominences explore the specific factors/determinants that affect the economic growth and industrial output which ultimately lead to comparative advantage. Redding and Venables (2004) found that comparative advantage in commodity exports is endogenously driven by innovation and advancement in technological infrastructure; however, Nachum, Dunning, and Jones (2000) affirm that dynamics of comparative advantage might result from role of changes in input trade, the frictions in investments and international trades, and is caused by information cost, institutions, geography and transportation (Overman, Redding, & Venables, 2001).

Grossman and Helpman (1991) document the knowledge management and its transformation across borders, technological infrastructural differences and its impacts on international trade flow. Krugman (1981) explains product differential on the basis of production & increasing returns to scale and monopolistic comparative advantage. Numerous economists and researchers empirically measure countries' dynamic revealed comparative advantage (e.g., Liesner, 1958;Balassa, 1965;Kanamori, 1972;Donges & Riedel, 1977;Bowen, 1983; Vollrath, 1991;Laursen, 1998).

Since the last decade patterns or behaviour of global trade have been changing among the developing and developed nations. A significant portion of the trade by many developed countries is with other developed countries, and it has grown over the period of time for instance 20%, 22%, 26% and 29% in 1985, 1995, 2005 and 2010 respectively (Tharakan & Thisse, 2011). On the other hand many developing economies have enhanced their trade flow towards the developed economies and remain their major trading partners for the international

exports and imports. Terms of trade[*] of developing economies have been deteriorating during the era of 80s and 90s; this has basically been because of deflation of primary goods in comparison to finished or manufactured goods (Razmi & Blecker, 2008). For instance, during the time period of 1980-95s the real price of coffee has fallen almost twofold, cocoa threefold, and oil fourfold at the global level (Yeats & Ng, 2005). Empirical literature is still vague or unable to answer whether these declines in prices are transitory or permanent; however, due to this decline in commodity prices developing nations suffer from significant economic losses which lead to sluggish economic development. Furthermore this decline in commodity prices and significant changes in terms of trade have forced many developing economies to shift their exports from primary goods to manufactured or finished goods (Yeats & Ng, 2005). In return developing nations import knowledge and capital intensive finished goods from the industrial economies in which developed economies retain comparative advantage.

O'brien, (1992) pointed out that global economies can be established in number of ways, for instance agreements among the partner economies, especially those are connected through regional/free trade agreements. Financial integration through agreements eliminates cross-border barriers and facilitates the financial institutions to perform operations smoothly. What is meant by Competitive advantage? And how it interacts and relates to the comparative advantage? Possible answers include barriers to entry and exit, market conditions and competitiveness, no of firms operating in industry which can provide the advantage in competing with foreign competitors (Neary, 2003). While another approach sees competitive advantage as a synonym for absolute advantage: some policy induced and natural superiority (lower tax rate, labour market, and flexible regulatory policies) which provide the cost reduction benefits for the national industrial sectors (Hunt & Morgan, 1995).

Research Objectives

There are a number of research objectives of this study; firstly, to determine the comparative advantage of a struggling economy of Pakistan over Asian, OECD, Latin American economies in Primary (raw material) & manufactured goods using aggregated & disaggregated level for the product codes 0 to 4 (raw material goods) and 5 to 8 (manufactured goods), over the period 1982-2011. Secondly the study aims to identify suitable regions or countries for exports. Thirdly, be able to provide relevant suggestions for policy makers to enhance the trade patterns and trade competitiveness at the industrial level. Fourthly, research

---

[*]The ratio of an index of a country's export prices to an index of its import prices

study will attempt to assist in identification & management of challenges faced by Pakistan's export industry due to high level competition at international trade level or during the crises period. Fifthly; using the Johnson Co-integration & Granger causality test the long-term relationship between (Total exports & GDP) variables inquire over the period 1970 to 2011.

LITERATURE REVIEW

"It is always possible for a regional integration agreement, formed among an arbitrary group of countries, to structure itself in such a way as to make the member countries better off without making any of the non-member countries worse off" (Kemp & Wan, 1976). The debate of regional level integration through trade agreements raises the interesting question of why economies enter regional trade agreements. What objectives countries seek from the regional trade agreements. Previous studies inquire the following objectives countries seeks from the regional trade agreements: strategic alliances, conventional trade benefits, boosting the multilateral bargaining power, ensuring access to markets, escalation of national level policy reforms (Bhagwati & Krishna, 1999; Fernandez & Portes, 1998; Whalley, 1998). Regional trade preferential agreements lead towards regional integration. Approximately, more than 300 regional trade agreements had taken place till 2011 and more than 40% of world total trade have been made thought the trade preferential agreements (Bhala & Gantz, 2011). On the other hand, bilateral trade agreements among the OECD economies and among other economies over the globe provide access to all markets to ensure a continuous supply of services and goods and it is also essential and indispensable policy towards the developed and developing economies across the world (Gundlach, Hiemenz, Langhammer, & Nunnenkamp, 1993). It has been observed that global integration grew in 1980s through the regional trade agreements and the share of net trade in GDP has doubled even after excluding the intra-OECD trade and the same stands true for the United States (Cadot, Kukenova, & Strauss-Kahn, 2010; Feenstra, 1998; Jacob, 2010).

Therefore, economies trade more through regional trade agreements specially when there is higher correlation in business cycle (Fujita et al., 1999). Trade statistics of Organization for Economic Co-operation and Development (OECD) revealed that OECD exports approximately $200 billion US dollars in 2010 which is equal to 27% of total exports of services and 9% of total exports of goods and services to bilateral trade agreement partners (Xing, 2011). Bender, Li, and Center, (2002) worked to gauge the manufactured export's performance among the Asian economies and Latin American countries. Authors documented economies from both regions show positive significant variation in pattern of RCA of

15

dissimilar sectors. They further stated, the downward trends of RCA in EANIEs nations especially in South Korea might be caused by Asian financial crises which happened in 1997. A period of 17 years from 1981 to 1997 has been taken under consideration. Abou-Stait, (2005) checked causal link between economic growth and exports by studying data over the period of 1977-2003. This research work documented a significant link between exports and GDP growth. The outcomes of stait's study support of ELG hypothesis. The study of (Ahmad & Harnhirun, 1996) also explored the causal link between GDP growth and exports by taking a sample of five economies from ASEAN namely: Indonesia, Philippines, Malaysia, Thailand and Singapore. They covered a period of 1966-1988 and documented that in case of ASEAN, long run link not exist between exports and GDP growth.

RESEARCH METHODOLOGY

We bifurcate our research methodology into two parts based on the research objectives; part 1 analyses the comparative advantage and trade complementary indices to measure the comparative advantage in commodities and sectors and analyses patterns of exports with other country's imports, based on the comparative advantage analysis in Part 2 analyses the relationship between Pakistan s total exports and economic growth.

We start our analysis by using Balassa (1965) index to measure the export performance of Pakistan and its comparative advantage at aggregated and disaggregated level using data on SITC rev-2 sectors and commodities. We also use trade complementary index Ng and Yeats (2003) to test the 'export-trade complementary' of Pakistan commodities exports and OECD, Asian and Latin American economies. Value of trade complementary index lies between 0 and 1, A higher value of index assumes more favourable prospects of trade among the sampled economies.

After investigating and testing the comparative advantage theories we turn to explore the relationship between economic growth and exports of Pakistan. The study employed the following econometric techniques to attain sub-categorized objectives; is there any relationship between economic growth and Pakistan's exports? To test these objectives following models have been employed; unit root of the variables has been tested from the linear combination of variables. Long-term relationship among the variables has been inquired by Johansen' Co-integration, VECM will be employed to test the speed of adjustment in case of short run disequilibrium in long run relationship and at the end Granger causality has been employed to test the causal relationship between the variables.

Significance of Data

The data for this research spans over 1982-2011 and has been collected from various resources. Revealed Comparative Advantage (RCA) and Trade complementary index data collected from various sources; UNCOM-TRADE (Based on SITC Rev.2 at the aggregated and disaggregated level of commodity codes) and Economy Survey of Pakistan (2011). To test the long-term and short-term relationship, Granger causality, Co-integration, Vector Error Correction Model test have been employed on economic growth (Gross Domestic Product) and Pakistan's total exports for the data collected from Economic survey of Pakistan (2011) and International Financial Statistics (IMF) over the spans of 1975-2011. Data analysis portion has covered three major regions; OECD, Asian and Latin American economies those occupied 10.6%, 30% and 3.9% of the total world land, total population of selected economies are 1.26, 3.90 billion and 590 million. However, Pakistan exports 45.5%, 25%, 10% on the other hand imports 25.7%, 27% and 1.3% from OECD, Asian and Latin American economies respectively. Data span of current research study consists of 30 year dataset over the period of 1982 to 2011, covering 70 countries and 305 sectors at IMF aggregated and disaggregated level for the comparative advantage and trade complementary index has been collected from 'United Nations Commodity trade statistics database' while data span on economic growth and total export is 42 years over the period of 1970 to 2011 from IMF. The wide range data under observation is a unique dataset and covers the spectrum of 70 countries, along with that it analyses the economies contributing almost 87% of the world GDP. Only limited studies capture such wide range of dataset few well recognized studies in the same domain are as follows; (Bender & Li, 2002; Widgren, 2005; Akhtar, Zakir, & Ghani, 2008; Widodo, 2009).

TABLE 1

Descriptive Statistics

	EXPORTS	GDP
Mean	387499.6	29847.58
Median	138371.6	9352.500
Maximum	2188534.	180629.0
Minimum	1892.000	477.5000
Std. Dev.	537206.2	43112.20
Skewness	1.745509	1.948112
Kurtosis	5.404481	6.225971

Source. International Financial Statistics (IMF)

RESULTS

Table A1 shows the change in comparative advantage in case of Pakistan at aggregate and disaggregate level. Results show that approximately 210 of the products and sectors under consideration showed positive movements in the timeframe under consideration. There was a significant change in comparative advantage in these products and sectors. While approximately in 95 products and sectors Pakistan lost comparative advantage over the period 1982 to 2011. Literature endorses various reasons for the comparative disadvantage in Pakistani products and sectors for instance electricity problems, political instability, Social changes, War on terrorism, financial crises and a crackdown on child labour (Widodo, 2009; Ullah, Zaman, Farooq, & Javid, 2009; Akhtar, Zakir, & Ghani 2008 Batra & Khan, 2005).

Table A1 insert here

Table A2 shows the share of sector in total exports of Pakistan over the sample period 1982 to 2011 results revealed that Food and live animals [0] had a comparative advantage index of 19.40 in 1982 and during the sample period it went as low as 9.07, however it recovered recently and ended up being 18.24 in 2011, Beverages and tobacco [1] had an index of 0.42 and during the sample period it has shown a decreasing trend and in year 2011 it is at 0.23. Crude materials (except fuels) [2] had an index of 14.56 in 1982, which indicate comparative advantage comparatively comparative disadvantage in year 2011. Mineral fuels and lubricants [3] started having a comparative advantage in financial year 1999 however it ended up at almost the same level as it was in 1982. Animal and vegetable oils and fats [4] sector indicates an upward trend in comparative advantage index but it is not that significant. Chemical products [5] revealed a significant contribution in total exports of Pakistan as its comparative advantage index moved from 0.59 to 4.43 during the 1982 to 2011. Manufactured goods classified by material [6] contributed approximately 46 percent of the total exports of Pakistan while the manufacturing sector lost its share in total exports of Pakistan over the sample period. Machinery and transport equipment [7] indicated that the contribution of sector in total exports was on average 2.42 and during the sample period it's indicates the downward trend but it's not significant to total exports of Pakistan.

The Balassa (1965) comparative advantage index explained above is used to analyse comparative advantage in commodity trade of raw material (product code 0 to 4) and finished goods (product code 5 to 8) according to SITC rev-2 over the time period 1982 to 2011 to three major regions namely Asia, OECD and Latin America. Results revealed that Pakistan having comparative advantage in 57 sectors on average per year, coefficient of variation is 0.68, standard deviation is 0.57 at the aggregated and disaggregated level over the period of time. Pakistan has a comparative advantage in the following commodities and industries at the aggregated and disaggregated level, Food and live animals chiefly for food [0], Cereals and cereal preparations [04], sugar, sugar preparations and honey [06], Fish, dried, salted or in brine; smoked fish [035], Crustaceans and mollusks, fresh, chilled, frozen, salted etc. [036], Rice [042], Fruit and nuts, fresh, dried [057], sugar and honey [061], spices [075], Tobacco, manufactured [122], Crude materials, inedible, except fuels [2], textile fibers (not wool tops) and their wastes (not in yarn) [26], crude animal and vegetables materials, nes [29], Seeds and oleaginous fruit, whole or broken, for other oils [223], cotton [263], Wool and other animal hair (excluding tops) [268], Fertilizers, crude [271], stone, sand and gravel [273], crude animal materials, nes [291], crude vegetable materials, nes [292], Manufactured goods classified chiefly by materials [6], Leather, leather manufactures, nes, and dressed furskins [61], Textile yarn, fabrics, made-up articles, nes, and related products [65], Leather [611], Manufactures of leather or of composition leather, nes; etc [612], Textile yarn [651] Cotton fabrics, woves (not including narrow or special fabrics) [653], Knitted or crocheted fabrics (including tubular, etc, fabrics) [655], Tulle, lace, embroidery, ribbons, trimmings and other small wares [656], Special textile fabrics and related products [657], Made-up articles, wholly or chiefly of textile materials, nes [658], Floor coverings, etc [659], Lime, cement, and fabricated construction materials [661], Pig and sponge iron, spiegeleisen, etc., and ferro-alloys [671], cutlery [696], Miscellaneous manufactured articles [8], Articles of apparel and clothing accessories [84], Men's and boys' outerwear, textile fabrics not knitted or crocheted [842], Women, girls, infants outerwear [843], Under garments of textile fabrics, not knitted or crocheted [844], Outerwear knitted or crocheted, not elastic nor rubberized [845], Under-garments, knitted or crocheted [846], Clothing accessories, of textile fabrics, nes [847], Articles of apparel, clothing accessories, non-textile, headgear [848], Medical instruments and appliances, nes [872], Baby carriages, toys, games and sporting goods [894], Other miscellaneous manufactured articles, nes [899] over the period of 1982 to 2011.

TABLE 2

Unit Root Test

Country	Variable	Unit Root Test		Test stat	1% C.V	5% C.V	10% C.V
Pakistan	Exports	ADF	Level	-2.15253	3.60559	2.93694	-2.60685
			1st difference	-5.25663	3.60559	2.93694	-2.60685
		PP	Level	-2.62728	3.60098	2.93500	-2.60583
			1st difference	-5.16336	3.60559	2.93694	-2.60685
	GDP	ADF	Level	-0.18706	3.60098	2.93500	-2.60583
			1st difference	-4.92208	3.60559	2.93694	-2.60685
		PP	Level	-0.18767	3.60098	2.93500	-2.60583
			1st difference	-4.87403	3.60559	2.93694	-2.60685

Table 2 presented the results of ADF and PP on Exports and GDP, results reveal that time series variable exports contain unit root in series at level as test statistics value of both techniques is less than 1% C.V, 5% C.V and 10% C.V[*] respectively. Hence, it becomes integrated at 1st difference and value of statistics becomes more than the critical at 1%, 5% and 10% respectively. In case of GDP both techniques again reveal that value of test statistics at level is less than the critical value at 1%, 5% and 10%, while it becomes stationary at 1st difference and value of test statistics is more than the critical value 1%, 5% and 10%. As the formal techniques AFD and PP for unit root test indicates time series variables are non-stationary i.e. times series variables contains unit root and become stationary at the 1st difference. If the time series variables are non-stationary at level and converted to stationary time series at the 1st difference they might contain the long-term relationship. Therefore, to test

---

[*] C.V is representing critical value

the long-term relationship among the time series variables exports and GDP Johansen's co-integration techniques have been employed and results are presented in Table 3.

TABLE 3

Johansen Co-Integration Test

Eigen Values	L.R Statistics	5% Critical Values	1% Critical Values	Number of CEs
0.496544	27.80830	15.49471	0.0004	None*
0.008909	0.357949	3.841466	0.5496	At most 1

Note. Trace test indicates 1 co-integrating eq(s) at the 0.05 level, and * denotes rejection of the hypothesis at the 0.05 level

Table 4 indicates the existence of long term relationship between exports and GDP as the Likelihood Ratio statistics reports 1 co-integration equation at 5% critical value. Vector error correction mechanism technique has been used in the study to analyse the speed of adjustment in case of short-run disequilibrium. However, speed of adjustment has been measured using coefficients of co-integration equation. Colum 1 of Table 4 reveals that Gross Domestic Product adjusted by 2% each year and will take 38 years approximately; while Colum 2 of Table 4 reveals that exports adjusted far more rapidly at 40% each year and will take 2 years approximately to completely eliminate short-term disequilibrium in long-run relationship.

TABLE 4

Vector Error Correction Mechanism

Error Correction:	D(GDP)	D(EXPORTS)
CointEq1	-0.025721	0.409357
t-statistic	(0.05497)	(0.12981)

To test the existence of causal relationship between GDP (Gross Domestic Product) and exports Granger causality (1969) technique has been employed; however, direction of causal relationship depends lagged term and data is supposed to stationary.

TABLE 5

Granger Causality

Null Hypothesis:	Obs	F-Statistic	Probability
EXPORTS does not Granger Cause GDP	40	5.62153*	0.00764
GDP does not Granger Cause EXPORTS		16.4136*	0.00001

Note. * 1% level of significance

Table 5 indicates that there is feedback causal relationship among both time series variables i.e. GDP and exports. Exports granger cause GDP at 1% level of significance as F-statistics is 5.621 and Probability value is 0.0076, on the other hand GDP granger cause exports at 1% level of significance as F-statistics is 16.413 and Probability value is 0.00001.

DISCUSSION

Results inquire that four leading sectors revealed comparative advantage in case of Pakistan namely; 'Food and live animals' [0], 'Crude materials, inedible, except fuels' [2], 'Manufacture goods classified chiefly by material' [6] and 'Miscellaneous manufactured articles' [8] at the aggregated level (Kilduff & Chi, 2006a, 2006b) also affirm the results; however, inadequate number of studies considered the impact of financial and war crisis in case of comparative advantage measurement. Financial integration foster the impact of global financial crisis from the developed nations to developing and under developing nations and Singapore played the role of bridge for Asian and global financial crisis transformation (Dooley & Hutchison, 2009; Gong, Lee, & Chen, 2004). Study documented that Asian currency crisis (1997-1998), Afghan war (2001) and global financial crisis (2007-2009) adversely affect the pattern of international trade especially in case of trade-export and comparative advantage, usually these crisis affect the comparative advantage indices of developing and newly industrial economies (Frieden & Rogowski, 1996; Lin, 2008). Trade complementary indices at aggregated level indicate that following sectors 'Food and live animals [0]', 'Mineral fuels, lubricants and related materials [3]', 'Animal and vegetable oils and fats [4]', 'Chemicals [5]', 'Manufacture goods classified chiefly by material [6]', 'Machinery and transport equipment [7]' and 'Miscellaneous manufactured articles [8]' having compatibility with OECD economies over the sample period, no of empirical studies affirm the results (Bergoeing, Loayza, & Piguillem, 2010; Daudin, Rifflart, & Schweisguth, 2011; Nunnenkamp, 2002). Empirical results also revealed comparative advantage at disaggregated level in Leather [611], Manufacturers of leather or of composition leather, nes; etc. [612], Textile yarn [651] Cotton fabrics, woves (not including narrow or special fabrics) [653], Knitted or crocheted fabrics (including tubular, etc, fabrics) [655], Tulle, lace, embroidery, ribbons, trimmings and other small wares [656], Special textile fabrics and related products [657], Made-up articles, wholly or chiefly of textile materials, nes [658], Floor coverings, etc. [659], Lime, cement, and fabricated construction materials [661], Pig and sponge iron, spiegeleisen, etc, and ferro-alloys [671], cutlery [696], Miscellaneous manufactured articles [8], Articles of apparel and clothing accessories [84], Men's and boys' outerwear, textile fabrics not knitted or crocheted [842],

22

Women, girls, infants outerwear [843], Under garments of textile fabrics, not knitted or crocheted [844], Outerwear knitted or crocheted, not elastic nor rubberized [845], Under-garments, knitted or crocheted [846], Clothing accessories, of textile fabrics, nes [847], Articles of apparel, clothing accessories, non-textile, headgear [848], Medical instruments and appliances, nes [872], Baby carriages, toys, games and sporting goods [894], Other miscellaneous manufactured articles, nes [899] over the period of 1982 to 2011, these results are aligned with results of following empirical studies (Hanif & Jafri, 2008; Kilduff & Chi, 2006a; Mahmood & Azhar, 2001; Nordås, 2009). Pakistan having comparative disadvantage in case of 'Beverages and tobacco [1]', 'Mineral fuels, lubricants and related materials [3]', 'Animal and vegetable oils and fats [4]', 'Chemicals [5]' and 'Machinery and transport equipment [7]' at the aggregate and disaggregate level; while, China and India having the comparative advantage in case above mention sectors although these economies are unable to maintain their comparative advantage in these sectors over the period of time (Batra & Khan, 2005; Jinping, 2003). Study documented that oil producing, NIEs[*] and developed revealed comparative advantage in case of raw and finished goods at aggregated and disaggregated level for instance 'Beverages and tobacco [1]', 'Mineral fuels, lubricants and related materials [3]', 'Chemicals [5]' and 'Machinery and transport equipment [7]', because these economies are documented as major importers of heavy machinery and equipment, and having focus towards the finished goods and also producing the similar products for under developed and developing nations e.g. Indonesia revealed comparative advantage in 'other fixed vegetable oils, fluid or solid, crude, refined [424]', 'Coal, lignite and peat [322]', and Gas, natural and manufactured [341]', however, Singapore, Malaysia, Philippines and Thailand revealed comparative advantage in case of 'Petroleum products, redined [334]', 'Hydrocarbons, nes, and derivatives [511]', 'Nitrogen-function compounds [514]', 'Organic-inorganic and heterocyclic compounds [515]', 'Civil engineering, contractors' plant and equipment and parts, nes [723]' and 'Thermionic, micro circuits, transistors, valves, etc. [776]', (Bensassi, Márquez-Ramos, & Martínez-Zarzoso, 2012; Kirkpatrick, Lee, & Nixson, 2012). Our empirical results are parallel to (Anwer & Sampath, 2000; Awokuse, 2007; Emery, 2007; Severn, 2007) and revealed that exports and economic growth have the long-term relationship and also having causal relationship and vector error correction mechanism affirms that elimination of disequilibrium in case of Gross Domestic Products take a long period; while, in case of export its take less

---

[*] Newly Industrialized economies (NIEs)

time(Ahmad, 2012; Shabbir, Anwar, Hussain, & Imran, 2012; Zaman, Shah, Khan, & Ahmad, 2012).

CONCLUSIONS

Present study attempts to assess Pakistan's trade-exports comparative advantage with Asian, OECD, Latin American economies and economic growth over the period 1982 to 2011, impact of three influential and significant crisis namely; Asian currency crisis (1997-1998), Afghan war (2001 to present) and global financial crisis (2007-2009) has been assessed on the comparative advantage and complementarities indices over the sample period, later on we also study the relationship between exports and economic growth over the sample period 1970 to 2011. Balassa (1965) technique has been employed to reveal the comparative advantage of Pakistan's sector and commodities over the Asian, OECD and Latin American economies, based on empirical results we second the classical theory of international trade[*]. Trade complementary index Yeats & Ng, (2003) has been employed to inquire the compatibility of Pakistan's exports and sample economies imports. Empirical results show that countries having more free trade agreements have better position in international markets and can sell to specific market where they get the better prices. Impact of crises has been assessed over the sample period and the results show that all three crises affected the international trade adversely and indices indicate the downward trend in case of comparative advantage and complementary indices; however, indices also indicate that there is downward trend in most of the cases before the appearance of financial crisis. Long-term relationship between exports and economic growth has been analysed using Johansen's co-integration techniques. It was revealed that there is long-term relationship between exports and economic growth exist, on the same time exports revert back to equilibrium quickly as compared to economic growth (GDP) these results has been inquired using Vector error correction mechanism. Granger causality test has been employed to inquire the direction of causal relationship between exports and economic growth; results revealed that there is feedback causal relationship between exports and economic growth.

After the recent global financial crisis (2007-2009) the Asian economies indicating a high growth rate as compared to developed economies. Asian economies have succeeded in saving them from large extent of external shocks, because these have insulated themselves by

---

[*] Classical theory of international trade documented that a country trade-exports commodities in which they have comparative advantage.

the regional trade preferential agreements. Over the period of time there is increasing trend in intra-regional trade backed by the regional trade agreements, this fact played the role of barrier to protect the Asian economies from tidal waves appearing in world economy due to volatility.

This study checked Pakistan's trade-exports comparative advantage with Asian, OECD, Latin American economies only but does not indicate picture of Pakistan's trade-exports comparative advantage with remaining regional organization all around the world, hence, it may be useful to fill this research gap in future research. Further, this study conduct analysis by taking data over the period of 1982-2011, which suggest the inclusion of most recent data in future research. To check the accuracy of indexes used in this study, this would further allow to propose new indexes for the purpose of comparing with already developed indexes. Further, the reinvestigation of the possible impact of various crisis (e.g., Asian currency crisis (1997-1998), Afghan war (2001 to present), global financial crisis (2007-2009), etc.)in presence of most recent data, wide range of regional organizations and regional trade agreements are left for future work.

REFERENCES

Abou-Stait, F. (2005), "Are exports the engine of economic growth? An application of cointegration and causality analysis for Egypt 1977-2003", *Economic Research Working Paper No. 76*, African Development Bank

Ahmad, J., & Harnhirun, S. 1996. Cointegration and causality between exports and economic growth: Evidence from the ASEAN countries, *The Canadian Journal of Economics/Revue canadienne d'Economique* 29, 413-416.

Ahmad, N. (2012). Determinants of export demand of textile and clothing sector of Pakistan: An empirical analysis. *World Applied Sciences Journal, 16*(16 (8)), 1171-1175.

Akhtar, N., Zakir, N., & Ghani, E. (2008). Changing revealed comparative advantage: A case study of footwear industry of Pakistan. *The Pakistan Development Review*, 695-709.

Anwer, M. S., & Sampath, R. K. (2000). Exports and economic growth. *Indian Economic Journal, 47*(3), 79-88.

Awokuse, T. O. (2007). Causality between exports, imports, and economic growth: Evidence from transition economies. *Economics Letters, 94*(3), 389-395.

Batra, A., & Z. Khan, 2005. Revealed comparative advantage: an analysis for India and China, *Indian Council for Research on International Economic Relations (ICRIER), Working Paper*.

Bender, S., & Li, K. W. (2002). The changing trade and revealed comparative advantages of Asian and Latin American manufacture exports. *Yale Economic Growth Center Discussion Paper*, (843).

Bensassi, S., Márquez-Ramos, L., & Martínez-Zarzoso, I. (2012). Economic integration and the two margins of trade: the impact of the barcelona process on North African countries' exports. *Journal of African Economies, 21*(2), 228-265.

Bergoeing, R., Loayza, N., & Piguillem, J. (2010). Why are developing countries so slow in adopting new technologies? The aggregate and complementary impact of micro distortions. *The Aggregate and Complementary Impact of Micro Distortions (August 1, 2010). World Bank Policy Research Working Paper Series.*

Bhagwati, J. N., & Krishna, P. (1999). *Trading blocs: Alternative approaches to analyzing preferential trade agreements*. Mit Press.

Bhala, R., & Gantz, D. A. (2011). WTO case review 2010. *Arizona Journal of International and Comparative Law*, *28*, 239.

Bowen, H. P. (1983). On the theoretical interpretation of indices of trade intensity and revealed comparative advantage. *Review of World Economics, 119*(3), 464-472.

Cadot, O., Kukenova, M., & Strauss-Kahn, V. (2010). OECD Imports: Diversification and quality search, *World Bank Policy Research Working Paper No. 5285*.

Daudin, G., Rifflart, C., & Schweisguth, D. (2011). Who produces for whom in the world economy? *Canadian Journal of Economics/Revue canadienne d'économique, 44*(4), 1403-1437.

Donges, J. B., & Riedel, J. (1977). The expansion of manufactured exports in developing countries: An empirical assessment of s upply and demand issues. *Review of World Economics, 113*(1): 58-87.

Dooley, M., & Hutchison, M. (2009). Transmission of the US subprime crisis to emerging markets: Evidence on the decoupling–recoupling hypothesis. *Journal of International Money and Finance, 28*(8), 1331-1349.

Emery, R. F. (2007). The relation of exports and economic growth. *Kyklos, 20*(4), 470-486.

Erzan, R., & Yeats, A. (1992). *Free trade agreements with the United States: what's in it for Latin America?* (No. 827). The World Bank.

Feenstra, R. C. (1998). Integration of trade and disintegration of production in the global economy, *The Journal of Economic Perspectives* 12, 31-50.

Fernandez, R., & Portes, J. (1998). Returns to regionalism: An analysis of nontraditional gains from regional trade agreements. *The World Bank Economic Review*, *12*(2), 197-220.

French, K. R., & Poterba, J. M. (1991). *Investor diversification and international equity markets* (No. w3609). National Bureau of Economic Research.

Frieden, J. A., & Rogowski, R. (1996). The impact of the international economy on national policies: An analytical overview. *Internationalization and domestic politics*, 25-47.

Fujita, M., P. R. Krugman, A. Venables, & I. Ebrary, 1999. *The spatial economy: cities, regions and international trade* (Wiley Online Library).

Gong, S. C., Lee, T. P., & Chen, Y. M. (2004). Crisis transmission: Some evidence from the Asian financial crisis. *International Review of Financial Analysis, 13*(4), 463-478.

Grossman, G. M., & Helpman, E. (1991). Trade, knowledge spillovers, and growth. *European Economic Review, 35*(2), 517-526.

Hanif, M. N., & Jafri, S. K. (2008). Financial development and textile sector competitiveness a case study of Pakistan. *South Asia Economic Journal, 9*(1), 141-158.

Gundlach, E., Hiemenz, U., Langhammer, R. J., & Nunnenkamp, P. (1993). Regional integration in Europe and its impact on developing countries. In *Regional integration and its impact on developing countries* (pp. 129-256). Tokyo.

Hunt, S. D., & Morgan, R. M. (1995). The comparative advantage theory of competition. *The Journal of Marketing*, 1-15.

Kanamori, H. (1972) . Structure of foreign trade. *The Developing Economies, 10*(4): 359-384.

Krugman, P. R. (1981). Intraindustry specialization and the gains from trade. *The Journal of Political Economy*: 959-973.

Jack Welch. (n.d.). BrainyQuote.com. Retrieved October 29, 2015, from BrainyQuote.com Web site: http://www.brainyquote.com/quotes/quotes/j/jackwelch173305.html

Jacob, P. (2010). *Three Essays in Dynamic Stochastick Macroeconomics* (Doctoral dissertation, Ghent University).

Jinping, Y. (2003). Comparative Advantage and trade complementarity between china and other Asian economies. *World Economy, 5*, 33-40.

Kemp, M. C., & Wan, H. (1976). An elementary proposition concerning the formation of customs unions.

Kilduff, P., & Chi, T. (2006). Longitudinal patterns of comparative advantage in the textile complex–part 1: An aggregate perspective. *Journal of Fashion Marketing and Management, 10*(2), 134-149.

Kirkpatrick, C., Lee, N., & Nixson, F. (2012). *Industrial structure and policy in less developed countries*. Routledge.

Laursen, K. (1998). Revealed comparative advantage and the alternatives as measures of international specialisation. *DRUID Working Papers*.

Liesner, H. H. (1958). The European common market and British industry. *The Economic Journal, 68*(270), 302-316.

Lin, J. Y. (2008). The impact of the financial crisis on developing countries. *Korea Development Institute, 31*.

Mahmood, Z., & Azhar, M. (2001). On overinvoicing of exports in Pakistan. *The Pakistan Development Review*, 173-185.

Nachum, L., Dunning, J. H., & Jones, G. G. 2000. UK FDI and the comparative advantage of the UK. *The World Economy*, 23(5), 701-720.

Neary, J. P. (2003). Presidential address: Globalization and market structure. *Journal of the European Economic Association*, 245-271.

Ng, F., & Yeats, A. J. (2003). Major trade trends in East Asia: what are their implications for regional cooperation and growth?. *World Bank Policy research working paper*, (3084).

Ng, F., & Yeats, A. J. (2005). Kenya Export Prospects and Problems. *World Bank Africa Region Working Paper Series*.

Nordås, H. K. (2009). *The global textile and clothing industry post the agreement on textiles and clothing*: World Trade Organization (WTO).

Nunnenkamp, P. (2002). *Why economic growth trends differ so much across developing countries: the globalization debate and its relevance to Pakistan*: Kieler Arbeitspapiere.

Overman, H. G., Redding, S. J., & Venables, A. J. (2001). The economic geography of trade production and income: a survey of empirics.

O'brien, R. (1992). *Global financial integration: the end of geography*. Royal Institute of International Affairs.

Razmi, A., & Blecker, R. A. (2008). Developing country exports of manufactures: moving up the ladder to escape the fallacy of composition?. *The Journal of Development Studies*, *44*(1), 21-48.

Redding, S., & Venables, A. J. 2004. Economic geography and international inequality. *Journal of International Economics, 62*(1): 53-82.

Severn, A. K. (2007). Exports and economic growth. *Kyklos, 21*(3), 546-548.

Shabbir, G., Anwar, S., Hussain, Z., & Imran, M. (2012). Contribution of financial sector development in reducing unemployment in Pakistan. *International Journal of Economics and Finance, 4*(1), p260.

Tharakan, J., & Thisse, J. F. (2011). 6 Market integration: trade versus economic geography. *International Handbook on the Economics of Integration: Competition, Spatial Location of Economic Activity and Financial Issues*, *2*, 119.

Ullah, S., Zaman, B., Farooq, M., & Javid, A. (2009). Cointegration and causality between exports and economic growth in Pakistan. *European Journal of Social Sciences*, *10*(2), 264-272.

Vollrath, T. L. (1991). A theoretical evaluation of alternative trade intensity measures of revealed comparative advantage. *Review of World Economics*, 127(2): 265-280.

Whalley, J. (1998). Why do countries seek regional trade agreements?. In *The regionalization of the world economy* (pp. 63-90). University of Chicago Press.

Widgrén, M. (2005). *Revealed comparative advantage in the Internal Market* (No. 989). ETLA Discussion Papers, The Research Institute of the Finnish Economy (ETLA).

Xing, Y. (2012). Processing trade, exchange rates and China's bilateral trade balances. *Journal of Asian Economics*, *23*(5), 540-547.

Widodo, T. (2009). Comparative advantage: Theory, empirical measures and case studies. *Review of Economic and Business Studies (REBS)*, (4), 57-82.

Zaman, K., Shah, I. A., Khan, M. M., & Ahmad, M. (2012). Macroeconomic factors determining FDI impact on Pakistan's growth. *South Asian Journal of Global Business Research, 1*(1), 79-95.

ANNEXURE

TABLE A1

Change in Comparative Advantage in Case of Pakistan at Aggregate and Disaggregate Level

Sr.	Description	RCA 1982	RCA 2011	% age change in RCA
00	Live animals chiefly for food	0.003	0.015	362
01	Meat and preparations	0.001	0.413	24377
02	Dairy products and birds' eggs	0.001	0.056	3907
03	Fish, crustacean and molluscs, and preparations thereof	0.185	0.098	-47
04	Cereals and cereal preparations	4.015	7.487	86
05	Vegetables and fruit	0.177	0.205	16
06	Sugar, sugar preparations and honey	0.075	0.020	-73
07	Coffee, tea, cocoa, spices, and manufactures thereof	1.014	0.417	-59
08	Feeding stuff for animals (not including unmilled cereals)	0.032	0.017	-45
09	Miscellaneous edible products and preparations	0.119	0.220	85
11	Beverages	0.001	0.083	7222
12	Tobacco and tobacco manufactures	0.797	0.578	-27
21	Hides, skins and furskins, raw	0.078	0.048	-38
22	Oil seeds and oleaginous fruit	0.275	0.169	-38
23	Crude rubber (including synthetic and reclaimed)	0	0.048	-
24	Cork and wood	0.001	0.010	695
25	Pulp and waste paper	0	0.003	-
26	Textile fibres (not wool tops) and their wastes (not in yarn)	15.13	6.801	-55
27	Crude fertilizer and crude minerals	0.880	2.284	160
28	Metalliferous ores and metal scrap	0.057	0.363	534
29	Crude animal and vegetable materials, nes	4.607	1.616	-65
32	Coal, coke and briquettes	0.123	0.002	-98
33	Petroleum, petroleum products and related materials	0.405	0.573	41
34	Gas, natural and manufactured	5.361	0.002	4823
35	Electric current	0	0	-
41	Animal oils and fats	0	0.000	-
42	Fixed vegetable oils and fats	0.031	0.017	-45
43	Animal and vegetable oils and fats, processed, and waxes	0.001	5.884	463444
51	Organic chemicals	0.095	0.556	481
52	Inorganic chemicals	0.106	0.227	114
53	Dyeing, tanning and coloring materials	0.081	0.331	305
54	Medicinal and pharmaceutical products	0.054	0.179	230
55	Oils and perfume materials; toilet and cleansing preparations	0.221	0.126	-43
56	Fertilizers, manufactured	0	0.000	-
57	Explosives and pyrotechnic products	0.001	0.002	15
58	Artificial resins and plastic materials, and cellulose esters etc	0.004	0.866	19982
59	Chemical materials and products, nes	0.067	0.098	46
61	Leather, leather manufactures, nes, and dressed furskins	6.434	3.993	-38
62	Rubber manufactures, nes	0.168	0.037	-78
63	Cork and wood, cork manufactures	0.022	0.178	678

Sr.	Description	RCA 1982	RCA 2011	% age change in RCA
64	Paper, paperboard, and articles of pulp, of paper or of paperboard	0.091	0.215	135
65	Textile yarn, fabrics, made-up articles, nes, and related products	13.733	20.04	46
66	Non-metallic mineral manufactures, nes	0.173	1.074	520
67	Iron and steel	0.113	0.197	75
68	Non-ferrous metals	0.002	0.088	3496
69	Manufactures of metals, nes	0.242	0.420	73
71	Power generating machinery and equipment	0.029	0.125	330
72	Machinery specialized for particular industries	0.122	0.129	6
73	Metalworking machinery	0.249	0.083	-67
74	General industrial machinery and equipment, nes, and parts of, nes	0.017	0.036	108
75	Office machines and automatic data processing equipment	0.008	0.004	-50
76	Telecommunications, sound recording and reproducing equipment	0.020	0.048	141
77	Electric machinery, apparatus and appliances, nes, and parts, nes	0.043	0.043	0
78	Road vehicles	0.017	0.029	71
79	Other transport equipment	0.346	0.030	-91
81	Sanitary, plumbing, heating, lighting fixtures and fittings, nes	0.015	0.037	139
82	Furniture and parts thereof	0.077	0.418	441
83	Travel goods, handbags and similar containers	0.168	0.194	15
84	Articles of apparel and clothing accessories	2.898	7.573	161
85	Footwear	0.681	0.727	7
87	Professional, scientific, controlling instruments, apparatus, nes	0.707	0.523	-26
88	Photographic equipment and supplies, optical goods; watches, etc	0.047	0.023	-50
89	Miscellaneous manufactured articles, nes	0.956	0.952	0
001	Live animals	0.011	0.054	361
011	Meat, fresh, chilled or frozen	0.002	0.574	22097
012	Meat, dried, salted or smoked	0	0	-
014	Meat in airtight containers nes & meat preptns	0.002	0.004	92
022	Milk and cream	0.000	0.382	198557
023	Butter	0	0.020	-
024	Eggs	0	2.441	-
025	Fish,fresh & simply preserved	0.015	0.071	353
034	Fish, salted, dried or smoked	0.109	0.333	205
035	Fish,in airtight containers,nes & fish preptns.	0.086	0.156	81
036	Wheat including spelt and meslin, unmilled	12.58	1.704	-86
037	Rice	0.882	1.565	77
041	Barley, unmilled	0.092	7.993	8502
042	Maize corn unmilled	19.84	12.74	-36
043	Cereals,unmilled excl.wheat,rice,barley & maize	1.342	0.018	-99
044	Meal and flour of wheat or of meslin	0.009	1.252	12475
045	Meal & flour of cereals,except wheat/meslin	0	0.035	-
046	Cereal preps & preps of flour of fruits & vegs	0	43.31	-
047	Fruit, fresh, and nuts excl. Oil nuts	0	3.648	-
048	Dried fruit including artificially dehydrated	0.444	0.649	46
054	Fruit,preserved and fruit preparations	0.187	0.300	60

Sr.	Description	RCA 1982	RCA 2011	% age change in RCA
056	Vegetables, roots & tubers, fresh or dried	0.580	0.146	-75
057	Vegetables, roots & tubers pres or prepared nes	1.866	2.772	49
058	Sugar and honey	0.008	0.074	746
061	Coffee	1.789	0.260	-85
062	Chocolate & other food preptns cont. Cocoa, nes	0.024	0.164	575
071	Tea and mate	0	0.000	-
072	Spices	0	8.431	-
073	Feed. Stuff for animals excl.unmilled cereals	0	0.000	-
074	Margarine & shortening	0.025	0.004	-83
075	Non alcoholic beverages,nes	0.295	0.057	-81
081	Alcoholic beverages	0.582	0.529	-9
091	Tobacco, unmanufactured	0	0.051	-
098	Tobacco manufactures	0.142	0.244	72
111	Hides & skins, exc.fur skins undressed	0.036	1.056	2830
112	Fur skins, undressed	0	0.000	-
121	Oil seeds, oil nuts and oil kernels	0.299	1.766	491
122	Crude rubber incl.synthetic & reclaimed	1.398	0.088	-94
211	Fuel wood & charcoal	0.123	0.067	-46
212	Wood in the rough or roughly squared	0	0.019	-
222	Wood,shaped or simply worked	0	0.191	-
223	Cork, raw and waste	11.95	2.067	-83
232	Pulp & waste paper	0	0.002	-
233	Silk	0	0.122	-
244	Wool and other animal hair	0	0.267	-
245	Cotton	0	0.008	-
246	Jute	0	0.138	-
247	Vegetable fibres,except cotton and jute	0.005	7.891	-100
248	Synthetic and regenerated artificial fibres	0	0.001	-
251	Waste materials from textile fabrics, incl.rags	0	0.004	-
261	Fertilizers, crude	0.687	0.115	-83
263	Stone, sand and gravel	42.97	13.52	-69
264	Sulphur & unroasted iron pyrites	0	1.828	-
265	Natural abrasives incl.industrial diamonds	0	0.026	-
266	Other crude minerals	0.604	0.067	-89
267	Iron and steel scrap	3.161	0.023	-99
268	Ores & concentrates of non-ferrous base metals	1.927	1.254	-35
269	Non-ferrous metal scrap	0.016	4.348	26704
271	Silver & platinum ores	3.588	0.023	-99
273	Ores & concentrates of uranium & thorium	1.427	3.685	158
274	Crude animal materials,nes	0	0.003	-
277	Crude vegetable materials,nes	0	0.024	-
278	Coal,coke & briquettes	0.066	2.614	3824
281	Petroleum, crude and partly refined	0	0.035	-
282	Petroleum products	0.161	0.138	-14
286	Gas,natural and manufactured	0	0	-

Sr.	Description	RCA 1982	RCA 2011	% age change in RCA
287	Electric energy	0.026	0.642	2291
288	Animal oils and fats	0	1.283	-
289	Fixed vegetable oils, soft	0.572	0.009	-98
291	Other fixed vegetable oils	5.190	4.394	-15
292	Anim./veg. Oils & fats,processed,and waxes	4.556	0.625	-86
322	Organic chemicals	0	0.001	-
323	Inorg.chemicals elems.,oxides,halogen salts	1.165	0.016	-99
333	Other inorganic chemicals	0	0	-
334	Radioactive and associated materials	1.400	1.061	-24
335	Crude chemicals from coal,petroleum and gas	0.021	0.008	-61
341	Synth.organic dyestuffs,natural indigo & lakes	6.351	0.003	4773
351	Dyeing & tanning extracts,synth.tanning mat.	0	0	-
411	Pigments, paints, varnishes & related materials	0	0.001	-
412	Medicinal & pharmaceutical products	0	0	-
423	Essential oils, perfume and flavour materials	0	0.004	-
424	Perfumery, cosmetics, dentifrices, etc.	0.114	0.032	-72
431	Soaps,cleansing & polishing preparations	0.004	9.230	195661
511	Fertilizers manufactured	0.082	0.039	-53
512	Explosives and pyrotechnic products	0.361	3.654	911
513	Plastic materials,regenerd.cellulose & resins	0.016	0.938	5641
514	Chemical materials and products,nes	0	0.000	-
515	Leather	0	0.001	-
516	Manuf.of leather or of artif.or reconst.leather	0.278	0.001	-99
522	Fur skins, tanned or dressed, including dyed	0.047	0.179	281
523	Materials of rubber	0.287	0.398	39
524	Articles of rubber,nes	0	0.009	-
531	Veneers,plywood boards & other wood,worked,nes	0.014	0.309	1966
532	Wood manufactures,nes	0.011	0.090	711
533	Cork manufactures	0.131	0.344	163
541	Paper and paperboard	0.079	0.198	148
551	Articles of paper, pulp, paperboard	0.141	0.023	-83
553	Textile yarn and thread	0.202	0.079	-61
554	Cotton fabrics,woven ex.narrow or spec.fabrics	0.284	0.289	2
562	Text fabrics woven ex narrow, spec, not cotton	0	0.001	-
572	Tulle, lace, embroidery, ribbons, trimmings	0.028	0.041	49
582	Special textile fabrics and related products	0.003	1.557	51670
583	Made up articles,wholly or chiefly of text.mat.	0.000	0.497	55626
584	Floor coverings, tapestries, etc.	0.030	0.004	-87
585	Lime,cement & fabr.bldg.mat. Ex glass/clay mat	0.034	6.210	17972
591	Clay and refractory construction materials	0	0.027	-
592	Mineral manufactures, nes	0.120	0.399	231
598	Glass	0.088	0.061	-31
611	Glassware	20.25	13.89	-31
612	Pottery	5.065	0.995	-80
613	Pearls and precious and semi precious stones	0.001	0.164	8401

Sr.	Description	RCA 1982	RCA 2011	% age change in RCA
621	Pig iron, spiegeleisen, sponge iron etc	0.560	0.031	-94
625	Ingots & other primary forms of iron or steel	0.041	0.051	22
628	Iron and steel bars,rods,angles,shapes,sections	0.355	0.012	-97
633	Universals,plates and sheets of iron or steel	0	0	-
634	Hoop and strip of iron or steel	0.014	0.126	751
635	Rails & rlwy track constr mat. Of iron or steel	0.035	0.223	529
641	Iron and steel wire, excluding wire rod	0.043	0.194	349
642	Tubes,pipes and fittings of iron or steel	0.275	0.259	-6
651	Iron steel castings forgings unworked, nes	13.32	23.67	78
652	Silver and platinum group metals	28.36	49.60	75
653	Copper	0.429	8.583	1897
654	Nickel	14.41	0.251	-98
655	Aluminium	0.228	1.164	409
656	Lead	1.148	0.825	-28
657	Zinc	0.282	0.601	113
658	Tin	40.16	45.52	13
659	Uranium and thorium and their alloys	25.23	5.804	-77
661	Miscell.non ferrous base metals	0.003	12.01	365590
662	Finished structural parts and structures, nes	0.025	0.102	307
663	Metal containers for storage and transport	0.681	0.280	-59
664	Wire products ex electric & fencing grills	0.243	0.141	-42
665	Nails,screws,nuts,bolts,rivets and sim.articles	0.233	0.209	-10
666	Tools for use in the hand or in machines	0.046	0.137	196
667	Cutlery	0.103	0.015	-85
671	Household equipment of base metals	2.733	0.349	-87
672	Manufactures of metal, nes	0	0.034	-
673	Power generating machinery, other than electric	0.014	0.062	344
674	Agricultural machinery and implements	0.000	0.005	1055
675	Office machines	0	0	-
676	Metalworking machinery	0	0.177	-
677	Textile and leather machinery	0.000	0.006	578
678	Machines for special industries	0.000	0.897	89887
679	Machinery and appliances non electrical parts	0	0.032	-
681	Electric power machinery and switchgear	0.001	0.003	151
682	Equipment for distributing electricity	0.002	0.149	5157
683	Telecommunications apparatus	0	0	-
684	Domestic electrical equipment	4.011	0.015	38409
685	Elec.apparatus for medic.purp.,radiological ap.	0.035	1.655	4546
686	Other electrical machinery and apparatus	0	0.059	-
687	Railway vehicles	0.004	0	-
688	Road motor vehicles	0	0	-
689	Road vehicles other than motor vehicles	0	0.009	-
691	Aircraft	0.004	0.778	19148
692	Ships and boats	0.046	0.207	350
693	Sanitary,plumbing,heating & lighting fixtures	0.051	0.078	53

Sr.	Description	RCA 1982	RCA 2011	% age change in RCA
694	Furniture	0.042	0.020	-51
695	Travel goods, handbags and similar articles	0.036	0.161	337
696	Clothing except fur clothing	4.610	4.605	0
697	Fur clothing and articles of artificial fur	0.481	0.915	90
699	Footwear	0.073	0.044	-40
711	Scientific,medical,optical,meas./contr.instrum.	0.004	0.073	1376
712	Photographic and cinematographic supplies	0.010	0.185	1590
713	Developed cinematographic film	0.026	0.150	468
714	Watches and clocks	0.001	0.129	8457
716	Musical instruments,sound recorders and parts	0.034	0.157	357
718	Printed matter	0.300	0.012	-96
721	Articles of artificial plastic materials nes	0.014	0.130	799
722	Perambulators,toys,games and sporting goods	0.004	0.693	13957
723	Office and stationery supplies, nes	0.297	0.104	-65
724	Works of art,collectors pieces and antiques	0.192	0.393	105
725	Jewellery and gold/silver smiths wares	0.001	0.043	2543
726	Manufactured articles, nes	0.008	0.080	966
727	Live animals	0.049	0.475	863
728	Meat, fresh, chilled or frozen	0.039	0.027	-30
736	Meat, dried, salted or smoked	0.166	0.061	-63
737	Meat in airtight containers nes & meat preptns	0.644	0.232	-64
741	Milk and cream	0.041	0.051	23
742	Butter	0.033	0.035	7
743	Eggs	0.000	0.070	8528
744	Fish,fresh & simply preserved	0.013	0.020	55
745	Fish, salted, dried or smoked	0.016	0.064	296
749	Fish,in airtight containers,nes & fish preptns.	0.008	0.007	-7
751	Wheat including spelt and meslin, unmilled	0.030	0.002	-93
752	Rice	0.005	0.003	-28
759	Barley, unmilled	0.003	0.006	110
761	Maize corn unmilled	0	0.000	-
762	Cereals,unmilled excl.wheat,rice,barley & maize	0.012	0.000	-95
763	Meal and flour of wheat or of meslin	0.010	0.002	-77
764	Meal & flour of cereals,except wheat/meslin	0.031	0.065	108
771	Cereal preps & preps of flour of fruits & vegs	0.516	0.023	-95
772	Fruit, fresh, and nuts excl. Oil nuts	0.016	0.012	-21
773	Dried fruit including artificially dehydrated	0.071	0.012	-83
774	Fruit,preserved and fruit preparations	0	0.003	-
775	Vegetables, roots & tubers, fresh or dried	0.035	0.363	916
776	Vegetables, roots & tubers pres or prepared nes	0.000	0.001	105
778	Sugar and honey	0.005	0.057	880
781	Coffee	0.009	0.002	-74
782	Chocolate & other food preptns cont. Cocoa, nes	0.024	0.035	44
783	Tea and mate	0.032	0.084	161
784	Spices	0.011	0.047	319

Sr.	Description	RCA 1982	RCA 2011	% age change in RCA
785	Feed. Stuff for animals excl.unmilled cereals	0.106	0.190	79
786	Margarine & shortening	0.004	0.051	989
791	Non alcoholic beverages,nes	0.181	0.041	-77
792	Alcoholic beverages	0.165	0.022	-86
793	Tobacco, unmanufactured	0.609	0.035	-94
812	Tobacco manufactures	0.058	0.087	49
821	Hides & skins, exc.fur skins undressed	0.077	0.418	441
831	Fur skins, undressed	0.168	0.194	15
842	Oil seeds, oil nuts and oil kernels	1.963	11.44	483
843	Crude rubber incl.synthetic & reclaimed	3.321	4.859	46
844	Fuel wood & charcoal	8.529	1.861	-78
845	Wood in the rough or roughly squared	0.539	4.449	725
846	Wood,shaped or simply worked	3.811	10.30	170
847	Cork, raw and waste	4.101	11.74	186
848	Pulp & waste paper	3.951	13.42	240
851	Silk	0.681	0.727	7
871	Wool and other animal hair	0.021	0.001	-93
872	Cotton	4.198	2.257	-46
873	Jute	0.002	3.161	-99
874	Vegetable fibres,except cotton and jute	0.083	0.033	-60
881	Synthetic and regenerated artificial fibres	0.026	1.110	-100
882	Waste materials from textile fabrics, incl.rags	0.001	0.133	7106
883	Fertilizers, crude	1.010	0	-
884	Stone, sand and gravel	0.228	0.011	-95
885	Sulphur & unroasted iron pyrites	0	0.001	-
892	Natural abrasives incl.industrial diamonds	0.637	0.068	-89
893	Other crude minerals	0.145	0.453	212
894	Iron and steel scrap	2.611	1.501	-43
895	Ores & concentrates of non ferrous base metals	0.126	0.237	87
896	Non ferrous metal scrap	0	0.358	-
897	Silver & platinum ores	0.098	2.696	2651
898	Ores & concentrates of uranium & thorium	0.081	0.096	19
899	Crude animal materials,nes	3.492	0.319	-91

TABLE A2

Total Share of Trade-Exports of Particular Sector in Total Exports of Pakistan

	Food and live animals	Beverages and tobacco	Crude materials (except fuels)	Mineral fuels and lubricants	Animal and vegetable oils and fats	Chemical products	Manufactured goods classified by material	Machinery and transport equipment	Miscellaneous manufactured articles
	0	1	2	3	4	5	6	7	8
1982	19.40	0.42	14.56	5.88	0.02	0.59	45.13	2.42	10.17
1983	20.75	0.29	12.99	1.86	0.00	0.99	49.04	1.15	11.64
1984	21.30	0.52	7.96	0.99	0.00	2.30	47.67	2.53	15.41
1985	16.66	0.32	18.34	1.42	0.00	3.37	43.31	1.99	13.67
1986	14.77	0.43	16.55	0.73	0.00	0.80	45.44	2.92	18.01
1987	13.10	0.28	13.32	0.69	0.08	0.41	52.07	1.31	18.51
1988	13.47	0.31	19.13	0.51	0.00	0.46	46.93	0.86	18.06
1989	11.29	0.13	17.45	0.94	0.00	0.55	48.97	0.90	19.40
1990	8.73	0.12	10.82	1.27	0.00	0.44	54.28	1.00	23.11
1991	9.89	0.12	9.15	1.47	0.01	0.37	54.07	1.02	23.58
1992	9.56	0.13	9.98	1.22	0.00	0.46	53.28	0.89	24.20
1993	9.21	0.08	4.75	0.98	0.04	0.46	55.26	0.74	28.18
1994	-	-	-	-	-	-	-	-	-
1995	11.41	0.06	4.27	0.98	0.00	0.67	56.19	0.54	25.63
1996	8.78	0.02	6.43	0.76	0.00	0.78	56.30	0.59	26.18
1997	9.85	0.04	2.98	0.86	0.00	0.55	56.27	1.26	28.04
1998	13.12	0.07	2.24	0.32	0.10	0.72	53.66	1.05	28.57
1999	12.56	0.06	1.76	0.92	0.23	0.82	53.60	1.21	28.60
2000	10.05	0.07	3.24	1.43	0.25	1.59	52.40	1.04	29.75
2001	10.34	0.09	2.12	2.13	0.14	1.75	52.54	1.16	29.52
2002	10.32	0.08	1.79	1.92	0.17	2.05	52.59	1.13	29.84
2003	10.17	0.14	1.82	2.29	0.37	2.36	52.35	1.30	29.04
2004	9.07	0.16	2.38	2.71	0.42	2.17	49.69	3.86	29.49
2005	11.17	0.17	1.94	4.20	0.61	3.03	48.70	1.82	28.29
2006	10.94	0.19	1.82	4.97	0.59	2.56	48.52	1.91	28.43
2007	10.96	0.11	2.15	5.57	0.61	2.58	46.79	4.47	26.53
2008	16.73	0.09	2.47	6.06	0.83	3.54	42.15	2.82	25.24
2009	15.53	0.14	2.77	4.06	0.55	3.76	43.99	2.34	26.81

	Food and live animals	Beverages and tobacco	Crude materials (except fuels)	Mineral fuels and lubricants	Animal and vegetable oils and fats	Chemical products	Manufactured goods classified by material	Machinery and transport equipment	Miscellaneous manufactured articles
2010	15.86	0.15	3.15	5.60	0.40	3.81	42.94	2.64	25.40
2011	18.24	0.23	3.64	5.18	0.76	4.43	41.82	1.76	23.92

TABLE A3

No of RCA of Pakistan over the sample period 1982-2011

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	C.V
< 1	47	44	48	54	51	45	47	47	48	44	46	48	0	47	47	46	48	50	54	52	52	57	60	56	56	60	59	65	67	56	.09
< 2	34	34	38	41	37	34	34	35	35	34	33	37	0	36	33	34	37	41	41	38	38	38	39	42	42	41	42	40	40	40	.04
< 3	28	28	30	34	26	25	30	26	26	26	25	33	0	28	25	26	29	29	31	25	28	30	33	31	31	31	33	30	30	32	.07
< 4	22	22	24	25	22	22	24	24	22	19	18	19	0	21	20	20	21	19	22	20	21	25	26	27	27	25	28	25	27	27	.12
< 5	16	16	22	19	17	15	16	17	18	17	17	17	0	19	16	16	20	18	20	18	20	22	24	22	21	21	24	22	24	22	.09
< 10	12	10	11	10	11	11	10	11	12	11	11	11	0	9	11	10	10	9	11	12	10	11	10	12	13	12	15	12	13	13	.14
< 20	5	4	4	6	5	5	6	4	5	5	5	5	0	4	5	4	5	5	7	6	3	4	4	6	7	6	6	5	5	5	.22
< 30	2	2	1	3	3	2	3	3	3	3	3	3	0	2	4	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	.09
< 40	2	0	0	2	2	2	2	2	0	1	2	0	0	1	1	1	1	2	2	2	2	2	3	3	3	3	3	3	3	3	.19
< 50	0	0	0	2	2	2	2	1	0	0	1	0	0	0	0	0	0	0	2	1	1	2	2	2	2	2	3	2	2	0	.54

TABLE A4

OECD (Consortium economies): Aggregated and disaggregated level having comparative advantage (Indices >1)

Country\Year	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Belgium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
France	139	130	134	153	139	135	124	130	130	131	128	135	132	131	137
Germany	0	0	0	0	0	0	0	0	0	131	123	121	120	120	113
Italy	105	106	109	118	109	105	102	106	99	103	101	102	99	108	114
Netherlands	88	86	87	110	115	119	118	118	119	118	116	119	128	119	121
U.K.	170	152	153	177	163	176	168	170	173	156	163	157	167	159	163
Norway	41	45	40	41	48	54	57	53	50	47	46	39	39	39	37
Sweden	101	92	95	102	102	99	92	88	92	93	97	98	96	83	79
Japan	89	85	87	85	73	73	75	75	75	75	73	73	75	76	78

Cont…														
Country\Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Belgium	0	0	124	127	120	116	114	128	118	120	118	133	130	131	105
France	132	126	130	135	132	132	131	131	131	135	138	141	132	137	114
Germany	116	113	117	121	111	123	114	110	123	131	120	125	122	123	117
Italy	112	109	118	131	120	126	125	126	129	135	129	134	141	148	138
Netherlands	126	127	124	107	101	106	115	103	110	107	108	108	108	106	0
U.K.	173	177	167	152	136	142	123	118	112	102	85	68	60	65	0
Norway	36	42	45	32	34	35	33	30	28	25	29	23	33	29	22
Sweden	81	85	95	91	101	101	98	97	96	97	94	103	108	103	91
Japan	76	78	82	79	82	77	80	74	80	79	79	78	91	80	78

TABLE A5

Asian economies: Aggregated and disaggregated level having comparative advantage (Indices >1)

Country\Year	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Pakistan	47	44	48	54	51	45	47	47	48	44	46	48	0	47	47
Azerbaijan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
Armenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bahrain	0	0	0	0	0	0	0	0	0	0	0	0	24	26	39
Bangladesh	31	29	23	32	31	31	29	35	31	29	36	33	33	33	32
Bhutan	0	0	0	0	0	0	0	0	0	23	30	32	27	0	0
Brunei	0	0	0	0	7	7	7	7	6	6	6	7	7	0	0
Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
China	0	0	21	59	57	105	105	110	113	107	122	123	124	116	120
India	76	69	66	86	72	69	75	83	86	86	86	86	87	89	99
Indonesia	25	27	29	40	51	55	58	62	62	66	69	72	72	76	79
Iran	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Iraq	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Israel	64	68	69	72	72	77	68	67	86	65	65	58	66	65	65
Jordan	66	51	52	51	48	58	49	49	54	65	50	59	53	63	0
Kazakhstan	0	0	0	0	0	0	0	0	0	0	0	0	0	62	55
Kuwait	0	0	0	0	0	80	78	78	9	16	6	6	10	8	9
Kyrgyzstan	0	0	0	0	0	0	0	0	0	0	0	0	0	72	91
Lebanon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malaysia	35	38	39	40	52	65	53	57	56	60	61	58	56	53	52
Maldives	0	0	0	0	0	0	0	0	0	0	0	0	0	17	16

Country														
Mongolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
Nepal	27	40	36	48	52	37	39	39	35	37	36	32	38	40	39
North Korea	82	76	69	75	75	73	74	77	76	73	78	81	76	74	72
Oman	0	0	0	0	0	0	0	62	47	80	88	92	90	85	93
Philippines	47	50	49	67	98	62	63	67	67	78	67	66	67	66	66
Qatar	0	0	0	0	0	0	0	17	17	17	15	18	21	19	17
Saudi Arabia	5	0	0	10	0	0	25	19	17	13	19	17	13	18	18
Singapore	49	57	51	57	59	47	67	72	59	61	64	57	50	48	44
Sri Lanka	46	38	36	45	49	49	49	53	50	52	51	53	57	0	0
Syria	31	31	31	26	34	35	0	43	42	0	34	0	0	46	36
Tajikistan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thailand	62	65	63	80	74	81	0	86	89	90	87	93	90	89	93
Turkey	0	0	0	96	83	83	88	88	7	81	102	86	84	91	96
Turkmenistan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UAE	0	0	78	86	84	0	83	38	87	31	30	30	0	0	0
Vietnam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yemen	0	0	0	0	0	0	0	0	0	15	0	0	0	13	11

Cont…

Country\Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Pakistan	46	48	50	54	52	52	57	60	56	56	60	59	65	67	56
Azerbaijan	43	38	31	23	18	22	29	32	35	29	27	8	15	13	11
Armenia	18	0	57	51	49	42	44	42	42	44	46	49	47	46	37
Bahrain	0	0	0	16	20	20	17	15	14	11	11	25	25	19	32
Bangladesh	31	32	0	30	33	30	31	33	43	40	40	0	0	0	0
Bhutan	0	33	36	0	0	0	0	0	42	37	36	12	24	28	0
Brunei	9	9	0	0	9	8	8	8	0	5	0	0	0	0	0
Cambodia	0	0	0	13	14	12	6	10	9	10	11	11	11	14	0
China	114	115	119	123	118	112	110	110	110	110	112	117	111	112	112
India	97	91	97	112	111	107	111	113	111	117	129	119	98	109	87
Indonesia	68	74	92	96	95	95	92	93	86	90	85	82	78	79	71
Iran	17	27	23	19	30	22	21	15	22	28	0	0	0	38	0
Iraq	0	0	0	6	7	6	0	3	3	3	3	3	3	0	0
Israel	62	61	60	53	47	50	51	47	52	51	70	0	60	58	55
Jordan	65	64	74	111	81	70	71	71	74	72	68	70	78	73	62
Kazakhstan	55	47	44	42	43	43	49	47	41	39	39	40	40	35	0
Kuwait	12	17	15	11	11	13	13	11	0	10	10	10	12	0	0
Kyrgyzstan	0	54	52	50	48	58	57	58	61	67	63	48	45	46	37

Lebanon	99	98	96	97	96	104	97	97	97	97	100	100	91	83	68
Malaysia	49	46	43	44	50	46	46	51	54	54	53	61	69	66	70
Maldives	16	15	17	15	15	16	14	19	16	10	11	10	13	11	10
Mongolia	30	32	32	27	25	26	28	31	28	25	22	0	0	0	0
Nepal	40	39	57	41	0	0	26	0	0	0	0	0	78	77	0
North Korea	71	69	73	74	73	64	63	59	64	66	65	67	72	70	64
Oman	90	89	92	89	84	83	93	96	94	102	105	105	99	11	96
Philippines	63	49	37	43	45	42	45	46	51	56	51	55	54	50	48
Qatar	0	16	13	15	9	15	14	17	12	14	15	11	12	0	16
Saudi Arabia	0	20	17	10	15	23	17	16	15	14	15	14	14	15	0
Singapore	48	48	46	44	47	54	54	50	45	44	44	48	43	46	44
Sri Lanka	0	0	51	53	50	52	57	69	62	71	68	67	62	62	53
Syria	39	38	36	32	19	34	41	51	51	63	63	75	72	65	0
Tajikistan	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0
Thailand	90	96	96	102	102	109	108	107	107	105	100	111	104	105	90
Turkey	96	0	94	100	108	96	93	94	99	101	103	107	106	108	99
Turkmenistan	26	29	26	24	0	0	0	0	0	0	0	0	0	0	0
UAE	0	0	37	29	33	21	22	19	23	26	24	20	19	17	0
Vietnam	56	49	55	65	71	69	66	63	69	79	81	78	82	90	0
Yemen	16	21	16	14	12	14	10	19	15	16	17	20	21	30	21

TABLE A6

Latin economies: Aggregated and disaggregated level having comparative advantage (Indices >1)

Country\Year	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Argentina	46	38	40	58	63	69	70	75	78	69	67	73	77	89	74
Belize	0	62	64	75	79	76	82	77	84	89	90	94	92	95	95
Chile	0	32	31	41	46	47	46	49	45	47	50	59	61	55	57
Colombia	43	39	33	46	38	42	47	50	49	61	67	63	59	65	61
Costa Rica	0	0	0	0	50	49	57	58	64	60	69	70	65	62	68
Cuba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dominican Republic	0	0	0	0	0	0	0	0	0	0	48	49	51	47	16
Ecuador	19	11	16	24	24	23	22	25	22	25	26	28	28	30	33
El Salvador	0	0	0	0	32	40	34	50	52	62	78	73	70	75	74
Guadeloupe	27	22	20	32	23	30	24	26	27	24	31	28	28	27	0
Guatemala	0	0	0	0	49	64	66	66	67	72	79	79	74	67	71
Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Country														
Haiti	0	0	0	0	0	0	39	40	34	45	39	38	38	38	40
Honduras	0	0	0	0	31	31	41	47	46	45	50	45	51	39	58
Jamaica	31	34	31	43	42	41	44	40	38	39	39	38	38	38	37
Mexico	0	0	0	0	71	59	65	63	61	70	76	75	74	76	73
Nicaragua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paraguay	0	30	27	28	36	37	38	38	38	36	38	40	50	45	48
Peru	41	38	42	49	47	49	47	61	56	56	55	57	53	55	58
Uruguay	0	52	55	64	58	71	73	79	80	74	73	65	70	71	75
Venezuela	8	6	8	20	12	8	15	14	16	23	22	24	20	28	23
USA	114	111	108	119	108	101	104	101	107	111	107	107	116	115	117

Cont…

Country\Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Argentina	85	85	96	98	96	93	85	94	94	99	87	84	85	82	63
Belize	95	91	98	104	101	94	100	99	98	95	99	86	93	86	62
Chile	56	63	62	59	63	64	63	59	59	54	51	60	61	59	48
Colombia	62	67	68	72	81	80	78	84	72	76	79	75	64	44	31
Costa Rica	70	70	59	65	70	68	66	74	82	72	69	81	59	80	63
Cuba	0	0	36	33	33	36	38	40	34	27	0	0	0	0	0
Dominican Republic	18	0	0	0	66	55	55	49	54	59	64	77	77	80	70
Ecuador	36	40	44	47	56	49	51	44	44	42	45	45	50	48	33
El Salvador	76	83	91	46	42	44	45	55	66	75	74	78	73	72	0
Guadeloupe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Guatemala	68	75	77	81	91	81	89	90	86	89	85	86	84	85	69
Guyana	21	25	25	28	34	37	39	36	39	38	41	34	34	31	31
Haiti	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Honduras	54	60	68	66	61	69	70	68	68	61	69	0	73	0	0
Jamaica	39	37	36	39	39	36	36	33	32	32	31	32	44	46	0
Mexico	77	80	72	70	66	69	72	76	78	69	71	74	79	74	57
Nicaragua	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paraguay	52	51	50	56	52	51	46	47	51	58	56	45	50	51	43
Peru	61	61	61	60	67	58	58	57	55	53	53	58	59	58	44
Uruguay	77	81	78	79	81	69	72	77	79	83	83	75	70	0	0
Venezuela	26	36	31	20	25	34	26	25	18	9	0	8	6	7	1
USA	118	114	113	123	128	130	130	135	135	140	130	132	126	137	110