©*The Pakistan Development Review*
55:3 (Autumn 2016) pp. 191–210

The Determinants of Pakistan Exports of Textile: An Integrated Demand and Supply Approach

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The determinants of demand and supply of textile and clothing exports of Pakistan are examined for seven major trading partners (US, UK, Canada, Italy, France, Japan and Spain) over the period 1972 to 2013. The simultaneous equation model is estimated by Generalised Method of Moment to handle simultaneous equation bias and for consistent and more precise estimates classical Empirical Bayes technique is applied. The results reveal that income of trading partners and devaluation policy has important and significant role in explaining exports performance of textile and clothing of Pakistan. As regards the supply side, the relative prices and capacity variable are important in determining the textile and clothing exports, however, the real wages have significant but small effect on textile and clothing exports supply. The removal of quantitative restrictions fails to provide incentives to the suppliers. The high income elasticity for the demand suggests that focus should be on raising the factors which can help in expansion of textile and clothing products in local market and marked countries.

Keywords: Textile and Clothing Exports of Pakistan, Simultaneous Equations, Real Effective Exchange Rate, Agreement on Textile and Clothing

1. INTRODUCTION

The exports from the developing countries are considered as an important contributor to their economic growth [Lewis (1980)]. The high growth achieved by some developing countries for example Korea, Taiwan and Singapore is partially due to adoption of export promotion strategies that increased their manufacturing exports. Their successful experiences have encouraged other developing countries to adopt export-led growth policy. The empirical literature suggests that both demand and supply side factors have their role in the determination of country's exports performance. The demand of exports is determined mainly by income of trading partners and competitive position of exporting country[1] and the supply of exports by the relative prices (i.e. ratio of export price to the domestic price of the product), domestic production capacity and wage rate [Virmani (1991); Hasan and Khan (1994); Atique and Ahmad (2003); Roy (2009)]. However, the policy factors also play significant role in boosting export performance. This reveals that export performance of any country is determined by both price and non-price factors.

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Authors' Note: The errors and omissions are authors' sole responsibility.

[1]It is represented by export price relative to the competitor's price [Riedel (1988)] and also to the world price [Hasan and Khan (1994)].

The current study has selected textile and clothing sector to analyse determinants of exports as it is the major industrial sector of Pakistan. It contributes around 46 percent in manufacturing output, accounts about 60 percent to export earnings and absorb approximately 39 percent of manufacturing labour force [*Economic Survey of Pakistan* (2012-13)]. Textile and clothing industries of Pakistan produce all types of products ranging from raw material processing (cotton yarn and other products) to the finished products (cloths, carpets and other industrial textile). Textile sector supplies major input (cotton) to clothing industry, furniture and car industries. Pakistan's climate is suitable for the production of important inputs (cotton and wool) for textile and clothing industry. Pakistan has been involved traditionally in the production and trade of raw material during early stages and was unable to take advantage of using these inputs in production of value added products. Although textile and clothing sector of Pakistan is very important at national level but its share in world exports is very small. Trade in textile and clothing sector has been subject to quota restrictions from importing countries (EU and USA etc) during period 1974-1994 in the form of bilateral trade agreement Multi Fiber Agreement (MFA) and then Agreement on Textile and Clothing (ATC).[2] Due to the devastating effects of restriction of MFA, it was decided in Uruguay Round (UR) 1994 to bring trade in textile and clothing sector under General Agreement on Tariffs and Trade (GATT) rules. ATC replaced MFA on January 1, 1995 and trade in textile and clothing sector started functioning under World Trade Organisation (WTO) agreement. Member countries were given ten years period to integrate textile and clothing trade in four phases to remove non-tariff restriction and to adjust for new phase of trade. ATC also focused on the removal of other non-MFA barriers that were not acceptable by the general GATT rules. This fact highlights the need to see the impact of removal of quota restrictions on the exports of textile and clothing in case of Pakistan.

The other motivation to undertake this study is that a change in the structure of textile and clothing trade have occurred during last few years which significantly influenced the magnitude and structure of textile and clothing industry and exports. This includes change in the consumers' expenditures pattern, decrease in protection in international market and increased share of developing countries in the world textile and clothing exports. Therefore, proper understanding of demand and supply side determinants of this important sector is required. As suggested in the literature both the demand and supply side determinants are equally important in explaining a country's export performance [Reidel, *et al.* (1988); Roy (1991, 2002) etc.]. However, there is no consensus of views available which could determine the relative importance of demand and supply side factors for developing countries like Pakistan. In addition, most of the studies have focused on aggregate exports whereas it is more beneficial to highlight the factors that determine sector wise export performance. This encourages to estimate factors that affect the demand and supply of the textile and clothing exports of Pakistan that is major contributor (more than 60 percent) in total exports. Further, simultaneous equations model have been specified to incorporate endogeniety problem for textile and clothing exports demand and supply. Seven major trading partners (US, UK, Canada, Italy, France, Japan and Spain) are selected for the analysis of disintegrated textile and clothing exports. Another contribution of this study is addition of dummy variable to

[2]See Textile Vision 2005 for further details.

examine the impact of removal of MFA restrictions on textile and clothing exports growth.

The main objective is to analyse the impact of demand and supply side determinants on textile and clothing exports of Pakistan.[3] The study also evaluates the relative importance of demand and supply side factors in export performance of textile and clothing products. The study examines that real devaluation of domestic currency as compared to other competitors' currency helps to accelerate exports performance in Pakistan textile exports or not. The study also investigates that whether the removal of MFA restrictions encourages domestic suppliers to expand their exports supply or not. The advantage of using GMM is that it takes into account the endogeneity problem present in the model and provides consistent estimates. Lag explanatory variables are used as instruments. Small sample sizes raise the possibility of getting biased and imprecise estimates with classical estimation techniques. This leads to use Empirical Bayesian technique that generates more efficient and precise estimates by adding valid information in the form of prior knowledge about the form of density.

The study is organised as follows. After the introduction, a brief overview of textile and clothing sector is presented in section two. Sections three presents the relevant literature for the exports determinant. Methodology and data sources are discussed in section four. The discussion and analysis of the results are given in section five and last section concludes the study.

2. SOME SALIENT FEATURES OF PAKISTAN'S TEXTILE EXPORTS

The textile and clothing sector is a major contributor to the growth of Pakistan's economy. Table 2.1 shows that the share of the textile sector (67.39 percent) is greater than the clothing sector (32.60 percent) in the total exports of Pakistan. However, the pattern in world textile and clothing exports is different. The share of clothing in exports is greater at 60.05 percent compared to textiles at 39.94 percent.

Table 2.1

Textile and Clothing Exports 2013

US$ billion

	World	% Share	Pakistan	% Share
Textile	306.0	39.94	9.3	67.39
Clothing	360.0	60.05	4.5	32.60
Total	766.0		13.8	

Source: Pakistan Economic Survey 2014-15.

Table 2.2 illustrate that Pakistan is facing major competition from China with share in world exports of 15.63 percent in 2001 increasing to 37.41 percent in 2014. Whereas share of Pakistan in the world's textile and clothing exports has increased from 1.95 percent in 2001 to 2.15 percent in 2005. Afterwards, its share in world market starts declining to 1.76 percent in 2014.

[3]The work in progress was published as working paper [Latif and Javid (2013)].

Table 2.2

Comparison of Pakistan's Textile and Clothing Exports with Asia

US$ million

Countries / Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
World	342226	358082	406173	454850	481882	529197	587133	613841	528384	606946	713421	703087	763748	797355
Bangladesh	5238	5314	6067	6893	7595	9812	9739	12762	12778	16118	21112	21422	25762	26945
Share in World Exports (%)	1.48	1.49	1.52	1.58	1.85	1.66	2.08	2.42	2.66	2.96	3.05	3.37	3.38	1.48
China	53475	61864	78961	95284	115213	144057	171552	185772	167088	206691	248185	255052	283982	298269
Share in World Exports (%)	15.63	17.28	19.44	20.95	23.91	27.22	29.22	30.26	31.62	34.05	34.79	36.28	37.18	37.41
India	11011	11645	12750	14332	17070	18444	19547	21340	21116	24062	30012	29276	32959	36082
Share in World Exports (%)	3.22	3.25	3.14	3.15	3.54	3.49	3.33	3.48	4.00	3.96	4.21	4.16	4.32	4.53
Pakistan	6661	7018	8521	9151	10691	11376	11177	11092	9867	11778	13632	12919	13890	14068
Share in World Exports (%)	1.95	1.96	2.10	2.01	2.22	2.15	1.90	1.81	1.87	1.94	1.91	1.84	1.82	1.76

Source: World Trade Organisation (WTO).

The percentage share and growth rate of major textile and clothing export categories with respect to total exports (1972-2010) are reported in Table 2.3. Share and growth rate of raw cotton has showed decreasing trend over review period. The exports of readymade garments have continuously increased over the last four decades and have 19.04 percent contribution in total exports. Other categories shows mixed trend in percentage share and growth rate.

Table 2.3

Concentration of Exports[4]

	1972-1980		1981-1990		1991-2000		2001-08	
	%Share	Growth	% Share	Growth	% Share	Growth	% Share	Growth
Raw Cotton	8.76	23.03	12.80	8.35	3.00	-6.06	0.51	-11.81
Cotton Waste	0.19	-4.83	0.26	304.21	0.67	5.03	0.31	1.08
Cotton Yarn	12.53	0.62	10.71	77.40	16.60	10.80	8.79	3.65
Cotton Thread	0.42	14.01	0.20	-3.56	0.04	-1.31	0.01	74.79
Cotton Cloth	12.99	11.72	10.67	40.20	13.50	27.34	12.22	13.57
Synthetic Textile	0.49	-0.65	3.60	25.81	6.57	20.35	3.41	-2.51
Readymade Garments	2.27	81.70	7.99	182.49	16.66	36.00	19.04	13.11

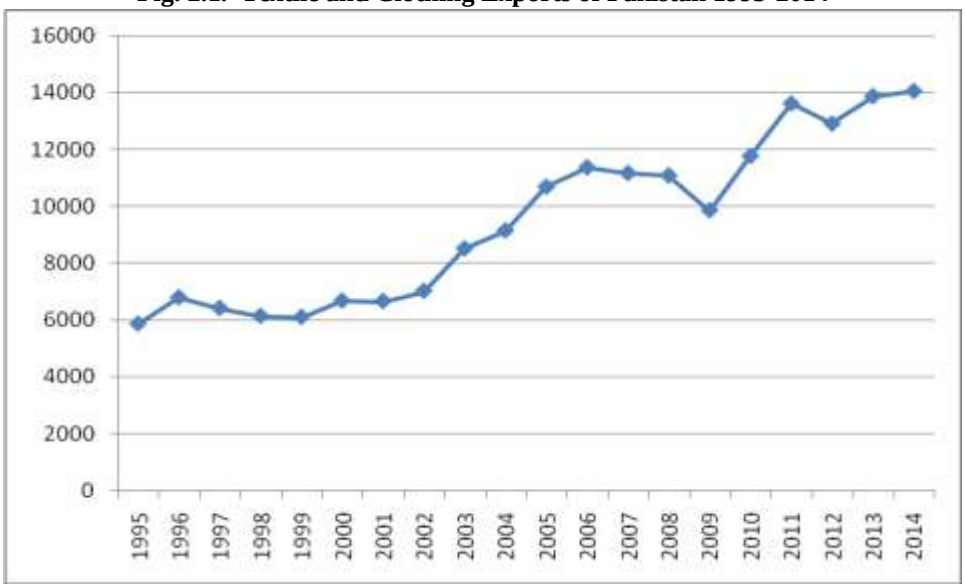
Source: Statistical Supplement and Economic survey of Pakistan.

The textile and clothing exports from developing countries remained constrained by the Multi-Fibre Agreement (MFA) from 1974-94 whose main purpose was to protect the textile and clothing industries of the developed countries. Pakistan's major buyers (EU and USA) imposed quota restriction on 15 and 39 categories respectively [Textile Vision (2005)]. It was expected that the removal of quantitative restrictions would bring significant improvement in textile and clothing exports of Pakistan [Khan and Mahmood (1996), Ingco and Winters (1995) and Trela and Whalley (1990)]. But there was no significant improvement even after 19 years of the quota abolishing regime. It is obvious that only those countries will survive in the post quota regimes which can perform well in the presence of quantitative restrictions such as China [Malik (2000)]. The analysis of

[4]Due to the problem of data availability in similar pattern for 1972-2010, this table consists of few components not all textile exports categories.

data given in Table 2.3 and Figure 2.1 shows that the decision to end non-tariff barriers has not been very beneficial for Pakistan in the face of tough competition from other developing countries. One of the reason of negative effect might be due to the fact that some of the units have shifted to Bangladesh.

Fig. 2.1. Textile and Clothing Exports of Pakistan 1995-2014



Source: WTO.

Fig. 2.2. Share of Textile Exports of Pakistan in Different Periods

(During the specified period, share of textile exports in total exports is more than 50 percent, any change in textile exports bring change in total exports. Because of data limitations, study use relative prices of exports as a proxy for relative prices of textile exports.)

The principal buyers of textile and clothing exports of Pakistan in two fiscal years 2007-08 and 2008-09 are discussed in Table 2.4. The major share of Pakistan's textile goods was exported to USA followed by UK during the last two fiscal years. The share of the remaining countries has either decreased or has been constant which clearly shows Pakistan's inability to expand its textile exports more than 50 percent of which remains tied to five countries only.

Table 2.4

Principal Buyers of Textile and Clothing Exports from Pakistan

US$ Million

	2007-08 (Textile and Clothing Exports)		2008-09 (Textile and Clothing Exports)	
Countries	Value	Percentage in Total	Value	Percentage in Total
USA	3,303,455	31.2	2,925,545	30.6
UK	783,749	7.4	678,592	7.1
GERMANY	598,549	5.7	547,440	5.7
CHINA	368,437	3.5	457,414	4.8
ITALY	471,616	4.5	385,168	4
BANGLADESH	255,319	2.4	334,342	3.5
SPAIN	422,085	4	327,980	3.4
UAE	379,852	3.6	324,872	3.4
BELGIUM	319,601	3	321,600	3.4
TURKEY	331,915	3.1	304,380	3.2
NETHERLANDS	352,777	3.3	293,778	3.41
HONG KONG	397,900	3.8	282,674	3
FRANCE	260,659	2.5	228,946	2.4
SAUDI ARABIA	135,919	1.3	169,618	1.8
SOUTH AFRICA	200,604	1.9	136,218	1.4
CANADA	149,197	1.4	132,530	1.4
PORTUGAL	150,139	1.4	113,480	1.2
SRI LANKA	127,023	1.2	105,405	1.1
SOUTH KOREA	91,041	0.9	91,182	1
AUSTRALIA	95,123	0.9	84,768	0.9
REST WORLD	1,376,857	13	1,318,458	13.8
TOTAL	10,571,817	100	9,564,390	100

Source: APTMA.

3. LITERATURE REVIEW

A large body of empirical literature has already analysed the factors upon which demand and supply of export depends. After the inception of World Trade Organisations (WTO) that interest for academicians, world market researchers and policy makers. In this section, a brief review of some of the relevant analysis in the same area is presented.

Earlier Less Developing Countries (LDCs) mainly exported primary goods to developed countries and these exports promote growth in these counties. Empirical evidence has shown that value addition is necessary to get the policy of devaluation of currency fails to improve the trade balance in LDCs on the one hand [Lewis (1980); Riedel (1988)]. On the other hand the policy shift from import substitution strategies to

the exports growth strategies has led to reduce the reliance on primary goods exports and increase in share of manufacturing exports. As a result the competitive position of LDCs has also changed. However, more reliance on markets in developed countries for exports growth is still an important issue that needs to be addressed. The manufacturing export growth of LDCs is more than proportionate to the economic growth in the developed countries, which clearly indicates that the growth is also dependent upon the supply side factors [Riedel (1984)].

As regards the literature on export demand, it is believed that the demand for export from lower developing countries is not only highly income elastic but also low price elastic. Studies on emerging economies (Hong Kong, Singapore and South Korea) have found contradictory results to this view [Riedel (1988)]. The income of trading partners is expected to have positive impact on the performance of exports. For analysis different parameters have been used in literature to represent the world demand.[5] Riedel (1988) finds low income elasticity of export demand for agriculture and non-agricultural exports demand of Hong Kong having large share in world market, and variation in the economic activity in the world market has minor effect on performance of exports. The developing countries can maintain their export growth in the world markets on the bases of prices, resources and healthier domestic economic conditions [Malik (2000)].

Vermani (1991) has reported less elastic coefficient of world exports for India, Narayan and Narayan (2004) for Fiji and Hassan and Khan (1994) for Pakistan primary exports. Although demand for primary goods is predictable but increase in economic activity in trading partners cannot bring significant improvement in exports of these commodities. Mustafa and Nishat (2004) find positive relationship between income of India, Malaysia, New Zealand, UK, US and exports of Pakistan, whereas, negative relationship exists between similar variables for other trading partners like Australia, Bangladesh and Singapore. It reflects that exports of Pakistan are considered inferior in later countries. There are some studies that find more income elastic export demands. Goldstein and Khan (1978) find exports of seven developed countries out of total eight are more elastic to change as compared to the income of rest of the world, whereas, income elasticity of exports demand for US is found to be less than unity.

Roy (1991, 2002, 2007) show world income has an important role in determination of exports growth for Bangladesh and India. Goldar (1989) shows that positive change in the income of importing countries tends to accelerate growth of India's engineering exports. Vermani (1991) has also found similar results for manufacturing exports demand of India in short-run and long-run processes. Rijesh (2007) has used world exports of capital goods to represent world demand for Indian machine tools and find similar results like the above mentioned studies. The relationship of the world demand to exports of Pakistan with different measures for world demand is found positive; Hassan and Khan (1994) use world GDP index; Akhtar and Malik (2000) income of four trading partners in comparison studies; Atique and Ahmed (2003) index of industrial production; Aurangzeb et al (2005) adjusted GDP with the index of industrial production of trade partners and Zada (2012) use GDP of ten trading partners for analysis.

The domestic prices of exports, as compared to the index of export prices of different exporting countries is used to show the competitive position of the country

[5]World exports, world GDP, weighted average of trading partners real income and world imports etc.

among other suppliers. Arize (1999) documents that increase in competitors' price has significant positive influence on exports growth of Singapore because her exports are good substitute to competitor's exports. Naryan and Naryan (2004) report similar results for competitor's exports price from Fiji. Zada (2012) finds negative relationship between own-price and exports growth for group of ten trading partners. Real Effective Exchange Rate has also been used in literature to represent competitive position of the country. The devaluation of currency proves that an effective policy measure to increase the production of tradable goods and to accelerate export performance is required. Developing countries like Bangladesh have already adopted this policy measures to liberalise and improve exports growth. The depreciation of currency also reduces anti export bias and provides incentives to the export to be more competitive in the world market [Hassan and Khan (1994); Ahmed (2000)].

Arize (1999) has deduced that exchange rate policy has an effective role in export growth of Singapore, Goldar (1989), Vermani (1991), Roy (2002) and Rijesh (2007) for India and Roy (1991) for Bangladesh exports. According to Hassan and Khan (1994) and Akhtar and Malik (2000) devaluation plays an important role to boost export growth of Pakistan for both primary and manufactured goods. Other view is that exchange rate adjustment policy cannot help to improve export growth in case of low price elasticity of export demand. Other non-price factors affecting the market also play an important role in improvement of exports growth for example by introducing new items in international market and by supplying high quality fashion products [Malik (2000); Akhtar and Malik (2000)]. According to the Vermani (1991), depreciation is not helpful in increasing primary exports of India and Malik (2000) and Atique and Ahmed (2003) for Pakistan's textile export. Aurangzeb, *et al.* (2005) reveal that exchange rate adjustment policy adversely affects the export growth.

For a long time, the literature has been presented on export performance majorly focusing on the single equation export demand model by considering export supply infinite elastic [Houthakker and Magee (1969)]. Later on, it appears that supply side factors also play important role in export growth, ignoring these factors generates spurious results. Non-price factors on supply side play crucial role in the improvement of comparative advantage in all sectors including textile and clothing. Role of supply side is stronger than the demand side in the product diversification [Riedel (1988); Goldar (1989); Malik (2000)].

The rise in exports price more than that of the domestic price leads to boost exports supply. Therefore, relative prices are important determinants of exports supply. Goldstein and Khan (1978), Lundborg (1981), Ahmed (2000) Havrila and Gunawardana (2006), Roy (2002) and Rijesh (2007) find that the relative prices have significant and positive impact on growth of textile exports. Atique and Ahmed (2003) report that relative price is not very important determinant for exports supply of Pakistan. Some other studies have revealed positive and significant impact of domestic capacity on exports supply. Hassan and Khan (1994) and Atique and Ahmad (2003) have used GDP of Pakistan for domestic capacity and find that it is very effective measure to accelerate manufacturing exports. Alternatively, Roy (2002) Roy (2007), Havrila and Gunawardana (2006), The cost of production is captured by different variables in supply equation for example wage rate, unit labour cost and import of inputs [Muscatelli, *et al.* (1992);

Atique and Ahmed (2003) and Zada (2012)]. According to Muscatelli, *et al.* (1992), unit labour cost played important role to boost exports supply of Hong Kong. Atique and Ahmed (2003) predict that decrease in wage rate and increase in production capacity together can improve exports supply from Pakistan. Amzonas and Barros (1993) also find similar estimates by using domestic real wage for the manufacturing exports supply of Brazil.

The above review of previous studies suggests it would be interesting to find the relative importance of demand and supply side factors in determination of textile and clothing exports for Pakistan. Textile and clothing sector has a major contribution in total exports, therefore, to improve exports potential, more margin exists in this sector. No study has provided comprehensive methodology and detailed analysis of this sector. Purpose of this study is to fill this gap and to provide in-depth analysis for the most important textile and clothing sector of Pakistan.

4. METHODOLOGY AND DATA

The present study has adopted the methodology to specify the export demand and supply side equations simultaneously following Goldstein and Khan (1978) and Muscatelli, *et al.* (1992). The domestically produced goods and imported foreign goods are assumed to be imperfect substitutes of each other in this model. Under the imperfect substitute model, the exports demand is assumed to be depending on the relative prices and income levels of the trading partners [Lundborg (1981); Goldstein and Khan (1978) and Abbott and Vita (2002)]. The textile and clothing exports demand is specified in log linear functional form as:

$$TCX_t^d = \alpha_0 + \alpha_1 REER_t + \alpha_2 WGDP_t + \varepsilon_t \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4.1)$$

Where TCX^d in Equation (4.1) represents demand for textile and clothing exports of Pakistan. *WGDP* is defined as GDP of the trading partners, represents foreign demand for the exports. *REER* is the export weighted Real Effective Exchange Rate[6] and it is used to capture the competitive position of Pakistan [Hassan and Khan (1994); Malik (2000); Atique and Ahmed (2003); Ahmed (2000); Roy (2009)]. The elasticity of textile and clothing export demand with respect to REER is expected to be negative because the devaluation of domestic currency as compared to foreign currency will make the textile and clothing exports cheaper in the world market. The elasticity of textile and clothing export demand with respect to world demand is expected to be positive. The economic condition of trading partners is also an important determinant of textile and clothing exports and this study uses GDP of the trading partners as proxy for economic activity of the world. This will show growth in the economy of trading partners and absorption of the textile and clothing products of Pakistan in these economies.

The export supply function is specified with logarithmic transformation as follows.

$$TCX_t^s = \beta_0 + \beta_1 RP_t + \beta_2 WG_t + \beta_3 GDP_t + \beta_4 D + \varepsilon_t \quad \ldots \quad \ldots \quad \ldots \quad (4.2)$$

[6]Different studies used different exchange rate (nominal and real), in this study REER is used because it includes exports weights with partners and calculation of REER is given in appendix.

Where TCX^s in Equation (4.2) represents textile and clothing exports supply, *RP* is the relative price of textile exports (UVI_{pak}/CPI_{pak} unit value index of exports of Pakistan divided by consumer price index). *WG* is the domestic real wage in the textile sector. It is used as a proxy for the cost of production in the textile sector [Muscatelli, *et al.* (1992); Amazonas and Barros (1993); Atique and Ahmed (2003)]. GDP of Pakistan is used as proxy for domestic production capacity of the economy and D is the dummy variable that captures the effect of the removal of bilateral trade restriction from 1994.[7]

The elasticity of relative price is expected to be positive in the supply equation of the textile and clothing exports. The high exports prices relative to the domestic price of products will lead to increase the benefits of selling in foreign markets. Due to data constraints, the relative prices of total exports are used as a proxy for the textile and clothing exports price and the share of textile and clothing exports is more than 50 percent of total exports during specified period. Share of textile and clothing exports was increased to 70-80 percent during the period 1992-2002. Therefore, any significant change in textile and clothing exports will bring larger change in total exports. Due to this, in the study the relative prices of exports are used as a proxy for the relative price of textile and clothing exports. The relative prices are represented by the unit value of exports to the domestic prices (Consumer Price Index (CPI)), base year for both indices is 2000. Following Goldstein and Khan (1985), Atique and Ahmad (2000) CPI is used here to represent domestic prices.[8]

Nominal wages of textile sector deflated by CPI of Pakistan represent the cost of production of textile and clothing exports. Pakistan is a developing country and most of the production activities are taken place in unorganised mill sector using labour intensive techniques. Especially, in clothing where sewing cannot be processed without labour. Muscatelli, *et al.* (1992), use index of nominal wage of manufacturing, Atique and Ahmad (2003) take wage rate per worker to represent cost of production for Pakistan's exports. GDP represents the economic position of exporting country and .GDP is expected to have positive influence on the exports of textile and clothing. Hasan and Khan (1994) and other studies have also used the GDP of Pakistan as a proxy for the scale of production.[9]

Changes in policy regarding textile and clothing exports at international or national level have direct impact on its export performance. It was decided in the Uruguay Round to remove quota restrictions under ATC in four phases (1st Jan. 1995, 1st Jan 1998, 1st Jan 2002 and 1st Jan 2005). It was expected that larger market access will provide incentive for domestic producers to increase level of production. Therefore, dummy variable D has been introduced in the textile and clothing exports supply equation to check influence of this trade policy. D is assigned zero for period 1974-1994 and one otherwise.

There are two endogenous variables in the demand and supply equations. One is textile and clothing exports and other is domestic prices and to handle endogeniety

[7]Dummy is introduced in supply side equation instead of demand side equation because only USA and EU impose restrictions and manufacturers were producing under the pressure of trade restrictions.

[8]Muscatelli (1992), Akhtar and Malik (2000), Roy (2009), and Zada (2012) have used the Whole Sale Price Index (WPI).

[9]Ahmad (2000) have used Predicted values of real GDP, Virmani (1991) and Akhtar and Malik (2000) have used real GDP.

Equations (1) and (2) are estimated simultaneously, assuming textile and clothing exports demand and supply equal to total exports. The instrumental variable technique Generalised Method of Moment (GMM) is employed.[10] The sample size is not quite large, therefore, for more consistency and precision Empirical Bayesian technique is used to estimate system of equations. Additional information in the form of prior density is used in the model that helps in acquiring precise and proper estimates. Hence, Empirical Bayes is believed to provide better results in the case of small sample [Casella (1985) and Casella (1992)].

4.1. Data Description and Sample Size

Annual data has been used for the period 1972-2013 for seven trading partners. Selected countries for the sample are United States, United Kingdom, Canada, Italy, France, Japan and Spain. The country selection criteria is more than 1 percent share in Pakistan's exports. The data for GDP has been taken from the World Development Indicators (WDI). The Data for exports prices, CPI and exchange rate has been taken from International Financial Statistics (IFS). The data for textile wage rate has been taken from the International Labour Organisation (ILO). The data for textile and clothing exports have been taken from United Nations Commodity Trade Statistics Database (UN COMTRADE). Data from the UN COMTRADE is extracted according to SITC Rev. 1.

5. EMPIRICAL RESULTS

The demand and supply equations of exports are estimated simultaneously by Generalised Method of Moments and lag of independent variables is used as instruments. For more precision Empirical Bayes estimates are also applied.

GMM estimates using lag explanatory variables as instruments for the demand of textile and clothing exports are given in Table 5.1. The results for Gross Domestic Product show that growth in the trading partners' income has the expected positive and significant impact on Pakistan's exports' demand which is elastic with respect to the trading partners' GDP in all cases except for Japan, UK, and USA. The lowest value of income elasticity is for UK i.e. 0.84 while the highest is for Spain i.e. 1.91. Therefore, the result indicates that improvement in world economic conditions will help to boost textile and clothing exports of Pakistan. These results are confirmed by the findings of Goldar (1989), Hasan and khan (1994), Akhtar and Malik (2000), Atique and Ahmad (2003) and Auragzeb et al (2005) Rijesh (2007) Zada (2012) indicating that increase in income of trading partners leads to increase textile and clothing exports of Pakistan. The textile and clothing exports demand is found to be much responsive to Real Effective Exchange Rate indicating that the real devaluation of Pakistan currency leads to increase in the textile and clothing exports demand. The Real Effective Exchange Rate depicts variation in real exchange rate. Textile and clothing exports' demand is quite responsive to REER. The estimated coefficients for Spain, UK and US are greater than unity, while the rest are less than unity. Coefficients across the countries appear to have their expected positive signs ranging

[10]Lags of independent variables are used as instruments.

from 0.71 to 1.37. The impact of REER is larger for Spain i.e. 1.37 percent followed by UK 1.18 percent; the lowest is 0.71 percent for Japan. The REER elasticity of textile and clothing exports' demand is 1.11 percent for USA, 0.96 percent for Canada and 0.88 percent for Italy and 0.86 percent for France. The positive sign of devaluation coefficient reflects improvement in the competitiveness of our textile and clothing exports. The positive and significant coefficient indicates that real devaluation of Pakistan rupee against all trading partner's currencies leads to increase in textile and clothing demand from Pakistan. The results indicate that the real devaluation of rupee is very helpful in increasing the textile and clothing exports. The significant and large coefficient of REER is also reported by Goldar (1989) for India. The study finds devaluation an effective measure to boost engineering exports demand from India. Virmani (1991) also finds manufacturing exports demand for India relatively more responsive to devaluation. Ahmad (2000) has observed the exports' performance of Bangladesh and has reported that real devaluation of domestic currency leads to increase in the competitiveness of exports. It can be noted that their estimates are very close to our estimates i.e. 0.96. Contrary to the findings of the present study, Atique and Ahmad (2003) find significant and small elasticity of devaluation for Pakistan's exports demand, the size of the coefficient is 0.39. In a similar way, Malik (2000) finds devaluation insignificant and less effective to increase textile exports demand from Pakistan. The textile and clothing exports' demand from Pakistan is elastic to change in prices; therefore, price effects have strong and important role in boosting the exports' demand.

Table 5.1

Results of Determinants of Demand of Textile and Clothing Exports by GMM

$$TCX_t^d = \alpha_0 + \alpha_1 REER_t + \alpha_2 WGDP_t + \varepsilon_t$$

Trading Partners	Constant	Real Effective Exchange Rate	WGDP	R^2
USA	-4.67	1.11	0.93	0.95
	(3.05)*	(2.48) **	(3.39) *	
UK	-3.55	1.18	0.84	0.86
	(6.83)*	(2.49)	(6.44)* *	
Canada	-4.35	0.96	1.09	0.93
	(6.50) *	(6.63) *	(9.58) *	
Italy	-2.73	0.88	1.23	0.93
	(1.53)	(2.27)**	(9.48) *	
France	-4.13	0.86	1.08	0.94
	(3.87)*	(3.79)	(7.15)*	
Japan	-2.63	0.71	0.93	0.96
	(6.83)*	(3.83)*	(9.44) *	
Spain	-5.24	1.37	1.91	0.96
	(1.01)	(2.78) *	(2.51)**	

Note: The t-ratios are given in parenthesis, (*), (**) and (***) represents 1 percent, 5 percent and 10 percent significance respectively.

Table 5.2

Results of Determinants of Supply of Textile and Clothing Exports by GMM

$$TCX_t^s = \beta_0 + \beta_1 RP_t + \beta_2 WG_t + \beta_3 GDP_t + \beta_4 D + \varepsilon_t$$

Trading Partners	*Constant*	Relative Price of Textile Exports	Domestic Wage	Domestic GDP	Dummy for Removal of MFA Restriction	R^2
USA	–2.41	4.41	–0.60	1.07	–0.21	
	(1.24)	(2.06)**	(1.82)***	(2.59)**	(0.82)	0.69
UK	–2.49	5.31	–0.06	1.05	–0.15	
	(–1.46)	(1.82) ***	(0.15)	(2.79) *	(0.35)	0.79
Canada	–2.52	4.23	–0.86	0.96	–0.58	0.78
	(–2.46) **	(2.12) **	(1.77)***	(4.27) *	(–1.98) **	
Italy	–2.48	7.43	–0.35	0.98	–0.10	0.91
	(1.16) *	(2.74) **	(0.63)	(2.13)* *	(0.25)	
France	–1.52	4.01	–0.03	0.72	0.02	0.78
	(1.81)***	(5.69) *	(0.14)	(4.02)*	(0.15)	
Japan	–1.64	5.53	–0.46	0.91	–1.16	0.37
	(0.69)	(4.66) *	(0.62)	(1.80) ***	(2.80)**	
Spain	–3.82	2.19	–1.48	1.01	0.29	0.77
	(–2.01) ***	(1.18)	(1.90) ***	(2.38) **	(0.50)	

Note: t-ratios are given in parenthesis, (*), (**), and (***) represents 1 percent, 5 percent and 10 percent significance.

The GMM estimates for the supply side equation of the textile and clothing exports are given in Table 5.2. Relative prices have expected positive and significant influence on the textile and clothing exports to all trading partners except for Spain where they are more responsive to change in real devaluation on demand side than the relative prices on the supply side. The result shows that the textile and clothing exports of Pakistan are more elastic to change in relative prices across countries. The coefficient of the relative price variable is found to be greater than unity. The highest relative price elasticity is 7.43 for Italy and the lowest is 2.19 for Spain. This shows that export prices have substantial role in determining the exports supply as compared to the domestic prices of the exportable goods. Therefore, increase in export prices11 compared to domestic prices will encourage manufacturers to increase textile and clothing exports of Pakistan. Zada (2012) also found similar results. Goldstein and Khan (1987) have examined exports supply elasticities with respect to relative price for seven European countries. Havrila and Gunawardana (2006) have estimated the relative price elasticity for textile exports supply of Australia and report long run elasticity of 1.83.

Textile and clothing exports seem less responsive to change in real wages. It shows that decrease in real wage of textile sector without increasing productive capacity cannot improve performance of the same sector. The negative sign of wage variable reflects that due to high wages the textile and cotton industry is adversely affected. This effect might also account for the movement of this export industry to other countries, however, coefficients for US, Canada and Spain are found significant at 10 percent and

Atique and Ahmad (2003) have come up with the same results. The size of the estimated coefficient is also small and this result implies that though the supply of Pakistan's textile and clothing exports increases with decrease in real wages but it is not very responsive. It shows that decrease in real wages in the textile sector without corresponding increase in productive capacity cannot improve the performance of the same sector. It means cuts in real wage are not effective in boosting textile and clothing exports.

Few estimates of exports supply elasticity with respect to real wages are available in literature to compare the results of this study with. Muscatelli, *et al.* (1992) have used the index of nominal wage of manufacturing sector and estimated relatively large response of –1.48 for Hong Kong. Atique and Ahmad (2003) have used wage rate per worker as a proxy for the cost of production.

They have obtained significant and negative exports supply (for Pakistan) response with respect to wages of –0.70. This is very close to our results. Amazonas and Barros (1993) report negative and significant response of Brazilian manufacturing exports to change in real wage of –0.83.

The GDP of Pakistan are employed to explain the production capacity of the domestic economy. This variable has the expected positive and significant impact on exports to all trading partners. The range of elasticity is 0.72 (lowest) for France and 1.07 (highest) for USA. The results show that GDP is an important determinant of this sector's exports supply for Pakistan. Growth in domestic economy will encourage manufacturers to produce and export textiles and clothing products. Virmani (1991) reports significant and positive relationship between GDP (manufacturing) and export supply of manufacturing product for India, where the magnitude of coefficient is 0.75. In the same way, Atique and Ahmad (2003) have computed income elasticity of exports supply for Pakistan and have found significant and positive coefficient of 3.67. Zada (2012) finds significant and positive income elasticity of exports supply for 11 trading partners, where the range of the coefficient is from 0.02 to 0.36. The estimated coefficient of the dummy variable has an unexpected negative sign for six out of eight trading partners. All coefficients are insignificant except for Canada and Japan and these estimates are small except for Japan. The response of Pakistan's textile and clothing exports supply to the liberalisation agreement (ATC) is not according to expectation. The trade in textile and clothing sector was supposed to operate freely after 2005, but results reveal a different story and indicate that trade liberalisation is unable to boost the exports supply and may even worsen the performance. There are other hurdles which lead to low textile and clothing exports performance;

(i) After removal of quantitative restriction, Pakistan has to face strict competition from
(ii) countries like China, South Korea and India in the form of quality and price;
(iii) supply side deficiencies i.e. technological backwardness and lack of skilled labour force are responsible for less productive capacity. From policy point of view appropriate steps were not taken to benefit from the abolition of the quota restrictions regime.

Empirical Bayes is applied that gives consistent estimates as compare to GMM for small sample size. Improvement in the Empirical Bayes estimates over GMM estimates is

because of addition of prior information in the model. Empirical Bayes estimates for the textile and clothing exports demand are reported in Table 5.3. The results shows that improvement in the world economic conditions will help to boost textile and clothing exports of Pakistan. There is less variation in income coefficient across countries as compare to GMM counterpart. Goldstein and Khan (1978), Virmani (1991), Muscatelli *et al.* (1992), Rijesh (2007) find positive and significant income elasticity of exports demand that are in confirmation with these results. Textile and clothing exports demand elasticities with respect to the REER range from 0.85 to 0.91 which is in confirmation with Akhtar and Malik (2000). The results indicate that real devaluation of rupee is very helpful in increasing the textile and clothing exports therefore, price and non-price factors i.e. product diversification and improvement in quality are equally important.

Table 5.3

Determinants of Demand of Textile and Clothing Exports by Empirical Bayes

$$TCX_t^d = \alpha_0 + \alpha_1 REER_t + \alpha_2 WGDP_t + \varepsilon_t$$

Trading Partners	Constant	Real Effective Exchange Rate	WGDP
USA	-3.26	0.89	1.02
	(-12.18)*	(9.49) *	(19.49) *
UK	-3.31	0.90	0.99
	(13.93)	(9.78) *	(19.07) *
Canada	-3.40	0.91	1.03
	(13.70)	(11.56) **	(18.51) *
Italy	-3.24	0.89	1.05
	(12.25)	(9.74) *	(21.42) *
France	-3.30	0.89	1.02
	(12.73)	(10.20) **	(20.54) *
Japan	-3.05	0.85	1.01
	(13.88)	(10.18) ***	(21.43) *
Spain	-3.26	0.91	1.02
	(12.19)	(9.83) **	(19.39) *

Note: t-ratios are given in parenthesis, (*), (**) and (***) represents 1 percent, 5 percent and 10 percent significance.

Table 5.4 shows the results of Empirical Bayes estimates for textile and clothing exports supply of Pakistan. Improvement in the precision of these estimates over GMM estimates is noticeable. Result shows that our textile and clothing exports of Pakistan are more elastic to change in relative prices across countries and that impact of relative prices on textile and clothing exports supply is almost similar for all trading partners. Therefore, increase in exports prices[11] as compare to domestic prices will encourage manufacturers to increase textile and clothing exports of Pakistan. The supply of Pakistan's textile and clothing exports increases with decrease in real wage. Muscatelli, *et al.* (1992), Atique and

[11]Exports price is used as a proxy for textile and clothing exports, see relative prices in explanation of variables for more details.

Ahmad (2003) and Amazonas and Barros (1993) come up with similar findings. GDP has expected positive relationship with textile and clothing exports supply of Pakistan. Results show that GDP is an important determinant of textile and clothing exports supply for Pakistan and difference in elasticities across counties is fairly small as compare to GMM estimates. Virmani (1991), Atique and Ahmad (2003) results are in line with these findings.

Table 5.4

Determinants of Supply of Textile and Clothing Exports by Empirical Bayes

$$TCX_t^S = \beta_0 + \beta_1 RP_t + \beta_2 WG_t + \beta_3 GDP_t + \beta_4 D + \varepsilon_t$$

Trading Partners	Constant	Relative Price of Textile Exports	Domestic Wage	Domestic GDP	Dummy for Removal of MFA Restriction
	–2.51	5.47	–0.42	0.97	–0.36
USA	(–4.01) *	(11.79) *	(1.99) **	(7.19) *	(2.96) **
	–2.51	5.65	–0.32	0.97	–0.37
UK	(–4.18) *	(11.38) *	(–1.65) ***	(7.52) *	(–2.91) **
	–2.52	5.58	–0.48	0.96	–0.42
Canada	(–4.62) *	(11.41) *	(–2.37) **	(8.19) *	(–3.49) *
	–2.51	6.20	–0.39	0.97	–0.34
Italy	(–4.21) *	(14.78) *	(–1.89) ***	(7.62) *	(–2.81) **
	–2.48	5.50	–0.39	0,95	–0.34
France	(–3.93) *	(11.49) *	(–1.77) **	(7.08) *	(–2.85) **
	–2.44	5.65	–0.41	0.96	–0.51
Japan	(–3.98) *	(11.77) *	(–1.92) **	(7.32) *	(–4.18) *
	–2.65	5.42	–0.41	0.97	–0.36
Spain	(–4.35) *	(11.15) *	(–1.90) **	(7.39) *	(–2.75) **

Note: t-ratios are given in parenthesis, (*), (**) and (***) represents 1 percent, 5 percent and 10 percent significance.

Coefficient of dummy variable is negative and significant for all countries; size of estimates is also small. Variation in estimated coefficient across countries is small as compare to GMM estimates; it lies between 0.34 and 0.51. Response of Pakistan's textile and clothing exports supply to the liberalisation agreement (ATC) is not according to expectation. It leads to the fact that removal of quantitative restriction is unable to boost textile and clothing exports supply, it even worsen the performance. There are other hurdles which lead to low textile and clothing exports performance. First, after removal of quantitative restriction, Pakistan has to face strict competition from countries i.e. China, South Korea, India in the form of quality and price. Second, supply side deficiencies i.e. technological backwardness and lack of skilled labour force are responsible for less productive capacity.

The results for the textile and clothing exports demand and supply equations are obtained by applying GMM and Empirical Bayesian techniques. The results support that both techniques almost lead to same findings. These results are in conformity with most of the earlier findings for other developing countries in general and for Pakistan in particular as mentioned in the above discussion.

6. CONCLUSIONS AND IMPLICATIONS

In the present study, the demand and supply determinants for Pakistan's textile and clothing exports are investigated for the period 1972-2013. The demand side determinants are REER and GDP of trading partners, whereas, supply side defines relative prices, real wages and GDP of Pakistan. This study finds a high income elasticity of textile and clothing exports demand and that world demand is major source of textile and clothing exports demand from Pakistan. The significant coefficient of REER indicates that devaluation of Pakistan currency with respect to the trading partner's currency is an effective measure to increase long-run textile and clothing exports growth. On the supply side, relative prices have significant impact and the rise in exports prices more than domestic prices provides incentives to the domestic producers. The real wages represent increase in cost which leads to decrease in textile and clothing exports supply. High income elasticity on the supply side indicates that domestic capacity of the economy plays important role in the textile and clothing exports supply.

Textile and clothing exports from Pakistan remained stagnant during the first five years of Agreement of Textile and Clothing (ATC) 1994-2005, after that there is positive turn and exports growth is observed [Latif and Javid (2013)]. Change in composition of textile and clothing exports from primary to manufactured products is supported by several demand and supply side factors. The findings of the present study suggest that textile and clothing exports growth rely on both demand and supply side factors. Pakistan has entered in more competitive phase after the removal of MFA restrictions through ATC. To survive in this competitive environment producers need to adopt new techniques for the production of high value added products i.e. readymade garments and cloths. Exporters should go for 'demand of market oriented strategies' by the production of high quality fashion cloths and explore new markets for exports. The results also support that devaluation is helpful in the improvement of long run textile and clothing exports because other exporters (Bangladesh and India)[12] are adopting same policy. Devaluation can be effective when combined with exports of high quality products and diversification in exports market.

On the supply side, significant and large magnitude of relative prices has important implications. Price incentives encourage domestic producers to increase exports supply. Government needs to provide infrastructure facilities and duty free imports of inputs to encourage textile and clothing producers. Spinning sector holds major share in total investment and as a result, share of cotton yarn is equally high in production and exports. There is need to focus on converting good quality yarn in the value added categories i.e. cloth and readymade garments. Organised mill sector also requires to be encouraged to produce good quality fabric.

Major share of fabrics is produced with cotton in Pakistan but demand for man-made fibre is increasing at international level. Textile and clothing producers need to increase synthetic fibre content in textile and clothing production. Emerging economies; China, Hong Kong and South Korea have achieved high growth targets in international market through relying more on domestic supply side factors. Incentives are needed to be provided to the producers in the form of low energy cost and easy capital availability, mere reduction in wage rate cannot entirely improve the production of textile and clothing.

[12]Ahmed (2000) and Roy (2003, 2007).

This study examines the determinants of overall textile and clothing exports. Components of textile and clothing (raw cotton, cotton yarn, cotton cloth, readymade garments, synthetic textile etc.) exports are not considered because of unavailability of data on each variable. For the future research, this study can be extended to by taking account of all components of textile and clothing.

APPENDIX 1

CALCULATION OF REAL EFFECTIVE EXCHANGE RATE

$$REER_{it} = \frac{\alpha_i E_{it} p_{it}^*}{p_j}$$

Here, *REER* shows the bilateral real exchange rate. *Eit* is the nominal exchange rate between country i and Pakistan currency which has been taken from various issues of Economic Survey. αi stands for trade weights and represents the share of trading partner exports in total textile and clothing exports of Pakistan. p_{it}^* is the Whole Sale Price Index of partner *I*; it is used here to represent the price of tradable commodities. *Pj* is Consumer Price Index of home country (Pakistan), it represents the price of non-tradable goods.

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