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An Estimation of Crowding-Out Effect of China's Textile Exports for Pakistan's Textile Exports

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Abstract

Background/Objectives: Textile and clothing is leading sector of Pakistan's trade. After the abolition of Multi-Fibre Agreements (MFA) in 2005, Pakistan's textile sector exports along with the China's textile exports were the promising candidates to acquire greater share in the world market. Mainly because Pakistan was one of the most restricted country by the quotas followed by China. After the phasing out of MFA, China's textile exports reaped the full benefit and acquired a larger share in world market, while Pakistan's share in international market remained stagnant overtime. This study explores the crowding-out effect of China's textile exports for textile export of Pakistan in international market for the period 2003 to 2015. **Methods:** A modified gravity model is used for the purpose. Model is estimated by Instrumental variable 2 stage least squares (IV2SLS). Which is applied by Generalised Method of Moments (GMM) to data. Other determinants of Pakistan's textile exports are also included in the model. **Findings:** It is found that Gross domestic product (GDP) of importing country, GDP of Pakistan and common language with importing countries have positive significant effect for textile exports of Pakistan while, China's textile exports have a significantly negative effect for Pakistan's textile exports along with the distance of importing country from Pakistan and the fact that importing country is landlocked. **Implication:** It is found that Pakistan's textile exports are facing crowding-out effect from China's textile exports. The result may have implications for other developing countries which are trying to follow export led growth policy by focusing mainly on textile sector and are in the same phase of development.

Keywords: Crowding-Out, Exports, Gravity Model, Textile Sector, Trade

1. Introduction

Textile and apparel industry is historically important for the countries to take-off. Many developing and low-income countries successfully followed the export led growth policy by developing textile and clothing industry, i.e. Japan, Bangladesh, Madagascar and China. It is major source of employment and foreign earnings through exports for these developing countries[1]. The role of this sector is still valid in twentieth century, as it requires simple technology, low investment, mostly low skilled labor and has an increasing demand[2].

Textile and clothing (T&C) is major manufacturing sector of Pakistan economy. Cotton based products including textile and clothing has 60 percent share in total exports and 8.5 percent share in the Gross Domestic Product (GDP) of Pakistan[3]. The industry is source of employment for 15 million people which is about 38 percent of workforce. Despite of having whole textile value chain from cotton production to finished products, Pakistan's share in international market is stagnant overtime, which is about 1.8 percent since 2003[4].

China joined WTO in 2001 and since then China's exports growth was much faster than its GDP growth.

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Its GDP growth rate was 10 percent on average while its exports growth rate was about 20 percent for the said period[5]. In 2009 China left behind the United States of America and Germany and became the largest exporter in the world[6]. China's economic expansion and increasing integration into global economy is of great significance for the policy makers of other developed and developing countries. One of the concerns is the downward effect on the exports of other countries[7–10]. Countries having major export sectors similar to that of China's along with same major export destinations are more likely to face downward effect on their exports[11–13]. There are some studies which found that the countries with abundant labour and textile as major exporting sector are more prone to such downward effect by China's exports[14].

After the abolition of MFA in 2005, Pakistan's textile sector exports along with the China's textile exports were considered to be the promising candidates to acquire greater share in the world market. Mainly because Pakistan was one of the most restricted country by the quotas followed by China[15]. After phasing out of MFA and Agreement on Textiles and Clothing (ATC), China's textile export, only to USA increased by 39 percent in 2005[16]. China reaped the full benefits of MFA elimination. As China's international market share of textile and clothing increased, exports from many other countries decreased[17]. Soon after the ATC phasing out, it was recognised that China is gaining market share at the cost of other T&C exporting countries and converting trade into a zero-sum game[18]. After 2005 Pakistan exposed directly competition from China in international market and Pakistan has not achieved the expected boom in exports[19].

Pakistan's textile sector exports are specially exposed to competitive threat posed by China's textile exports[20]. As USA, UK and Germany are main exports markets for Pakistan's textile and clothing. These are also major export destinations for China in the sector. In sub-categories of the sector both countries export manly same type of products, i.e. Articles of apparel and clothing accessories, knitted or crocheted, not knitted or crocheted, other made-up textile articles; sets; worn clothing and worn textile articles; rags[21].

Some studies about the competitive effect of China's exports included Pakistan among the affected or vulnerable countries[22–24]. These studies found, Pakistan's exports as vulnerable to competitive threat posed by China's exports.

The current study is an attempt to explore that is there any crowding-out effect of China's textile exports for Pakistan's textile exports in third country markets. It also considered other determinants of textile exports of Pakistan as GDP of Pakistan and of importing country, distance from importing country, common language and landlocked importing countries. Specific objective of the study is to estimate the crowding-out effect of China's textile exports for Pakistan's textile exports.

2. Empirical Framework

2.1 Gravity Model

Now are more than 50 years that the gravity equation is being used as workhorse of empirical analysis of international trade, it proved consistent and robust over time. It is one of the clearest and robust discoveries of applied economics[25]. The model explained most of the variations in international trade successfully and consistently. It fits well to trade data of different countries[26]. Following the literature, a modified version of gravity equation is used for the estimation.

2.2 The Data

Study covers the period from 2003 to 2015. Pakistan and China are taken as competitor exporting countries in textile industry. While 172 countries are taken as importers. Trade Data for the study is downloaded from the World Integrated Trade Solution (WITS), World Bank software, link is http://wits.worldbank.org. Data for all other gravity equation variables is taken from the "square" gravity dataset of French Institute for research into international economics. Link for downloading is http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=8.

2.3 List of Variables

All variables of the gravity model are defined according to the definition used by CEPII data base for gravity model estimation[27]. For trade related variables and categories, United Nations Conference on Trade and Development (UNCTAD) definitions and classifications are used.

2.4 Model Specification

Following modified trade gravity model is used to estimate the crowding out effect China's textile exports on Pakistan's textile exports.

lnPTXit = f (lnCHTX, lnPDistance, lnPGDP, lnMGDP, P Com Language, Land locked i) General functional form which is estimated as

$$\ln PTXit = \beta_0 + \beta_1 \ln CHTXit + \beta_2 \ln PDistancei + \beta_3 \ln PGDPt + \beta_4 \ln MGDPit + \beta_5 PComLanguagei + \beta_6 Landlockedi + \varepsilon 1$$

Where **ln PTXit,** log of textile exports from Pakistan to country i at time t is variable to be explained. **ln CHTXit** log of China's textile exports to country i at time t, **ln PGDPt,** log of GDP of Pakistan in year t and **ln MGDPit** log of GDP of importing country i in year t, are time varying explanatory variables of the model. **ln PDistancei,** log of distance between Pakistan and country i**, PCom Languagei,** binary dummy which is 1 if Pakistan and country i share common language, 0 otherwise, **Landlockedi**, binary dummy which is 1 if importing country i do not have seaport, 0 otherwise, are explanatory variables which are constant overtime and are varying across the countries. **ε** is the error term for omitted influences on exports and **βs** are the parameters to be estimated.

2.5 Estimation of the Model

Following the literature on the topic, it is recognised that explanatory variables such as GDP of importing country, which are affecting dependent variable may also affect the China's textile export. So, it may create relationship with error term and among important independent variables. Standard treatment for the problem is application of instrumental variables 2 stage least square (IV2SLS) method[28].

2.5.1 Test of Endogeneity

Test of endogeneity is performed with the null hypothesis that a regressor is exogenous and is independent of other regressors. For China's exports, null hypothesis is rejected, and alternative is accepted that China's exports are endogenous.

2.5.2 Instrumental Variable 2 Stage Least Squares (IV2SLS)

With the problem of endogeneity simple OLS is not feasible. Following the standard method for the problem of endogeneity IV2SLS is performed. In first stage endogenous variable is treated as dependent and some variables external to the original model are used as explanatory variable. Result of this first stage is used in the second stage to estimate the proposed equation. These external or instrumental variables should be strongly correlated to the endogenous variable and should not have any systematic relationship with the dependent variable or with the error term[29,30].

2.5.3 Selected Instrumental Variables and F Test for Relevance

To replace the endogenous variable (China's Textile Exports) three instruments are selected. First is the distance of the China from export destinations. Second is China's common language with export destinations and third is China's GDP. As these would be strongly related to China's exports but has nothing to do with Pakistan's exports. To check the relevance of the instrument, F-statistics of first stage regression is examined. It is a hypothesis testing with null that all instruments have zero coefficient in first stage results. Its interpretation is that instruments are irrelevant and are useless. Alternative hypothesis is that coefficients estimated in first stage are different from zero. Usually it is accepted that instruments are not irrelevant if value of F is more than ten in first stage regression.

2.5.4 Kleibergen-Paap rk LM Under-Identification Test

For further check of relevance and validity of instruments, following three tests are applied. First test is to check that equation in stage one is not under identified. It must fulfil both rank and order condition to conclude that instruments are not under-identified or not redundant. For the purpose Kleibergen-Paap rk LM test is applied with the null that instruments are redundant. If null is rejected, instruments are not redundant.

2.5.5 Kleibergen-Paap rk Wald F for Strength of Instruments

Second test is applied to check that instruments are strong enough. For the purpose Kleibergen-Paap rk Wald F test is applied. It has null hypothesis that instruments are weak. If it is rejected, alternative is accepted that instruments are not weak[31]. Null hypothesis of both above mentioned tests are rejected successfully for all the three instruments.

2.5.6 Hansen J Statistics for Over Identification if the Instrumental Variables

Third and last step to finalize the instruments is a further test used to check orthogonality of variables, selected as instruments, to error term. It is Hansen J statistics, with null hypothesis that over identification boundaries are valid. So, if null is rejected instruments are not good enough[32].

There is only one endogenous variable, China's exports in the model and three instruments are selected. Over identification null is rejected when all three instruments are used, so to pass the over identification test, China's common language is omitted from the lists of exogenous instruments and China's GDP and China's distance are used as exogenous instruments in the model.

2.5.7 Pagan and Hall Test to Check Heteroskedastic Problem in Error Term

After the selection of instruments, next issue is that the method is successful only if errors terms of the model are homoscedastic. From available tests for checking that errors are homoscedastic or heteroskedastic, pagan and hall test is applied[33]. It suggested that errors are heteroskedastic.

2.5.8 Generalised Method of Moments (GMM)

To get the efficient coefficients in the presence of heteroscedasticity problem, GMM is a better technique than straight IV method. GMM is preferred in the case when cross sectional units are more than that of time units. GMM technique gives better estimates when instruments are more than the endogenous variables. To check heteroscedasticity problem, Pagan-Hall general test statistic is applied. In GMM estimation robust standard errors are computed in presence of unknown heteroscedasticity. It gives more efficient estimates of the coefficients[34].

3. Results and Discussions

3.1 Results of Gravity Model Estimation

Gravity model, equation 1, results are given in Tables 1–2. Value of F statistic for overall goodness of fit for model is 146 and is highly significant representing that model is a good fit to data. All coefficients are significant and have expected signs. China's textile exports coefficient is 1.7 with negative sign and is significant at 1 percent. Any one percent increase in China's export may decrease Textile exports of Pakistan by 1.7 percent. It is indication of crowding out effect in international market from China's Textile exports for Pakistan's Textile exports. This result is in accordance with[5,9,14]. All these studies found that China's textile exports are a threat for textile exports of other countries. But it is first attempt to estimate the effect for an individual country's textile exports.

Coefficient of distance is significant and negative. Its value is 1.1 and is significant at 1 percent. Increase in distance from importing country reduces Pakistan's textile exports by 1 percent[35]. Coefficient of GDP of Pakistan is significant and positive. Its value is 0.9. One percent increase in GDP of Pakistan increases Pakistan's Textile exports by 0.9 percent. Most important and significant factor for Pakistan's Textile exports is GDP of importing countries. Every one percent increase in GDP of importing country may increase Textile exports of Pakistan by 2.5 percent[36]. Common language has positive significant effect for Textile exports of Pakistan[37]. Its coefficient is

Table 1. Variables summery with expected signs of coefficients for first model

Variables	Description	Sources	Expected Sign
Pakistan's Textile Exports	In US dollars	WITS, World Bank	
Pakistan's GDP	In US dollars	CEPII	Positive
Importing Country GDP	In US dollars	CEPII	Positive
Distance between Pakistan and its importing countries	In Kilometres	CEPII	Negative
Common language	Dummy, 1 or 0	CEPII	Positive
Landlocked country	Dummy, 1 or 0	CEPII	Negative
China's Textile Exports	In US dollars	WITS, World Bank	To be determined

Source: Author's Calculation

Table 2. Gravity model results

Pakistan's textile exports as Dependent variable	**IV-2SLS (GMM)**	**Robust standard errors**	**P-Values**
Variables and test statistics	Coefficients		Statistical Significance
China's textile exports	**−1.722**	**0.216**	**0.000*****
Distance between Pakistan and importing countries	−1.102	0.174	0.000***
GDP of Pakistan	0.994	0.298	0.001**
GDP of Importing Country	2.573	0.206	0.000***
Common language	0.625	0.178	0.000***
Landlocked	−3.067	0.298	0.000***
Constant	−32.247	7.764	0.000***
F Statistics	146.24		0.0000***
Number of Observations	2070		

Note: Statistical significant at 1%, 5%, and 10% level is presented by, *** p<0.001,** p<0.01, * p<0.05, respectively.
Author's calculations.

0.6 with positive sign and is significant at one percent. Pakistan's textile exports toward land locked countries are hindered due to greater transportation cost and time to these countries[38]. Landlocked countries coefficient is 3 with negative sign and is significant at one percent[39].

3.2 Results of Post-Estimation Tests

Results of endogeneity test for China's textile exports and of other post-estimation tests for 2SLS are given in Table 3 with null hypothesis of the tests. Result of endogeneity test suggests that null hypothesis that China's textile exports are exogenous cannot be accepted. It is considered as endogenous so instrumental variable 2SLS method is applied. China's distance from importing country and its GDP is chosen as instrumental variables. Tests result in table shows that instruments are neither under-identified nor are weakly identified. Instruments are not found to be related to error term. While overall error terms are found to be heteroscedastic, that's why robust standard errors are used for model estimation. Applying IV 2SLS through GMM with robust standard error gave us estimates which are robust and efficient to heteroscedasticity.

4. Conclusion

Effect of China's growing textile exports on Pakistan textile export growth is explored with the application of gravity model. A comprehensive data set of Pakistan's textile exports to its 172 trading partners is used for analysis. Study period starts from 2003, a year before the

Table 3. Results of post estimation tests

Test	**Null Hypothesis**	**Value**	**P-Value**	**Outcome**
Endogeneity Test	Tested Variable is exogenous	130.977	0.0000***	Not Accepted
Kleibergen-Paap rk LM statistic	Instruments are under identified	78.627	0.0000***	Not Accepted
Kleibergen-Paap rk Wald F statistic	Instruments are weakly identified	62.919	0.0000***	Not Accepted
Hansen J Statistic	Instruments are not correlated to the error term	1.790	0.1809	Accepted
Pagan-Hall general test statistic	Error terms are homoscedastic	27.457	0.0000***	Not Accepted

Note: Statistical significant at 1%, 5%, and 10% level is presented by, *** p<0.001,** p<0.01, * p<0.05, respectively.

Kleibergen-Paap rk LM statistic: Under identification test.

Kleibergen-Paap rk Wald F statistic: Weak identification test.

Hansen J Statistic: Overidentification test of all instruments.

Pagan-Hall general test statistics. Test for presence of heteroscedasticity

Source: Author's calculations

complete elimination of ATC, to 2015. Along with China's exports, other factors effecting textile exports of Pakistan are also analysed.

It is found that China's textile exports are crowding out Pakistan's textile and clothing exports from international market. It is concluded that increasing textile exports of China are a reason behind the stunted textile exports of Pakistan. As both countries have same major export destinations, same types of exports in the sub categories and same comparative advantage of being labour abundant.

GDP of Pakistan is an important, positive determinant of Pakistan's textile exports. Pakistan's textile exports are very responsive to volume of GDP of importing country. Destination's GDP is important for Pakistan's textile exports expansion. Distance from destination has significantly negative effect for textile exports of Pakistan. Exporting to landlocked countries is a serious hindrance for textile exports of Pakistan, as it incurs more trade costs. Landlocked countries trade less and import less due to greater transportation costs. Common language with importing country is trade facilitator and enhances textile exports of Pakistan.

Instead of focusing only on internal factors to enhance textile exports, Pakistan should consider external factors too. With annual 4 percent predicted growth rate world textile market will be about US$ 2.5 trillion in 2025. China will be the largest market and will also be the major exporter. China's textile market will be about US$378 billion. This growth in apparel market will be due to increasing demand in international market.

Pakistan should take advantage of this growing demand. Pakistan should focus on growing market of China. China is already largest buyer of Pakistan's cotton. Pakistan should negotiate for more relaxation on exports of final goods of textile industry to China in coming phase of Pak-China free trade. Pakistan can also take advantage of current USA and China trade war by securing more shares in USA market. Keeping in view the global prospects Pakistan should try to focus on exports of value added apparel and readymade garments. Current international scenario not only presents competitive threat to textile and clothing exports of Pakistan but also great opportunities to avail.

Pakistan should work comprehensively for overall competitiveness of its textile exports. Pakistan should re-evaluate all its trade policies, keeping in view the changed global scenario with China as a major economic player. As Pakistan's textile exports are facing crowding-out effect from China's textile exports it may be true for other developing countries which are in the same phase of development. Further research is required on the topic.

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