DETERMINANTS FOR THE DEMAND AND SUPPLY OF TEXTILE EXPORTS OF PAKISTAN

Rabia Latif & Attiya Javed
Exports are “engine of growth” in economy.

Successful experience of NIC’s have encouraged other DC’s to adopt export promotion strategies.

T&C sector has vital role in the economic development of Pakistan.

T&C industries of Pakistan produces all categories of products (from raw material to finished products).

It adds around 46% in manufacturing output, 60% to export earnings & 39% to labor force (Eco. Survey of Pak 2010-11).

Climate is suitable for the production of inputs (cotton & wool).

Advantage has not been much taken by converting inputs in value added products.

Therefore, its share in world exports is very small.
Trade in T&C sector has been subject to restriction in the form of:

- **Multi Fiber Agreement (MFA) 1974-94**
  - Quota restrictions by importing countries (Canada, EU & USA etc.).
  - MFA has provided rules for importing T&C products.
  - Textile Surveillance Body monitors the functioning of MFA.

- **Agreement on Textile and Clothing (ATC) 1995-2004**
  - ATC replaced MFA on 1st January 1995.
  - Uruguay Round (1994) decided to bring T&C trade under GATT rules.
  - Ten years time period had been given to remove quota restriction and to adjust for new phase of trade.
  - Textile Monitoring Body ensures the implementation of ATC rules.
Several changes have been observed in the structure of T&C trade i.e.

- Decrease in protection for more access to international market.
- Increased share of developing countries in world T&C exports.
- Change in the pattern of consumer’s expenditures &
- Incentives provided by the Govt. to encourage producers.

It influenced the magnitude of T&C industry.

T&C exports are given less attention being Pakistan economy’s major sector.

Therefore, proper understanding of demand & supply side factors of this sector is required.
Contribution of the study in existing literature:

- Incorporated policy variables in the demand & supply side equations.
- Simultaneous equation model have been specified for the country wise analysis of T&C exports.
- Highlights important demand & supply side factors of T&C exports.

This study is carried out to attain the following Objectives.

- To analyze the impact of demand & supply side determinants on T&C exports of Pakistan.
- To evaluate the relative importance of demand and supply side factors in export performance of T&C products.
- To see the impact of real devaluation on T&C exports of Pakistan.
- To examine whether the removal of MFA restriction encourages domestic suppliers to expand their exports supply or not.
# Textile and Clothing Exports 2010

<table>
<thead>
<tr>
<th></th>
<th>World</th>
<th>% Share</th>
<th>Pakistan</th>
<th>% Share</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Textile</strong></td>
<td>250.7</td>
<td>41.63</td>
<td>7.8</td>
<td>66.10</td>
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<tr>
<td><strong>Clothing</strong></td>
<td>351.5</td>
<td>58.36</td>
<td>3.9</td>
<td>33.05</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>602.2</td>
<td></td>
<td>11.8</td>
<td></td>
</tr>
</tbody>
</table>

US$ million

Source: Pakistan Economic Survey
Sector wise share in total investment 1999-2008

- Spinning: 50.20%
- Textile processing: 17.08%
- Weaving: 15.23%
- Knitwear & Garments: 7.02%
- Synthetic textile: 5.76%
- Madeups: 4.71%

Source: PBS (2008-09)
521 yarn producing mills from 150 in past

Effect of MFA, especially for production of cloth in unorganized mill sector.

More than 50% of cotton cloth is produced using power looms with poor technology, unskilled labor, low production capacity and unavailability of good quality yarn.

Grey fabric contributes more than 50% of the total cloth production as compared to other categories (blended, bleached and dyed & printed fabrics).
Dyeing & printing adds more value to the grey fabric.

50-80% of total cloth production is used in domestic market and rest is exported.

Major share of readymade garment is produced in small and medium scale units.

Demand of synthetic fiber is increasing in production of T&C products in local and international market.

Share of cotton consumption is more than 70% over the review period.
# Pakistan's Textile Exports

<table>
<thead>
<tr>
<th></th>
<th>2006-07</th>
<th>2007-08</th>
<th>2008-09</th>
<th>2009-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton &amp; Cotton Textile (%ge)</td>
<td>94.00</td>
<td>93.45</td>
<td>95.25</td>
<td>94.36</td>
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<tr>
<td>Synthetic Textile (%ge)</td>
<td>3.89</td>
<td>4.55</td>
<td>3.26</td>
<td>4.31</td>
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<tr>
<td>Wool &amp; woolen Textile (%ge)</td>
<td>2.11</td>
<td>2.00</td>
<td>1.48</td>
<td>1.33</td>
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<tr>
<td>Total Textile</td>
<td>100</td>
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Source: Economic Survey of Pakistan 2011-12
<table>
<thead>
<tr>
<th>Countries / years</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>Growt Rate per annum%</th>
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<td>world</td>
<td>341166</td>
<td>356870</td>
<td>405301</td>
<td>453786</td>
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<td>583302</td>
<td>612028</td>
<td>525336</td>
<td>602116</td>
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<tr>
<td>Bangladesh</td>
<td>5238</td>
<td>5314</td>
<td>6067</td>
<td>6893</td>
<td>7595</td>
<td>9812</td>
<td>9739</td>
<td>12010</td>
<td>13411</td>
<td>16923</td>
<td>20.99</td>
</tr>
<tr>
<td>Share in world exp. (%)</td>
<td>1.54</td>
<td>1.49</td>
<td>1.50</td>
<td>1.52</td>
<td>1.59</td>
<td>1.87</td>
<td>1.67</td>
<td>1.96</td>
<td>2.55</td>
<td>2.81</td>
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<tr>
<td>china</td>
<td>53475</td>
<td>61864</td>
<td>78961</td>
<td>95284</td>
<td>115213</td>
<td>144057</td>
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<td>185772</td>
<td>167088</td>
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<tr>
<td>Share in world exp. (%)</td>
<td>15.67</td>
<td>17.34</td>
<td>19.48</td>
<td>21.00</td>
<td>24.08</td>
<td>27.42</td>
<td>29.41</td>
<td>30.35</td>
<td>31.81</td>
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<td>India</td>
<td>11011</td>
<td>11645</td>
<td>12750</td>
<td>14332</td>
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<td>18444</td>
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<tr>
<td>Share in world exp. (%)</td>
<td>3.23</td>
<td>3.26</td>
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<tr>
<td>Share in world exp. (%)</td>
<td>1.95</td>
<td>1.97</td>
<td>2.10</td>
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<td>2.23</td>
<td>2.16</td>
<td>1.92</td>
<td>1.81</td>
<td>1.88</td>
<td>1.96</td>
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Source: World Trade Organization (WTO)
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<tbody>
<tr>
<td></td>
<td>% Share</td>
<td>Growth</td>
<td>% Share</td>
<td>Growth</td>
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<tr>
<td>Raw Cotton</td>
<td>8.76</td>
<td>23.03</td>
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<td>Cotton Waste</td>
<td>0.19</td>
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<td>Cotton Yarn</td>
<td>12.53</td>
<td>0.62</td>
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<td>Cotton Thread</td>
<td>0.42</td>
<td>14.01</td>
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<td>Cotton Cloth</td>
<td>12.99</td>
<td>11.72</td>
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<td>Synthetic Textile</td>
<td>0.49</td>
<td>-0.65</td>
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<td>25.81</td>
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<td>Readymade Garments</td>
<td>2.27</td>
<td>81.70</td>
<td>7.99</td>
<td>182.49</td>
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Source: Statistical Supplement and Economic survey of Pakistan
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<td>Germany</td>
<td>598,549</td>
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<td>547,440</td>
<td>5.7</td>
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<td>368,437</td>
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<td>385,168</td>
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<td>255,319</td>
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<td>Turkey</td>
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<td>Netherlands</td>
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<td>3.3</td>
<td>293,778</td>
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<td>Hong Kong</td>
<td>397,900</td>
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<td>282,674</td>
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<td>France</td>
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<td>Saudi Arabia</td>
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<td>South Africa</td>
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<td>1.9</td>
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<td>Canada</td>
<td>149,197</td>
<td>1.4</td>
<td>132,530</td>
<td>1.4</td>
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<td>Portugal</td>
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<td>1.4</td>
<td>113,480</td>
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<td>Sri Lanka</td>
<td>127,023</td>
<td>1.2</td>
<td>105,405</td>
<td>1.1</td>
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<td>South Korea</td>
<td>91,041</td>
<td>0.9</td>
<td>91,182</td>
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<td>Australia</td>
<td>95,123</td>
<td>0.9</td>
<td>84,768</td>
<td>0.9</td>
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<tr>
<td>Rest World</td>
<td>1,376,857</td>
<td>13</td>
<td>1,318,458</td>
<td>13.8</td>
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<tr>
<td>Total</td>
<td>10,571,817</td>
<td>100</td>
<td>9,564,390</td>
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Source: APTMA
<table>
<thead>
<tr>
<th>Author</th>
<th>Time Period</th>
<th>Objective</th>
<th>Variables</th>
<th>Methodology</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hassan and Khan (1994)</td>
<td>1972-91</td>
<td>Aggregate (Primary &amp; Manufacturing)</td>
<td>$P_x$, $P_w$, $Y_w$, $ER$ and GDP</td>
<td>3SLS (Simultaneous Equation)</td>
<td>Price, world GDP and ER are significant</td>
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<tr>
<td>Akhtar &amp; Malik (2000)</td>
<td>1982(1)-1996(4)</td>
<td>Aggregate</td>
<td>$P_x$, $P_d$, $Y_w$, $ER$, GDP, WPI, Exports incentive index.</td>
<td>3SLS</td>
<td>$Y_w$ &amp; real devaluation have most important &amp; significant coefficients for all trading partners.</td>
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<td>Naseeb (2012)</td>
<td>1975-2008</td>
<td>Aggregate</td>
<td>$P_x$, $P_w$, $P_d$, $Y_w$, GDP, Import of inputs, D.</td>
<td>GMM &amp; Empirical Bayes</td>
<td>Only $P_x$ play important role on supply side &amp; Demand side factors are more important.</td>
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<td>Variables</td>
<td>Methodology</td>
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<tr>
<td>Goldar</td>
<td>1960-79</td>
<td>Engineering Exports</td>
<td>Px, Pw, Yw, total factor prod., ER, Domestic dd, T</td>
<td>OLS</td>
<td>World income &amp; ER has important &amp; significant role.</td>
</tr>
<tr>
<td>Roy</td>
<td>1976-87</td>
<td>Aggregate ER, Yw, Effective rate of assistance, Domestic Demand Pressure (DD), CGDP.</td>
<td>OLS</td>
<td>Yw &amp; ER plays has important role in boosting Bangladesh exports.</td>
<td></td>
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<td>Virmani</td>
<td>1961-86</td>
<td>Aggregate Px,Pw,Yw,ER, rate of exports subsidy and price of non-exported commodities.</td>
<td>OLS and TSLS (Simultaneous Equation)</td>
<td>World income &amp; RER plays important role in exports growth.</td>
<td></td>
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<tr>
<td>Muscatelli et al</td>
<td>1972-84</td>
<td>Aggregate Px,Pw,Yw, price of raw material inputs(PM) and index of nominal wages in manufacturing.</td>
<td>Modified OLS &amp; FIML(Simultaneous Equ.)</td>
<td>All demand &amp; supply side variables are significant except wage rate.</td>
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<td>Arize</td>
<td>1973(2)-1997(1)</td>
<td>Aggregate Px, Pw, Yw, Exchange rate volatility.</td>
<td>ECM, Dynamic OLS</td>
<td>All variables play significant &amp; important role in the SR &amp; LR except Pd.</td>
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<tr>
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<td>Objective</td>
<td>Variables</td>
<td>Methodology</td>
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<td>------------------------------------------------</td>
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<tr>
<td>Ahmed (2000)</td>
<td>1974-1995</td>
<td>Aggregate</td>
<td>$P_x$, $P_d$, REER, GDP, D</td>
<td>ECM</td>
<td>All variables are significant, REER has important role in exports growth of Bangladesh.</td>
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<td>Roy (2002)</td>
<td>1960-1997</td>
<td>Aggregate</td>
<td>$P_x$, $P_w$, $Y_w$, ER, GDP</td>
<td>FIML</td>
<td>All demand &amp; supply side play significant role except GDP of exporting countries.</td>
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<td>Narayan &amp; Narayan</td>
<td>1970-99</td>
<td>Aggregate</td>
<td>$P_x$, $P_w$, $Y_w$</td>
<td>ARDL, Dynamic OLS &amp; FMOLS</td>
<td>$P_x$ &amp; $P_w$ are significant &amp; important determinants but $Y_w$ has inelastic coefficient.</td>
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<tr>
<td>Roy (2007)</td>
<td>1960-2000</td>
<td>Disintegrated manufacturing</td>
<td>$P_x$, $P_w$, $P_d$, $Y_w$, ER, GDP, Dummy (D)</td>
<td>ECM &amp; FIML</td>
<td>$P_x$, $P_w$, $Y_w$, are significant for all categories except iron&amp;steel. GDP is only significant for the supply of iron &amp; steel only.</td>
</tr>
</tbody>
</table>
Demand and supply equations for T&C export:

- Logarithmic form of demand equation:
  \[ \ln X^d_t = a_0 + a_1 \ln \text{REER}_t + a_2 \ln \text{WY}_t + \varepsilon_t \]

  \( X^d \) shows demand for T&C exports
  REER is real effective exchange rate and
  WY represents GDP of trading partners

- Logarithmic form of Supply equation:
  \[ \ln X^s_t = \beta_0 + \beta_1 \ln \text{RP}_t + \beta_2 \ln \text{W}_t + \beta_3 \ln \text{Y}_t + \beta_4 \text{D} + \nu_t \]

  \( X^s \) shows supply for T&C exports
  RP represents relative price = \( \frac{\text{UVI}_{\text{pak}}}{\text{CPI}_{\text{pak}}} \)
  W is real wage of textile sector
  Y denotes GDP of Pakistan economy
  D is dummy variable
  \& \( X^d = X^s = X \)

During the specified period, share of textile exports in total exports is more than 50% , 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.
Demand & supply equation for the T&C exports are estimated simultaneously

using  \( X^d = X^s = X \)

The exports quantity is considered as a dependent variable for the estimation of both supply and demand equations [Joshi & Little (1994)].

Instrumental variable technique GMM is employed here for the simultaneous equations.

Empirical Bayesian technique is used to get unbiased and consistent estimates.
The Estimation Technique

- Riedel (1988) have examined exports demand & supply equations independently using 2SLS.

- Goldstein & Khan (1978) have estimated exports demand and supply equations simultaneously by using FIML.

- Some other studies have used 3SLS technique for simultaneous equations to generate consistent and efficient estimates (Hassan & Khan 1995, Akhter & Malik 2000)
Following estimation procedure has employed here:

(a) Generalized Method of Moment (GMM)

GMM is employed here as it takes into account the endogeniety problem & heteroscedasticity.

(b) Empirical Bayes (EB) Technique

- EB technique have been used to generates more consistent and robust estimates.
- Bayesian technique assumes the density of unknown parameter as:
  \[
  \tilde{\beta}_j / \beta_j \sim N (\beta_j, \gamma_j)
  \]
- \(\beta_j\) shows true coefficient, \(\tilde{\beta}_j\) values of GMM estimates
- Estimated values of parameters has normal distribution with \(\beta_j\) (mean) & \(\gamma_j\) (variance).
Prior Density

- True parameter values are related and clustered around a centralized point. So
- $\beta_j$ has prior normal distribution given of the form as:
  \[
  (\beta_j|\theta, \delta) \sim N(\theta, \delta)
  \]
- $\beta_j$ is normally distributed given mean $\theta$ and variance $\delta$
- Variance of prior density is calculated as:
  \[
  \delta = \left[ \sum_{j=1}^{n} \gamma_j^{-1} \right]^{-1}
  \]
- It is computed from the variance covariance matrices $\gamma$.
- The formula for the mean of prior density is:
  \[
  \theta = \delta^{-1} \left( \sum_{j=1}^{n} \gamma_j^{-1} \bar{\beta}_j \right)
  \]
- The mean of prior density which is calculated from the $\gamma$ & $\delta$.
- Here, more precise estimates gain more weights and vice versa.
Posterior Density

\[ \frac{\hat{\beta}_j}{\beta_j} \sim N(\mu, \varphi) \]

- \( \mu \) and \( \varphi \) represents the mean and variance of posterior density.

\[ \varphi = (\gamma_j^{-1} + \delta^{-1})^{-1} \]

- The variance of posterior density is calculated from \( \gamma \) and \( \delta \).
- Standard errors of EB can be calculated from the variance.
- Next step is to calculate mean of posterior density, it is also considered as Empirical Bayes formula:

\[ \hat{\beta}^{EB} = \varphi \left( \gamma_j^{-1} \hat{\beta}_j + \delta^{-1} \theta \right) \]

Where, \( \varphi \) is the posterior variance,
\( \theta \) and \( \delta \) shows mean and variance of prior density respectively
\( \hat{\beta}_j \) is the estimates coefficient of GMM.
DATA DESCRIPTION AND SAMPLE SIZE

- Annual data has been used for the period 1972-2010 for eight trading partners.
- Selected countries are US, UK, Canada, Italy, France, Japan, Spain and UAE.
- The data for GDP has been taken from the World Development Indicators (WDI).
- Exports prices, CPI and exchange rate has been taken from IFS.
- Textile wage has been taken from ILO.
- T&C exports have been taken from (UN COMTRADE).
- Data from the UN COMTRADE is extracted according to SITC Rev.1.
## GMM Estimates for the Demand Equation:

$$\ln X^d_t = \alpha_0 + \alpha_1 \ln REER_t + \alpha_2 \ln WY_t + \varepsilon_t$$

<table>
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<th>Trading Partners</th>
<th>$\alpha_0$</th>
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<th>$\alpha_2$</th>
<th>$R^2$</th>
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<td>3.29 (0.54)</td>
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<tr>
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<td>-1.56 (-1.66)</td>
<td>1.02 (11.16) *</td>
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</tr>
<tr>
<td>Canada</td>
<td>8.23 (2.76) *</td>
<td>-5.51 (-4.94) *</td>
<td><strong>0.78</strong> (4.84) *</td>
<td>0.87</td>
</tr>
<tr>
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<td>-2.91 (-2.93) *</td>
<td>1.07 (7.57) *</td>
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<tr>
<td>France</td>
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<td>-2.01 (-1.04) **</td>
<td><strong>0.79</strong> (2.28) **</td>
<td>0.81</td>
</tr>
<tr>
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<td><strong>1.51</strong> (2.94) *</td>
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<tr>
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<td>21.49 (2.27) **</td>
<td>-13.12 (-3.72) *</td>
<td>1.13 (2.78) *</td>
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<tr>
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<td>-9.51 (-3.46) *</td>
<td><strong>0.27</strong> (0.87)</td>
<td>0.80</td>
</tr>
</tbody>
</table>

T-ratios are given in parenthesis, (*) (**) and (***) represents 1%, 5% and 10% significance respectively.
**GMM Estimates for the Supply Equation:**

\[
\ln X^s_t = \beta_0 + \beta_1 \ln RPT_t + \beta_2 \ln W_t + \beta_3 \ln Y_t + \beta_4 D + \varepsilon_t
\]

<table>
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<th>(\beta_2)</th>
<th>(\beta_3)</th>
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<td>(-1.90) ***</td>
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<tr>
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<td>(1.52)</td>
<td>(-0.96)</td>
<td>(2.60) **</td>
<td>(-1.26)</td>
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</tr>
</tbody>
</table>

T-ratios are given in parenthesis, (*) , (**) and (***) represents 1%, 5% and 10% significance respectively.
### Empirical Bayes Estimates for the Demand Equation:

\[ \ln X^d_t = \alpha_0 + \alpha_1 \ln REER_t + \alpha_2 \ln WY_t + \varepsilon_t \]

<table>
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<th>Trading Partners</th>
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<th>( \alpha_1 )</th>
<th>( \alpha_2 )</th>
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<td>(14.08) *</td>
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</table>

t-ratios are given in parenthesis, (*) , (**) and (*** ) represents 1%, 5% and 10% significance respectively.
EMPIRICAL BAYES ESTIMATES FOR THE SUPPLY EQUATION:

$$\ln X_t^S = \beta_0 + \beta_1 \ln RPT_t + \beta_2 \ln W_t + \beta_3 \ln Y_t + \beta_4 D + \varepsilon_t$$

<table>
<thead>
<tr>
<th>Trading Partners</th>
<th>$\beta_0$</th>
<th>$\beta_1$</th>
<th>$\beta_2$</th>
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</tbody>
</table>

t-ratios are given in parenthesis, (*) (**) and (***)) represents 1%, 5% and 10% significance respectively.
Both GMM and Empirical Bayes give similar results regarding determinants of demand and supply.

The Empirical Bayesian technique provides better estimates with expected sign as compare to GMM estimates.

World demand is a major source of T&C exports demand from Pakistan.

Devaluation is less effective to improve T&C exports.

Relative prices & domestic capacity plays important role in the supply of T&C exports.

Results reveals that supply side factors play more important role in the determination of T&C exports.
POLICY IMPLICATIONS

- Producer needs to adopt new techniques for the production of value added products i.e. readymade garments and cloths.
- Exporters should go for ‘demand of market oriented strategies’ by producing high quality fashion cloths.
- Devaluation should be aligned with exports of high quality products and diversification in exports market, to make it effective.
- Price incentives encourage domestic producers to increase exports supply. Govt. should provide infrastructure facilities and duty free imports incentives to encourage T&C producers.
Producers should focus on converting good quality yarn into cloth and readymade garments.

Organized mill sector should also be encouraged to produce good quality fabric.

Demand for man-made fiber is increasing at international level therefore, T&C producers should increase synthetic fiber content in T&C production.

Incentives should be provided to the producers in the form of low energy cost and easy capital availability with reduction in wage rate.
thank you