AN INVESTIGATION INTO THE EXPORT SUPPLY DETERMINANTS OF SELECTED SOUTH ASIAN ECONOMIES

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ABSTRACT

Importance of exports in improving economic growth and living standards of a nation cannot be stressed enough and thus its determinants need to be identified. Determinants of the export supply performance of selected South Asian economies for the period of 1984-2012 were investigated. Traditional factors of export supply such as relative export prices, productive capacity and variable cost in imperfect substitute model of export supply had been extended to include variables that take into account the impact of trade reform policies, import compression and technological innovation on the export supply performance. Keeping in view the current scenario of these economies, corruption and energy crisis variables were also considered. FMOLS estimation of the extended imperfect substitute model showed significant impact of traditional as well as the contemporary variables especially corruption and energy crisis in case of South Asian economies. Some policy implications are also discussed.

Keywords: Export Supply, Productive Capacity, Import Compression, Technological Innovation, Corruption, Energy Crisis.
1. INTRODUCTION

The importance of exports can be well understood from the writings of classical and modern economists. Marshall (1890) clearly stated that, “a nation’s economic growth and development depends on the international trade,” while Nurkse (1961) declared international trade as the engine of economic growth. Export growth and economic growth of a country has been found to have a very close relationship. If exports grow at a faster rate as compared to imports, it will lead to increased economic growth, improvement in balance of payments (BoP), increased foreign exchange reserves, resulting into increased purchasing power of the country.

The decisions of what to export are made on the basis of comparative advantage, i.e., a country or its firms exports the products which they can produce competitively and cheaper. Thus, a natural-resource abundant country will produce the products that use these resources and export them to the world at competitive prices. Rapid export growth can be achieved in developing economies not only by focusing on abundantly available resources but also by introducing suitable economic policies that incentivize in transforming scarce resources used in domestic consumption to export production (Azam, 2010). It is also important that economies should aim for exporting high valued added finished goods rather than raw materials to earn more export revenue.

Although exports continue to be the one of the most important economic indicators globally but its importance for South Asian economies cannot be stressed more vehemently as they continue to face severe BoP deficit and economic growth issues. The selected South Asian economies have shown slowdown in economic growth with Bangladesh showed annual growth rate of 6.23 percent, India 3.23 percent, Pakistan 4 percent and Sri Lanka 6.40 in 2011-12 (World Bank, 2013). While in the same year, exports showed growth rate of 18.55 percent in Bangladesh, 9.15 percent in India, -6.44 percent in Pakistan and 5.58 percent in Sri Lanka (World Bank, 2013). It is evident that higher
export growth rate is associated with high GDP growth in Bangladesh and low export growth rate of Pakistan and India result in lower GDP growth.

To ensure a sustainable growth of exports, factors determining the export performance of a country need to be identified and then policies need to be framed and implemented accordingly. According to Goldstein and Khan (1985) export supply was found to be determined by productive capacity, relative prices of exports and variable cost of production.

The traditional factors discussed above were suitable in explaining the export performance initially but with changing economic scenarios globally, factors determining the export decisions have evolved too in the last two decades. After the 1980s, the South Asian economies started opening up their economies and this liberalization process caught pace in the 1990s. The lowering of trade barriers and increased openness was meant to facilitate trade and subsequently the export performance of the economies. Also, countries require raw materials imports and technological innovation to produce better finished goods and expand exports, the liberalization process was meant specifically to reduce the restriction on such imports which in turn would facilitate the exports.

Although trade reform policies were meant to support the export growth process but the South Asian economies continued to show fluctuating export performance over the years, which had resulted in being a hindrance in growth stability of these developing economies. The fluctuations in exports supply of these South Asian economies can also be attributed to the domestic factors such as deteriorating law and order, increased energy crisis and corruption.

According to the latest reports, Pakistan faces a shortfall of 4000-5000 MW of electricity generation and faces the additional pressure of diminishing fuel reserves and almost exhausted gas reserves (GOP, 2013). In India power shortages peaked in December with the country facing a shortfall of 5,547 MW in December 2013, which was attributed to decreased hydel and wind generation and
increased load (GOI, 2014); while Bangladesh was facing a power shortfall of 0.0253 Quadrillion BTU in 2011 as the gas consumption skyrockets and rural energy crisis worsens (EIA, 2012). Sri Lanka is the only South Asian nation that is at par with the other developed economies at least in the context of population’s access to electricity but it faced pressure due to increased oil prices and lower hydel generation and thus encountered an energy shortfall of 0.0157 Quadrillion BTU in 2011 (EIA, 2012).

Besides the energy crisis, another hindrance to the effective implementation of export facilitating policies was higher level of corruption prevailing in the South Asian region. According to the WDAR (2011) out of 180 countries, in terms of corruption levels prevailing; Sri Lanka was ranked 66, India 75, Bangladesh 93 and Pakistan 106. While, Corruption Perception Index (CPI) score (ranging from 0 (highly corrupt) -10 (very clean)) for these countries in 2010 was; India 3.3, Sri Lanka 3.2, Bangladesh 2.4 and Pakistan 2.3. These alarming corruption levels arose because of lack of clear rules, opportunity for public officials to abuse power, low income levels in these economies (Bhargava, 2005).

Various studies have been carried out in order to determine the factors impacting the export decisions using traditional variables (see for instance Goldstein and Khan, 1985; Faini, 1994; Prasad, 2000; and Utkulu, et al., 2004). In contrast, recent research had not only focused on the traditional factors of export supply functions but also considers the trade reform, import compression and technological innovation (see for instance Utkulu, et al., 2004, Khan and Knight (1988), and Lapp, et al., (1995)) as factors determining the export supply decisions. Similarly, Prasad (2000) showed that exports in case of Fiji depend on relative prices of exports, trading partners’ income and agriculture supply shocks while Ahmed and Said (2012) that corruption and unfriendly business environment can have a significantly negative impact on export growth of firms that have access to external finance in South Asian economies. Our study extends the model of Utkulu, et al., (2004) and adds to
the already existing literature by examining corruption and energy crisis as the new factors determining the export supply decisions of the selected South Asian economies of Bangladesh, India, Sri Lanka and Pakistan for the period of 1984-2012.

2. LITERATURE REVIEW

Examination of trade relations had been one of the oldest and most researched parts of international economics. So far numerous studies have been published on the determinants of export performance, which clearly testifies to this issue’s importance in playing a very vital role in trade and economic growth of a country. Owing to this significance much focus had been on the factors that determine the export performance of the economies both on supply and demand sides. Most of the researchers have used a single-equation approach to model the exports while others have opted for a simultaneous approach to model and estimate the exports. Irrespective of the approach used to model exports, consensus exists on the importance of the factors influencing exports because identification of these factors helps the economy to develop policies that boost exports which will in turn promote economic growth (Zada, et al., 2011).

Major breakthrough in the modeling of export functions was by Goldstein and Khan (1985) in the form of imperfect substitute model which is considered as standard approach to formulating the trade models. This model was based on the assumption “neither imports nor exports are the perfect substitute for domestic goods”. They considered export supply as function of relative export price, productive capacity and variable costs.

Khan and Knight (1988) carried out this study with the purpose of presenting an alternative extended model that integrated the relationship between imports and exports. The model presented was a variant of the standard imperfect substitute model of exports accounting for the factor that exports require imported inputs to produce and it was concluded that reduction in volume of imports will result in reduction in exports’ volume sand thus import compression policies had been
found to have an adverse effect on export performance. Lapp, et al., (1995) while discussing the real exports of the G7 countries asserted that real effective exchange rates and the foreign economic activity have significant impact on real exports of these countries.

Prasad (2000) carried out a study that showed that exports in case of Fiji depend on relative prices of exports, trading partners’ income (same as Goldstein and Khan (1978)) and agriculture supply shocks as a new variable in the traditional imperfect substitute model of exports using error correction framework. It was shown that trading partner income strongly influences export growth of Fiji in the long run but in short-run, factors like weather conditions that affect agricultural production were found to be influencing the exports more strongly.

Van Dijik (2002) pointed out that in case of Indonesia technology and cost related factors played a major role in determining the exports from the firms in the country. This study added the much needed factor of human capital affecting the export supply from a country and showed that worker skills were positively related to exports especially in case of scale intensive industries.

Utkulu, et al. (2004) argued through their research that the traditional model with traditional variables can be further extended by accounting for the variables of trade reform, import compression factor, productive capacity and technological innovation. It was found that the trade reform by reducing anti-export bias, import compression and technological innovation significantly influence the export supply of Turkish economy while the traditional variables of relative prices and real exchange rates fail to show any significant influence.

Haque and Kemal (2007) made an attempt to evaluate the export promotion policies like export financing and rebate schemes and their impact on export performance. ARDL co-integration analysis was used to analyze the impact of export subsidies on export performance and results showed that there is a long-run relationship existent between variables. Subsidy schemes were found
to be insignificant in promoting exports in long-run but the impact in short-run was found to be significant for rebate schemes.

Ahmed and Said (2012) undertook a study with the objectives of analyzing the impact of world financial crisis on exports and to determine the export determinants for South Asia. Pooled OLS estimation of the panel showed that corruption and business environment can have a significantly negative impact on export growth of firms that have access to external finance while corruption fails to show a significant impact on other South Asian countries that are part of the pooled sample.

As is evident from these studies carried out in South Asia and world shows that these studies fail to take into account the factors that have been continuously playing a major role in domestic and foreign environments and thus affect the related markets too. These factors include the increased energy crisis and corruption prevalent in the South Asian region that adversely affects economic growth, which in turn negatively affects the export performance too. This gap in research motivates us to study export performance of selective South Asian nation by incorporating these factors in the extension of the imperfect substitute model as discussed by Goldstein and Khan (1985).

3. OVERVIEW OF SOUTH ASIAN ECONOMIES

South Asia refers to the existing political entities of the Indian Subcontinent and connected islands, including states of India, Pakistan, Bangladesh, Nepal, Bhutan, and Sri Lanka. South Asia has shown good GDP growth pattern in recent years and has grown at 5.6 per cent in the decade of the 1990s and was last recorded at 6.59 per cent in 2010 (World Bank, 2013). This growth rate of South Asian economies is better than low income countries but slower than the East Asian economies (Hussain, 2004).

Trade policy environment has changed dramatically in South Asian economies after the 1970s. Before that time, like rest of the developing economies, South Asian economies had virtually closed
economic policies with focus on import substitution and industrialization which was meant to ensure the development of domestic industries but unfortunately resulted in economic inefficiencies in the country (Bhagwati and Srinivasan, 1975). This led to a movement towards export-oriented industrialization and economic liberalization throughout the world in the late 1970s and resulted in making the economies efficient with increased competition. South Asian economies also started opening up their markets in the early 1980s and witnessed an increase in investment inflows as the efficiency improved and development process continued due to increased growth rates in the region (Palit, 2006).

Following section explains the trends and policies regarding trade especially exports of selected South Asian economies of India, Pakistan, Sri Lanka and Bangladesh and its impact on their economies.

3.1 Bangladesh

Trade and export in Bangladesh fell in the post-independence scenario (1971) as the economy suffered severe losses and export-GDP ratio deteriorated to very low levels till the later part of 1980s. Bangladesh had a closed economy till the mid-1980s but it announced major policy reforms and measures to liberalize its economy under the auspices of IMF and the World Bank in the late eighties (Sahoo, 2006). In the 1990s, Bangladesh liberalized industrial and trade policy, removed performance standards and allowed foreign-owned joint ventures in the country that improved the investment policy to a greater extent. This led to the improvement in export growth rates and export-GDP ratio had shown a rising trend. The export performance of Bangladesh in the 1990s was so good that it overshadowed the economic growth in the same period.
Bangladesh had emerged as a major exporter of non-agricultural goods especially readymade garments which account for 77 percent of Bangladesh exports of merchandise in 2002 (BoB, 2003). Export growth rates increased to 13.99 percent in 2005 and 21.45 percent in 2006. Bangladesh’s top target markets include European Union and U.S., which had resulted in its vulnerability to global financial crisis and also reduced its exports’ growth rate to 6.2 percent in 2012 in contrast to 39.2 percent of 2011. This fall in growth was due to the decreased garment demand from U.S. and EU to 6.6 percent while it was 43 percent in 2011.

3.2 India

At the time of independence India had a mix economy with combined features of both socialism and capitalism which caused the dominance of inward-looking policies with focus on import substitution which continued till 1980s when India ended up being the most closed economy of the world. Such trade policies of India resulted in exports playing very little role in international market. The balance of payments crisis of 1991 led India to open up its economy for the first time with a comprehensive effort towards stabilizing economy, controlling monetary policy and improving the rupee convertibility was launched (Chadha, et al., 1997). The Share of exports in GDP of India increased from 7.13 percent in the 1990s to 23.48 percent in 2008 (Ramdasi, 2010).

India’s exports showed negative growth rate of 2.33 percent in 1997 due to the East Asian crisis. Second impediment in its export performance was faced in 2001-02 due to US’s semi-recession
episode as it is one of the major trading partners of India. The next setback was faced in 2008 due to
the global financial crisis in that year with the negative growth in exports of 2.9 percent in 2008-09
(GOI, 2013).

Despite the popular perception of growing contribution of service sectors in exports, exports of
manufacture sector continue to dominate India’s exports. Indian agricultural exports were the major
contributor in the initial years of independence but the industrialization process in the same years
resulted in a shift towards the manufactured exports. Manufacturing exports are the largest share
contributor to Indian exports as its share had increased from 50 percent in 1985 to above 64 percent
in 2009.

3.3 Pakistan
In Pakistan, trade policy had always been guided by the economic and political setting of the
country. Besides focusing on industrial development in the 1950s and 1960s, policies in that era also
focused on import substitution while various incentives like tax rebates and exemptions, etc., were
offered on exports which resulted in large export volumes with exports showing a growth rate of
16.19 percent in the 1960s. With the nationalization policies and dismal performance of the newly
nationalized industries Pakistan’s exports fell to 10.31 percent in the 1970s.

Due to increased economic pressures and globalization forces at work, Pakistan initiated its trade
reform process in the late 1980s and its intensity increased in the first half of the 1990s. Thorough
liberalization programs started in 1996-97 and wide ranging reforms started in agricultural sector and
Government reduced average tariffs in all sectors to 20.4 percent 2001-02 as compared to 56
percent in 1993/94. But the export performance of Pakistan remained dismal in those years with an
average growth of 3 percent annually because of imposition of sanctions on Pakistan economy.
Although Pakistan’s trade had remained resilient to global crisis of 2002 and 2008 but the growth of exports had been fluctuating erratically for the past two decades because of socio-economic and political problems in the domestic market. The issues of politics, lack of infrastructure and a limited export base that had resulted in heavy reliance of export growth on fewer products had resulted in worsening conditions of exports (Alam, 2011). Also, Pakistani exports were also faced with the issue of compliance with international production laws like labor conditions maintenance, lack of product and market diversification etc.

### 3.4 Sri Lanka

Ever since its liberalization reforms, Sri Lanka was the first economy of South Asia to open up its trade and move away from inward-looking policies that had been the trademark of this economy since its creation. Such trade liberalization policies which included opening up of trade, elimination of administrative controls on domestic prices, lowering of food subsidies and opening up of closed off sectors to private investors (Pursell and Ahsan, 2011).

Exports responded very well to these liberalization policies especially the manufactured goods export supply showed increased growth instantaneously of around 20 percent between the period 1976-1984. This growth rate slowed immediately in next five years and then increased after 1989 to around 16 percent. During this time period (1989-2000) industrial exports showed growth from 10
percent to almost a third of total exports with garments exports accounting for 65 percent of total manufactured exports in 2000. During this period tariff rates continued to fall in the economy which supported the export growth process.

The increasing trend in export growth was hindered after 2000 as the 40 percent surcharge was imposed on custom duties as the Government succumbed to the opposition to the liberal policies. Also, the economic conditions deteriorated with the worsening law and order situations domestically and because of these economic and opposition pressures, import policies continued to become more restrictive between 2001-04 as the liberal stance of government reverted to import substitutive policies especially in case of manufacturing and agricultural sectors. These protectionist policies strengthened and continued during 2007-09 and are still continuing and this had resulted in decline in exports as a share of GDP in the economy over this period as well as in global exports (Kelegama, 2013).

Fig.3.3. Exports of Sri Lanka (1984-2012)


Analysis of the export policies implemented by the South Asian economies shows clearly that although much attention is paid to the trade related policies in the form of trade liberalization and export promotion policies but exports growth rate had shown a decline over the last three decades. These unfavorable fluctuations in exports growth rate need to be examined and the factors that are the reason behind this decreasing trend need to be determined. Thus, the effect of not only the basic factors like productive capacity, export prices are needed to be examined but the effect of new
factors like trade reforms, technological innovation, increasing energy crisis in the region and rampant corrupt activities need to be considered too in determining the export performance.

4. THEORETICAL FRAMEWORK

Measurement of export performance studies had always paid special attention to the model specification and as a result of this general consensus had been achieved on empirical form of demand and supply function for exports. The customary approach to measure the supply side determinants of exports is the “imperfect substitute model” assuming that neither the imports nor exports are perfect substitutes of domestic goods in a country (Goldstein and Khan, 1985). Based on this assumption, imperfect substitute model shows that in the long run, supply of exports from a country depends on the productive capacity, input prices and relative price of the exports, i.e., export price relative to domestic market prices. Thus, long-run general form export supply function is:

\[ X^* = f\left(\frac{P_x}{P_d}, VC, K\right) \]  \hspace{1cm} (1)

where, \( X^* \) shows the exports supply volume that depends positively on relative export price (\( P_x/P_d \)), production capacity (\( K \)) and negatively on input prices (\( VC \)) (Goldstein and Khan, 1985). The model in Equ. (1) is the standard export supply function used in many empirical researches carried out so far.

Several researchers have extended the standard export supply model in different dimensions like Utkulu, et al. (2004) extended the traditional export model to estimate the impact of trade reform (\( TR \)), i.e., measures to reduce anti-export bias on the export supply in case of Turkey along with the traditional variables used in Equ. (1). This extended model of export supply also included import compression factor (\( IC \)) and technological innovation (\( TI \)).
Trade reform is described in the sense of more openness and a movement towards trade liberalization and a reduction in anti-export bias in policies and tariff levels in the country that results in increased export supply. Trade reform variable proxied by trade reform dummy as well as trade openness (which is calculated by taking ratio of sum of imports and exports with the GDP of the economy) is expected to show a positive impact on export supply.

With the increased trade liberalization it is expected that Government will decrease the tariff and non-tariff barriers, i.e., quotas, licensing, etc., avoid engaging in activities like deflation and currency depreciation that discourage imports and result in import compression. Thus, import compression decreases as the tariff and non-tariff barriers (that result in import compression) fall as a result of trade liberalization. Import compression can adversely affect export performance of a country as the export supply depends on the availability of imported inputs (Khan and Knight(1988) and Zia and Mahmood (2013)). Thus, decreased import compression will result in strong export supply response and expected to increase the export supply.

Technological innovation is the ability of a country to use new ideas to develop new products through better and improved processes and transfer of knowledge this thus plays a key role in trade. Increased technological innovation fosters international trade among all countries and results in increased export supply (Márquez-Ramos and Martínez-Zarzoso, 2010).

5. EMPIRICALMODEL

With the continuously changing environment in the domestic and international trade the factors effecting trade keep on evolving. In the present scenario of the South Asian economies, besides trade reform economy, these economies also face the domestic pressures like worsening energy
crisis \((EN)\) and corruption situation \((Cor)\). Thus, in our opinion, the extended model in Equ. (2) needs to be further augmented for the case of South Asia for the following variables:

\[
X^s = f\left(\frac{P}{P_d}, VC, K, TR, IC, TI, Cor, EN\right)
\]  

(3)

Export performance of a country is hindered by the corrupt activities and the level of corruption prevalent in the country as the country specific frictions like corruption in the customs valuation and finance sector, etc., act as a discouraging factor for exporters resulting in decreased export supply from the country (Ahmed and Said, 2012). Besides the corrupt practices at Government level, exporters themselves indulge in corrupt activities like exports misinvoicing with the connivance of government officials in order to extract high duty drawbacks and to take illegal money abroad (Mahmood and Nazli, (1999) and Mahmood and Azhar (2001)). Corruption variable is very complex and difficult to measure. Our study used the Corruption indicator \((Cor)\), which specifies the average value of corruption in the country between the ranges of 0-6 with lower score indicating the higher levels of corruption. Corruption is expected to be negatively affecting the exports of the country.

Same is the case with the energy crisis, with prevalent energy crisis as industries shutdown with energy supply diverted from this to meet the needs of domestic sector. Energy or power is one of the major factors of production in any industry and with the increased GDP and population growth the demand for energy is increasing both at consumer and producer levels. To cater this demand, supply of energy needs to increase with the same pace, which unfortunately failed to happen in case of the South Asian economies. The available sources of energy are very expensive resulting in the cost-ineffectiveness of the products produced and reduced competitiveness of exports due to these shortcomings in domestic facilities which results in adverse effect on export supply. This inadequate
supply of energy to the industries had resulted in a failure to generate sufficient exportable surpluses. Thus, energy shortage measured as the difference between potential and actual energy consumption will negatively impact the supply from the exporting industries.

So the augmented-exports supply model introduced by us, including all the above variables is specified by:

\[ X_t = \beta_0 + \beta_1 \left( \frac{P_t}{P_d} \right) + \beta_2 VC + \beta_4 K + \beta_4 TR + \beta_4 IC + \beta_5 TI + \beta_6 Cor + \beta_8 EN + \epsilon_t \]  

(4)

In our opinion, estimating this augmented model in Equ. (4) will help us determine the impact of these variables on the export supply of the South Asian economies in light of the prevailing domestic conditions in these economies. It will thus have important implications for the policy as it will help policy makers to assess that the extensive trade reforms that had been carried out since the 1980s had delivered the desired impact on trade and exports or not. Also, the impact of current conditions of the domestic market (like corruption and energy crisis) on exports supply will be determined and policies can be made to deal with them accordingly.

Data sources and variable explanation is available in Appendix A.

6. RESULTS DISCUSSION

The data being used in our research of export supply determinants of South Asian economies included the data for selected four South Asian countries (India, Bangladesh, Pakistan and Sri Lanka) from the year 1984-2012. Hence, the total pooled observations in our balanced panel were 116. This section includes the discussion the empirical findings of the study.

Identification of a long-run relationship between export supply and explanatory variables requires that time series properties of these variables be analyzed first. As the cointegration tests can be performed only when
the panels are non-stationary and to test the stationarity of the series, panel unit root test (Levin et al., 2002) were run based on the null hypothesis of unit root. Results reported in Table. 6.1 show that all variables were found to be accepting the null of common unit process at level but rejected the null hypothesis at first difference and thus we concluded that all variables were found to be stationary at first difference i.e. I(1).

<table>
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</thead>
<tbody>
<tr>
<td>EXP</td>
<td>4.965</td>
<td>1.0000</td>
<td>-3.836</td>
<td>0.0001***</td>
<td>I(1)</td>
</tr>
<tr>
<td>K</td>
<td>3.150</td>
<td>0.9949</td>
<td>-9.634</td>
<td>0.0000***</td>
<td>I(1)</td>
</tr>
<tr>
<td>RP</td>
<td>-0.109</td>
<td>0.5437</td>
<td>-4.449</td>
<td>0.0000***</td>
<td>I(1)</td>
</tr>
<tr>
<td>C01</td>
<td>0.459</td>
<td>0.6772</td>
<td>-5.996</td>
<td>0.0000***</td>
<td>I(1)</td>
</tr>
<tr>
<td>TI</td>
<td>-0.773</td>
<td>0.2198</td>
<td>-2.518</td>
<td>0.0059***</td>
<td>I(1)</td>
</tr>
<tr>
<td>IC</td>
<td>0.064</td>
<td>0.5258</td>
<td>-6.310</td>
<td>0.0000***</td>
<td>I(1)</td>
</tr>
<tr>
<td>COR</td>
<td>-0.769</td>
<td>0.2208</td>
<td>-6.244</td>
<td>0.0000***</td>
<td>I(1)</td>
</tr>
<tr>
<td>EN</td>
<td>-0.059</td>
<td>0.4764</td>
<td>-6.912</td>
<td>0.0000***</td>
<td>I(1)</td>
</tr>
</tbody>
</table>

Table 6.1. Levin, Lin & Chu Test for Stationarity

To identify whether the I(1) variables give spurious regression or a long run relationship exists, Kao (1999) panel cointegration test was run based on the null hypothesis of no cointegration. Table 6.2 shows that the null hypothesis of no cointegration is rejected and there exists a long run relationship between the variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-efficient</th>
<th>Std. Error</th>
<th>t-statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESID (-1)</td>
<td>-0.269</td>
<td>0.07245</td>
<td>-3.720</td>
<td>0.0003***</td>
</tr>
</tbody>
</table>

Table 6.2. Kao Residual Cointegration Test Estimation

Based on the Kao cointegration test, we had established that there exists a linear combination that results in a long-run relationship between the included explanatory variables and independent variable. In view of this, OLS estimators will be biased and inconsistent if applied to a co-integrated panel and thus an alternative method needs to be adopted. For this reason, we run panel Fully

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1 *** shows statistical significance at 1%
Modified OLS (FMOLS) developed by Pedroni (2000). Fully Modified OLS (FMOLS) developed by Pedroni (1996) can be used which uses a correction approach to deal with the nuisance parameters and thus gives the long-run coefficients for the estimated model free of endogeneity and serial correlation. The major advantage of FMOLS is that it allows for estimation of common cointegration vectors while allowing for heterogeneity both across time and cross-sections. Thus, to obtain long-run impact of the variables free of serial correlation we use fully modified OLS (FMOLS) estimations.

\[
\hat{\beta}_{FM} = \left[ \sum_{i=1}^{N} \sum_{t=1}^{T} (x_{it} - \bar{x}_i)^\prime \right]^{-1} \left[ \sum_{i=1}^{N} \left( \sum_{t=1}^{T} (x_{it} - \bar{x}_i) \hat{y}_{it}^+ + T\hat{\Delta}_{\epsilon_{it}} \right) \right]
\]

Where \( \hat{\Delta}_{\epsilon_{it}} \) is correction term for serial correction and \( \hat{y}_{it}^+ \)is the variable that is transformed to account for endogeneity. These estimations not only generate the consistent estimates of the parameters even in small samples but it also helps to control for likely endogeneity and serial correlation.

The estimations for Classical export supply model of Goldstein and Khan (1985) in equ. (1) is given in Appendix B and it shows that all variables are significantly affecting the export supply in case of the selected South Asian economies while same was observed for the variables of model of Utkulu, et al., (2004) in equ. (2) in Appendix.

<table>
<thead>
<tr>
<th>Table. 6.3. Overall Model Fitness Statistics</th>
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<tbody>
<tr>
<td>R-squared</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
</tr>
<tr>
<td>S.E. of regression</td>
</tr>
<tr>
<td>Durbin-Watson stat</td>
</tr>
</tbody>
</table>

Adjusted R-squared value obtained clearly showed that high explanatory power of the independent variables i.e. they can explain 98.48 percent\(^2\) of export supply of the selective South Asian economies

\(^2\) Although such high \( R^2 \) seems unrealistic for panel data analysis but high values were also witnessed in Venables and Redding (2002),and Fugazza (2004).
(Table. 6.3). Also low Sum square residuals and Standard deviation values indicated that our model is the best fit and helped explain the maximum variation in export supply from the South Asian region. Model is also adjusted for serial correlation and possible endogeneity problem because of FMOLS estimations.

**Table 6.4. FMOLS Estimations Results**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-efficient</th>
<th>Elasticity(^3)</th>
<th>Std. Error</th>
<th>t-statistic</th>
<th>Prob.(^4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>1.683372</td>
<td>1.683372</td>
<td>0.014472</td>
<td>116.3226</td>
<td>0.0000***</td>
</tr>
<tr>
<td>RP</td>
<td>0.078856</td>
<td>0.133127</td>
<td>0.006665</td>
<td>11.83133</td>
<td>0.0000***</td>
</tr>
<tr>
<td>VC</td>
<td>-0.000992</td>
<td>0.090628</td>
<td>0.000160</td>
<td>-6.196856</td>
<td>0.0000***</td>
</tr>
<tr>
<td>TR</td>
<td>0.042251</td>
<td>0.008013</td>
<td>0.010597</td>
<td>3.987010</td>
<td>0.0001***</td>
</tr>
<tr>
<td>TI</td>
<td>0.002100</td>
<td>0.048802</td>
<td>0.000170</td>
<td>12.33348</td>
<td>0.0000***</td>
</tr>
<tr>
<td>IC</td>
<td>0.000157</td>
<td>0.016129</td>
<td>8.57E05</td>
<td>1.830500</td>
<td>0.0702**</td>
</tr>
<tr>
<td>EN</td>
<td>-0.111610</td>
<td>-0.112870</td>
<td>0.012823</td>
<td>-8.704176</td>
<td>0.0000***</td>
</tr>
<tr>
<td>COR</td>
<td>0.115659</td>
<td>0.261678</td>
<td>0.007739</td>
<td>14.94539</td>
<td>0.0000***</td>
</tr>
</tbody>
</table>

Cross-section Dummy:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PAK-C</td>
<td>-14.02399</td>
</tr>
<tr>
<td>IND-C</td>
<td>-15.39018</td>
</tr>
<tr>
<td>BANG-C</td>
<td>-14.01605</td>
</tr>
<tr>
<td>SRI-C</td>
<td>-12.63730</td>
</tr>
</tbody>
</table>

Our estimations were carried out while accounting for heterogeneous long-run coefficients and results clearly show that export supply function in case of the selective South Asian economies is significantly dependent on the variables included in the model. Productive capacity, defined as the potential output that the economy can produce and measured by quadratic detrending of the simple

\(^3\) Conversion to elasticity using formula given by Gujarati, D. (2004) “Basic Econometrics”, 4\(^{th}\) edition, pp.190 (Table 6.5). All further percentage conversions are based on this formula.

\(^4\) *, ** and *** show statistical significance at 10%, 5% and 1% respectively.
log of actual output (GDP), is found to be positively impacting the export supply in the South Asian economies as the one percent increase in productive capacity of a nation will result in 1.68 percent increase in the export supply of the nation (Table 6.4). These results corroborate with the findings of the Dunlevy (1980) in the case of the United States and the United Kingdom, and Faini (1994) in case of Turkey. The significance and impact also support the findings of Goldstein and Khan (1985) and Utkulu, et al. (2004).

Relative prices, measured as the ratio of export prices to the GDP deflator, also give positive results which show that as the relative export prices increase by 1 percent, the export supply of the South Asian economies also increases by 0.13 percent. This change in export supply as a result of change in relative export prices can be interpreted as the price elasticity of exports and as can be seen that 1 percent change in the relative prices had brought on less than one percent change in export supply which shows that export supply in the selected South Asia economies is inelastic. The results in the case of relative prices (RP) are consistent with the studies done by Goldstein and Khan (1985), Faini (1994), and Zada, et al. (2011).

A decrease of one unit in the variable cost will increase the export supply by 0.0009 units, alternatively one percent decrease in variable cost will increase export supply by 0.09 percent. As the variable cost increase will result in increase in the cost of production of the exportable commodities, so its competitiveness will fall decreased export supply.

Trade reform is described in the sense of more openness, a movement towards trade liberalization i.e. a reduction in anti-export bias and tariff levels in policies which will ultimately lead to an increased export supply. Trade reform variable was measured by trade openness (which is calculated by taking ratio of sum of imports and exports with the GDP of the economy) and also a dummy for trade reform was created and both are found to be showing a positive impact on export supply. The trade reform process (proxied by trade reform dummy) of these South Asian economies was found
to be significantly impacting export supply as one percent of increased trade reforms will increase the export supply by 0.008 percent. Trade reform process not only includes decreased tariff but also radical cuts in import licensing schemes, abolishing state enterprise control over import of key goods, reduction in quantitative restrictions, simplifying the tariff structures, and removal of export taxes. All these measures will ultimately lead to facilitating exports and export-related industries which will positively impact the export performance (Pursell and Ahsan, 2011). These results support the findings of Thirwall (2000) and especially Utkulu et al. (2004). Exports from a country are also dependent on the imports coming into it as the production of exportable goods may be dependent on the imported raw materials. Increased trade reforms and openness of the economy will result in the fall of import quotas and tariffs thus decreasing the import compression effects and thus will result in increased supply of raw materials and thus increased export supply. This effect is evident in Table 5.4 as the import compression variable showed significant positive impact which shows that a percent decrease in import compression will result in increased imports and which in turn will increase the export supply by 0.016 percent. Thus the impact of import compression reduction is significant but small and same was observed in the case of Turkey by Utkulu, et al., (2004). These results support the findings of Khan and Knight (1988), Khan, et al., (1995) and Utkulu, et al. (2004). Thus, exports from the South Asian economies are dependent on their own natural resources and the contribution of the imports is very small thus the size of coefficient was found to be significant but small in determining the export supply. Similarly, technological innovation in a country will result in increased capability of the country to produce innovative products that are demanded vastly and thus increases export supply. FDI inflows into the economy are not only a source of technology transfer but also result in knowledge transfer through knowledge about “production methods, product designs etc” that will improve the

5 Trade openness proxy results are reported in the Appendix D.
exports production and thus increase the supply of exports. This effect is shown by the significantly positive sign of technological innovation variable \((TI)\) and one percent increase in technological innovation will increase export supply by 0.048 percent from South Asia. These findings support the research results of Barrell and Pomerantz (2007), Utkulu et al. (2004) and Márquez-Ramos and Martínez-Zarzoso (2010).

Export performance of a country is hindered by the corrupt activities and the level of corruption prevalent in the country as the country specific frictions like corruption in the customs valuation and finance sector, etc., act as a discouraging factor for exporters resulting in decreased export supply from the country. The coefficient of the corruption variable shows a significantly positive sign which in the case of corruption index developed by ICRG means that the lower the value of corruption index variable, the higher the corruption level in the country which will result in the lower export supply. Thus the positive sign in the case of corruption variable here shows the inverse relation between the export supply and corruption. Thus, one percent fall in corruption will increase export supply by 0.24 percent. These results support the findings of the research done by Tanzi (1998) and Ahmed and Said (2012).

Similarly the energy crisis prevailing in the selected South Asian economies is expected to inversely affect the export supply in the region as industries shutdown due to energy supply diverted to meet the needs of domestic sector. The available sources of energy are very expensive resulting in the increased cost of production and reduced competitiveness of exports. Due to these shortcomings in domestic facilities, adverse effect on export supply is seen. Energy crisis, measured by the difference in energy demanded and supplied, thus showed a negative impact on export supply as an increase by one percent in the energy crisis resulted in a fall of export supply by 0.112 units. These results support the survey-based findings of Amjad, et al. (2012).
7. CONCLUSION AND POLICY SUGGESTIONS

Based on the empirical model and by employing panel data techniques we have clear empirical evidence that the imperfect substitute model variables of productive capacity, variable cost and relative prices have significant effects on the export supply performance of the South Asian nations selected for this research. Export supply is found to be positively affected by the increased productive capacity and relative export prices while the variable cost increase will reduce the export supply from these economies.

The extended model including trade reform variables proxied as trade openness show significantly positive impact on export supply clearly indicating that trade reform process works in the case of South Asian economies. Also, the variables of import compression and technological innovation show significant effect on export supply in South Asia.

Our extended model also had the variables of corruption and energy supply which are found to be significant and thus influence the export supply performance of these economies. The deteriorating situation of the energy sector and increased corruption levels have proven to be acting as the significantly deterring variables when it came to export supply decisions.

The results discussed above show that South Asian governments need to pay attention to the capacity building that will help facilitate the export supply growth. Also as the increased trade reforms and technological innovation had resulted in the increased export supply so the South Asian economies need to continue the trade reform process. Although with the onset of trade liberalization process in the late 1980s, a marked shift had been seen from import substitution to export promotion that had resulted in removal of protective duties which promotes competition. However, in the existing trade policies of these selected South Asian; trade regimes still have anti-export biases. Thus there is a need to devise such policies that aims at removing anti-export bias in policies to promote exports. Also, reduction of tariff and quantitative restrictions on all imports had
resulted in imports outstripping the exports had not only resulted in BoP crisis but also inhibited manufacturing sectors’ performance in these countries which had affected the export performance. Thus, for a successful exporter-friendly atmosphere, these countries need to adopt a more controlled liberalization of imports by ensuring freer imports to exporting industries through special export processing zones.

Similarly, technological innovation and knowledge transfer, through FDI inflows, will not only impact the exporting industries by improving production process but will also help in bridging the technology gap in the whole economy increasing productivity of the economy as a whole. Thus policies aimed at simplifying tax structures, flexible labor markets, improved infrastructure, lowering corruption and security conditions in these economies will help attract the FDI investors and will subsequently improve the performance of the economy especially exports.

Corruption variables are found to be negatively impacting the export supply performance and in order to ensure exporters’ confidence and safety; these economies need to reform their policies regarding corruption besides having encouraging macroeconomic environment. Their foremost need is to improve the governance mechanism that will help ensure corruption control. Exports valuation process determining the duty drawback rates, also provide for a lot of corruption opportunities that increase the export transaction cost further. Simplification of the trade procedures and processes will not only reduce the corruption opportunities but also reduce the transaction costs resulting in increased competitiveness of exports.

Corrective measures on the part of government and development of proper ethical and business standards for public and private sectors will result in reducing discretionary powers and their blatant use by public officials and lack of transparency in the decision-making process of the government which will ensure reduced opportunities for corruption and will restore the exporters’ confidence ensuring less restrictions and more exports.
Similarly, energy crisis that is affecting the production process needs to be dealt with by either importing electricity from regional surplus countries or by exploring and developing energy resources domestically that will help reduce the load shedding for the industries and thus ensure a smooth production process. This will not only help facilitate the export supply but also reinforce the exporters’ confidence in the government abilities to address their problems and will help attract new investors in the region too.
References


Appendix

A. Summary of Data Variables and Sources

<table>
<thead>
<tr>
<th>Variable</th>
<th>Abbreviated As</th>
<th>Proxied as</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Productive Capacity</td>
<td>K</td>
<td>Potential output calculated by quadratic de-trending of the GDP</td>
<td>GDP source: WDI, World Bank.</td>
</tr>
<tr>
<td>Relative Prices</td>
<td>P_x / P_d</td>
<td>Ratio of Unit value of exports to domestic price (GDP deflator)</td>
<td>IFS, International Monetary Fund.</td>
</tr>
<tr>
<td>Variable Cost</td>
<td>V/C</td>
<td>Average of monthly wage rate per worker in each year</td>
<td>World Development Report, World Bank.</td>
</tr>
<tr>
<td>Trade Reform</td>
<td>TR</td>
<td>1) Trade openness calculated by taking ratio of sum of exports and imports with GDP 2) Trade reform Dummy with score 1 for significant reform.</td>
<td>WDI. World Bank. Review of Trade policies of respective Countries.</td>
</tr>
<tr>
<td>Technological Innovation</td>
<td>TI</td>
<td>FDI inflows into the economy</td>
<td>WDI, World Bank.</td>
</tr>
<tr>
<td>Corruption</td>
<td>Cor</td>
<td>Corruption Index (0-6)</td>
<td>International Country Risk Guide (ICRG).</td>
</tr>
<tr>
<td>Energy Crisis</td>
<td>EN</td>
<td>Measured by quadratic detrending of Net Primary Consumption of energy and then taking the gap between potential and actual consumption of energy</td>
<td>U.S. Energy Information Agency.</td>
</tr>
</tbody>
</table>

B. FMOLS Estimation (Classical Export Supply Model)

Dependent variable: LOG(EXP)
Method: Panel Fully Modified Ordinary Least Square
Sample (adjusted):1984-2012 Periods Included:28 Cross-sections:4
Total observations:112

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-efficient</th>
<th>Std. Error</th>
<th>t-stat</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
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<td>69.30907</td>
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<tr>
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<td>0.015093</td>
<td>8.648260</td>
<td>0.0000***</td>
</tr>
<tr>
<td>VC</td>
<td>-0.000624</td>
<td>0.000365</td>
<td>-1.70767</td>
<td>0.0907*</td>
</tr>
</tbody>
</table>

Cross-section Dummy:
PAK-C -25.17456
IND-C -27.01750
BANG-C -24.54473
### C. FMOLS Estimations (Extended Model from Utkulu, et al.,)

**Dependent variable:** LOG(EXP)

**Method:** Panel Fully Modified Ordinary Least Square

**Sample (adjusted):** 1984-2012  
**Periods Included:** 28  
**Cross-sections:** 4

**Total observations:** 112

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-efficient</th>
<th>Std. Error</th>
<th>t-stat</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
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<td>0.0000***</td>
</tr>
<tr>
<td>RP</td>
<td>0.063194</td>
<td>0.007395</td>
<td>8.545798</td>
<td>0.0000***</td>
</tr>
<tr>
<td>VC</td>
<td>0.002367</td>
<td>0.000307</td>
<td>7.720391</td>
<td>0.0000***</td>
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<tr>
<td>TR</td>
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<td>0.014314</td>
<td>3.607730</td>
<td>0.0005***</td>
</tr>
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</table>

**Cross-section Dummy:**

<table>
<thead>
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<th>Country</th>
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</thead>
<tbody>
<tr>
<td>PAK-C</td>
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</tr>
<tr>
<td>IND-C</td>
<td>-24.397</td>
</tr>
<tr>
<td>BANG-C</td>
<td>-22.064</td>
</tr>
<tr>
<td>SRI-C</td>
<td>-20.635</td>
</tr>
</tbody>
</table>

| R-squared | 0.981040 | Mean Dep var | 23.18015 |
| Adjusted R-squared | 0.979957 | S.D. Dep var | 1.266011 |
| S.E. of regression | 0.179233 | Sum sq. resid | 3.373068 |
| Durbin-Watson stat | 0.266671 | Long-run var | 0.015269 |
# D. FMOLS estimations (Trade openness as dummy)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-efficient</th>
<th>Std. Error</th>
<th>t-statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
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<td>0.020090</td>
<td>65.74568</td>
<td>0.0000</td>
</tr>
<tr>
<td>RP</td>
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<td>3.831774</td>
<td>0.0002</td>
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<tr>
<td>VC</td>
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<td>-5.705984</td>
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</tr>
<tr>
<td>TR</td>
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<td>22.74667</td>
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</tr>
<tr>
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<td>-0.000418</td>
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<td>-5.300750</td>
<td>0.0000</td>
</tr>
<tr>
<td>TI</td>
<td>0.001471</td>
<td>0.000146</td>
<td>10.05043</td>
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</tr>
<tr>
<td>COR</td>
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<td>11.19245</td>
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</tr>
<tr>
<td>EN</td>
<td>-0.065347</td>
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<td>-5.837209</td>
<td>0.0000</td>
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</table>

<table>
<thead>
<tr>
<th>Cross-section Dummy:</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAK-C</td>
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<tr>
<td>IND-C</td>
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<tr>
<td>BANG-C</td>
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<tr>
<td>SRI-C</td>
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</table>

<table>
<thead>
<tr>
<th>Measures</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>R-squared</td>
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</tr>
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<td>Mean Dep var</td>
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<td>Adjusted R-squared</td>
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<td>S.D. dep var</td>
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<tr>
<td>S.E. of regression</td>
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<tr>
<td>Sum sq. resid</td>
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</tr>
<tr>
<td>Durbin-Watson stat</td>
<td>0.373265</td>
</tr>
<tr>
<td>Long-run var</td>
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</table>
S³H Working Paper