An Investigation into the Determinants of Labor Intensive Exports by the Developing Countries

By:

Khondoker Abdul Mottaleb
&
K.P. Kalirajan

An Investigation into the Determinants of Labor Intensive Exports by the Developing Countries

By:

Khondoker Abdul Mottaleb
&
K.P. Kalirajan

Abstract

The role of export-oriented garment and textile industry on overall economic development is widely recognized. While some of the developing countries such as, China, Vietnam and Bangladesh have been highly successful in exporting highly labor intensive garment and textiles products, not all of the developing countries have been equally successful in exporting garment and textiles. The performance of developing countries in exporting these highly labor-intensive products is in fact, highly heterogeneous. Using cross-country panel data on the exports of garment and textiles by the developing countries, an attempt has been made in this paper to ascertain the importance of infrastructure and business environment in explaining the heterogeneous performance in exporting labor-intensive garment and textiles by the developing countries. The paper empirically demonstrates that besides labor, the availability of fixed capital, basic infrastructure and a business friendly environment significantly affect the export of labor-intensive garment and textiles by the developing countries. The paper, thus suggests to invest on infrastructure, and to develop a business friendly environment in developing countries to untie the growth potentials of labor-intensive exports, and economic growth.

Key words: developing County, garment and textile export, infrastructure, business environment

Introduction

The last two decades of the twentieth century witnessed the emergence of a few rapidly growing developing countries mostly of which have been propelled by the export-oriented industries such as, garment and textiles that are highly labor intensive. For example, Bangladesh, Vietnam, China and India are some of the steadily growing developing countries in the world have been the major garment and textiles exporters (e.g., Gereffi, 1999; Joshi, 2002; Mottaleb and Sonobe, forthcoming, Yamagata, 2007). The availability of the cheap labor in the developing countries may provide a comparative advantage in exporting labor-intensive products as Hecksher-Ohlin's factor endowment theory states. However, not all of the labor-abundant developing countries are equally successful in exporting labor-intensive products, and the performance varies greatly among the developing countries. The question arises as to what determines the success of the developing countries' labor-intensive exports?

Unfortunately, while the studies are relatively available on the roles of exports on overall economic growth (e.g., Salvatore and Hatcher, 1991; Moschos, 1989; Krueger, 1980), only a few studies directly examine the determinants of the success of exports particularly the labor-intensive exports by the developing countries. Using information from four countries in Asia, Dollar, Hallward-Driemeier and Mengistae (2005) demonstrate that the business environment and infrastructure critically affect the growth of the labor-intensive garment industry, and garment export. A study that uses a more direct approach to examine the determinants of labor-intensive exports by the developing countries is Ninkovic (2009). Using cross country panel data, she empirically demonstrates that besides the labor and capital, home countries' transport infrastructure, as well as transportation costs critically determine the export performance of labor-intensive products by the developing countries. Ninkovic's (2009) study, however, may suffer from some problems. Firstly the study does not solely focus only on the developing countries. Rather, data were pooled across a number of middle (e.g., Malaysia) and low-income countries (e.g., Bangladesh), and across a number of seemingly intensive products (e.g., garment, textile, printing) even without any control for countries' income

status and products. Moreover, Ninkovic (2009) has pooled across data over 28 years (1976 to 2004) without considering any structural changes during that long time period such as, the removal of garment export quota system under the Multi Fiber Agreement (MFA) in 1995. The above arguments indicate the need for further careful studies to investigate the factors that facilitate or hinder the labor-intensive exports by the developing countries.

In this context, the objective of this paper is to identify the factors that affect labor-intensive exports by the developing countries using information on garment and textiles exports by 65 developing countries from Asia, Africa, Latin America and Europe during 2003 to 2007. We believe that this study is important for two reasons. Firstly, around 40 percent of the total population in Sub-Saharan Africa and 30 percent in South Asia are extremely poor (World Bank, 2007). Eradication of extreme poverty is a major item in the development policy agenda in these regions. The development of export-oriented and labor-intensive industries would be instrumental to poverty alleviation and sustainable economic growth. This is because; it would not only create enormous income and employment opportunities for the poor (e.g., Hayami, 1998; Hayami et al., 1998; Sonobe and Otsuka, 2011), but also would facilitate to absorb advanced skills and know-how through exports to advanced countries (e.g., Gereffi, 1999, Schimitz and Knorringa, 2000).

Secondly, the garment industry has been identified as a typical starter industry, because many of the presently developed countries such as, USA, UK, and Japan started their industrial development through the garment industry (Zakim, 1999; Gereffi, 1999, Yamagata, 2007). The newly industrialized countries (NICs) that are Hong Kong, South Korea, Taiwan and Singapore also started industrial development through the export-oriented garment industry. Presently, the garment export is dominated mostly by a few developing countries such as, China, Bangladesh, India and Vietnam, however, the performance varies greatly among the developing countries. It is important to identify why a few developing countries are highly successful, and why others are not, and what can be done to facilitate the labor-intensive exports by the developing countries.

In this paper, we empirically demonstrate that besides the availability of labor, the availability of fixed capital, basic infrastructure and transportation costs, and above all a business friendly environment significantly determine the exports of labor-intensive garment and textiles by the developing countries. Our finding is robust in the sense that the major empirical findings do not change even after the exclusion of some control variables during sensitivity test. In line with Eifert, Gelb and Ramchandran (2008), Tybout (2000), and Dollar, Hallward-Driemeier and Mengistae (2005), the paper thus suggests the provision of infrastructure and creating a business friendly environment in poverty stricken developing countries to facilitate the development of labor-intensive and export-oriented industries, which is instrumental to poverty alleviation and economic growth.

The rest of the paper is organized as follows. Section 2 presents a brief review of the literature addressing a stylized fact related to the emergence of garment industry in low-income countries, and also presents a comparative analysis on the performance of the developing countries in garment and textiles export. Section 3 presents data sources, theoretical background, and an empirical model that we use for this paper. Regression analyses and findings are presented in Section 4 followed by conclusion and policy implications in Section 5.

2.0 Relocation of Export Oriented Garment Industry from Developed to Developing Countries: The Stylized Fact

According to Vernon's (1966) product life cycle theory, it is usually the developed countries that introduce new products in the market as the result of their supremacy in scientific innovation and research. Once the technology becomes standardized for the newly introduced product, the production base gradually shifts to other countries mainly to slice down the production and marketing costs. The garment industry is the typical industry that has been relocating from the developed to developing countries in the way that the product life cycle theory predicts.

Historically, most of the presently developed countries, for example, UK, USA and Japan started their industrialization process first through the development of garment industry (e.g., Gelb, 2007; Zakim 1999; Yamagata, 2007). Zakim (1999) articulated that organized garment factories emerged in England in the 18th century, and later in the 1850s in the USA. During the 1850s, for example, the garment industry was the largest manufacturing industry in New York, where more than 400 garment entrepreneurs were engaged in producing garments (Zakim, 1999). In the 1950s, the garment industry developed in Japan, and in the 1960s the country became the largest exporter of garment in the USA.

In the 1970s, the garment industry gradually developed in the East Asian countries, and by the end of the decade, Hong Kong, Korea, Taiwan and Singapore, presently known as the newly industrialized countries (NICs), emerged as the major garment exporters in the world. Finally, since the 1980s, the industry has been gradually developing in other Asian and Latin American countries, and some of the developing countries such as, China, India, Bangladesh, and Vietnam have been emerged as the major garment exporting countries. Thus, historically the garment industry has been migrating from high income countries to low income countries, while playing a critical role on the early stage of industrial development process in the host economies. Observing its critical role on industrial development process, Gereffi (1999) refers the garment industry as the "typical starter industry".

The high dependence on the cheap labor is one of the important reasons behind the migration of the garment industry from the high income to low-income countries. The garment industry is highly labor-intensive, and thus highly sensitive to the wage rate. Generally, wage rate tends to be relatively lower in the developing countries. As garment industry is highly labor-intensive industry, developing countries tend to enjoy a comparative advantage in producing the labor-intensive garment. As industrialization proceeds, wage rate increases, the comparative advantage in producing the labor-intensive products may be lost eventually. Yamamura et al., (2003) clearly depicted the evolution and the relocation pattern of garment industry in Japan, in which, a sharp

increase in the wage rate due to the rapid industrialization in the 1970s forced the Japanese garment entrepreneurs to relocate their production base firstly from urban to rural area inside Japan, and finally, from Japan to China and other East Asian countries, where relatively the cheap labor was abundant, mainly to slice the production costs. Thus, in general the labor-abundant developing countries tend to be successful in exporting labor intensive garment and textiles products compared to the high-income countries.

Figure 1: Relationship between Garment Export and Per Capita Income

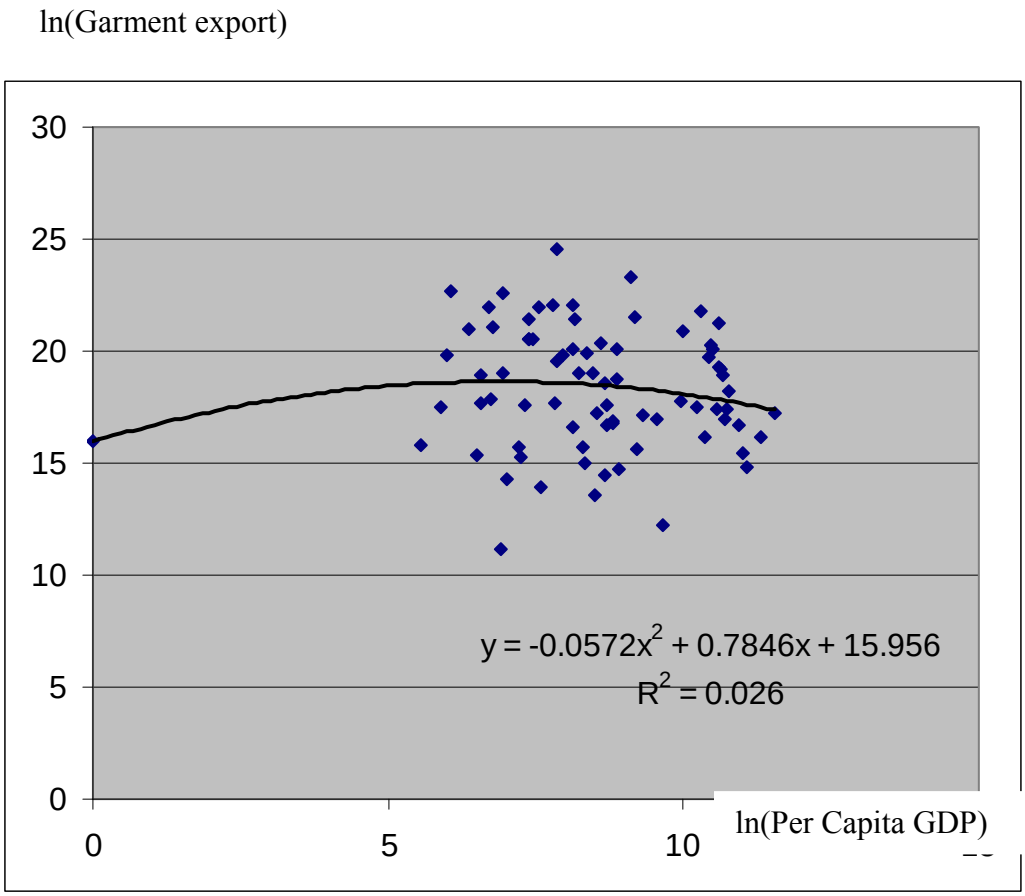

Figure 1 clearly demonstrates the fact. In the vertical axis of figure 1, we plot the natural log of garment export by 78 countries to the USA in 2007. We only consider the countries that have exported at least USD 2000 of garment to the USA in 2007. In the horizontal axis we plot the natural log of per capita GDP of 78 countries measured in current US dollar in 2007. The fitted line in figure 1 is estimated based on a polynomial

functional form. The inverted u-shaped fitted line confirms the stylized fact that the low-income countries tend to export garment more compared to the high income countries.

2.1 The performance of Developing Countries in Exporting Labor-intensive Textiles and Garments Varies Greatly

While developing countries dominate the garment and textile exports in the world, not all of the developing countries endowed with relatively cheap labor have been equally successful in exporting highly labor-intensive garment and textiles. For example, according to WTO trade statistics, in 2007, the total export of garment and textiles in the world was USD 588.39 billion. Bangladesh, a low-income country from South Asia, exported nearly 10.0 billion in 2007 that accounted for 1.66 percent of the world's export. In the same year, the sum of the total garment and textiles export by 30 low-income Sub-Saharan African countries was less one-tenth of Bangladesh's export (WTO, 2010). Table 1 clearly presents the fact.

Table 1: Information on Garment and Textiles Exports by the Sample Developing countries in 2007 (Per country average in the region)

Indicators	South and East Asia	Central Asia	Sub-Saharan Africa	Latin America/North Africa and Europe
No of countries	13	7	30	14
Garment export (Million USD)	5440.00	86.40	17.90	752.0
Textiles export (Million USD)	6080.00	347.0	13.10	181.00
Share of textiles export into total export earnings (%)	9.5	1.5	0.03	1.1
Share of garment export into total export earnings (%)	5.4	1.1	0.09	6.6

Sources: Garment export: Official Website of the European Commission on Statistics (EUROSTAT). Online: http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home. and U.S. Department of Commerce, Office of Textiles and Apparel (OTEXA). Online: http://otexa.ita.doc.gov/msrpoint.htm, Textiles export: World Trade Organization: Online: http://stat.wto.org/StatisticalProgram/WSDBStatProgramSeries.aspx?Language=E

Table 1 presents information on the garment and textiles exports and its share in the total export earnings of the sample 65 developing countries. Data on the garment export in table 1 were extracted from the official website of USA and EU. It is constructed as the

sum of exports by a country to EU and USA. We only consider exports of HS code 61 that includes woven garment export, and HS code 62 that include knitwear garment export. Data on textiles exports were extracted from the online data base of the World Trade Organization.

In table 1, we divide the sample countries into four groups based on their locations. The first group consists of 13 countries located in South and East Asia. The second group consists of seven countries located in Central Asia. The third group consists of 30 countries from Sub-Saharan Africa. The fourth group consists of 14 countries, in which seven are from Latin America, three are from Europe and the rest are from North Africa. Table 1 show that the South and East Asian countries are the top exporters of garment and textiles compared to all other countries across the region. It shows that on average, in 2007, a country from South and East Asia region exported USD 4950 million of garment and USD 5920 million of textiles. The sum of exports of garment and textiles comprises more than seven percent on average of the total export earnings of a country in South and East Asia. The second largest exporters are the countries from Latin America, Europe and North Africa, in which, the average garment and textile export by a country was USD 750 million and USD 180 respectively. The table vividly demonstrates that compared to all other regions, countries in Sub-Saharan African region are relatively poor performer in exporting garments and textile, despite they are given a favorable market access to USA under the African Growth and Opportunity Act (AGOA) 2000. Thus, the performance of the developing countries in garment and textile export is highly heterogeneous.

In the next section, we explain the data sources, define the variables, and develop an empirical model with an aim to identify the factors that may be responsible for the heterogeneous performance in exporting garment and textiles by developing countries.

3.0 Materials and Method

3.1 Data sources and Definition

This study is based on the information on 65 developing countries in 2003 to 2007. Out of 65 sample developing countries, of 13 are from South and East Asia, 10 are from Central Asia, 30 are from Sub-Saharan Africa, seven are from Latin America, three are from Europe and the rests are from North Africa. The name of the sample countries by group are presented in Table A4 in the annexure. Among the sample developing countries, 38 countries are the lower-middle income countries according to the definition of the World Bank (2009) with per capita gross national income (GNI) ranges between USD 996 to USD 3,945, and rest 27 are the low income countries with per capita GNI is less than USD 996. As we already mentioned in the previous section, data on the garment export by the sample countries to US and EU were extracted from the official websites of US government and European Commission. The rest of the data we extracted from the *World Development Indicators 2009,* and the online infrastructure data base of the World Bank (2010), International *Financial Statistics, 2009* by International Monetary Fund (2009), and the online data sources of Food and Agriculture Organization (FAO). We also collect supportive information from the *World Fact Book*, the online data base of the Central Intelligence Agency (CIA) of USA. The details about the data sources are included in Table A1 in the annexure.

To put some light on the probable influential factors that may affect the exports of labor intensive products by the sample developing countries we develop descriptive tables 2 and 3.

Table 2 presents information on the factor endowments such as gross fixed capital, land and labor, and information on some of the crucial physical infrastructural on the sample developing countries in 2007. The gross capital consists of net changes in the level of inventories plus the fixed assets of an economy (World Bank, 2009). Fixed assets include improvement of land, plant, machinery, and equipment purchases; and the construction of roads, railways, schools, offices, hospitals, private residential dwellings,

and buildings for commercial and industrial use. The arable land area is defined as land under temporary crops, temporary meadows for mowing or pasture, plus land uses for market and kitchen gardens and temporarily fallow land (FAO, 2010). The total labor force comprises all economically active people who are 15 years or older either working or unemployed. It shows that on average, South and East Asian countries are relatively land-poor but labor rich compared to all other sample countries.

Table 2: Information on the Factor Endowment and Physical Infrastructure of the Sample Developing countries in 2007 (Per country average)

Indicators	South and East Asia	Central Asia	Sub-Saharan Africa	Latin America/North Africa and Europe
Gross fixed capital per worker (current US Dollar equivalent)	816.5	1545.5	475.4	1398.4
Arable land per worker (hectares)	0.24	0.50	0.50	0.60
Total no. of workers (million)	116.0	7.77	8.83	6.16
Electricity consumption per person (Kilowatt hour)	637.1	1740.6	206.8	988.7
Internet user (per 100 people)	7.4	13.9	3.0	12.8
Total road networks (1000 kilometers)	623.9	58.7	42.1	37.7

Sources: See annexure

Table 2 shows that Central Asian and Latin American countries are relatively more endowed both with capital and land. The Sub-Saharan African countries are absolutely less endowed with capital compared to all other countries; however, they are relatively more labor abundant, at least in terms of the absolute number of workers compared to the Latin American countries. However, the volume of exports of labor-intensive garment and textiles by the sample Sub-Saharan African countries is much lower than the Latin American countries. Thus, only the availability of cheap labor cannot explain the sharp contrast in the performance of the developing countries in garment and textiles export.

Table 2 also presents information on basic infrastructure of the sample countries such as, electricity consumption per capita, internet users per 100 people and total road networks. The electric power consumption per capita measures the total production of power minus the transmission, distribution, and transformation losses divided by the total population. The total road network includes all roads in country including motorways, highways, and

main or national roads and secondary or regional roads, and the internet users are the people with access to worldwide network. The table shows that Sub-Saharan African countries are not only capital poor, but also relatively poor in basic infrastructure. It shows that on average, a country in Sub-Saharan Africa consumes less than 210 kilowatt hour of electricity in a year per capita; only three people in one hundred have connected with broad band internet facility, and on average, each country is equipped with 42 thousand kilometers of road networks.

In Table 3, we try to depict the overall business environment, and some information on trade costs using some proxy variables such as, days required to start a new business, inflation rate, currency exchange rate, and the distance to USA and EU. The days required starting a business is the number of calendar days needed to complete the procedures to legally operate a business, which can be seen as a proxy of the efficiency of the government, and the overall business environment of a country. Inflation is measured as the annual increase in the general prices. A few studies (e.g., Mottaleb and Kalirajan, 2010) considers inflation provides a signal on the health status of a country, where controlled and moderate inflation works as an indicator of a promising economy. The currency exchange rate is the nominal exchange rate between US dollar and local currency.

Table 3: Information on Physical Infrastructure and Business Environment in the Sample Developing countries in 2007 by region (Per country average)

	South and East Asia	Central Asia	Sub-Saharan Africa	Latin America/North Africa and Europe
Days required to start a business	48.0	20.7	51.3	30.1
Inflation rate, consumer price (annual)	6.5	9.2	7.2	6.9
Currency exchange rate with US dollar	1583.6	2098.0	712.4	343.7
No. of landlocked countries	2	3	8	3
No. of lower-middle income countries	10	5	8	15
Distance to New York (Kilometer)	12925.9	9092.9	11242.3	6709.4
Distance to Brussels (kilometer)	9300.9	4938.2	5754.1	7392.9

Sources: Various sources. See annexure

Table 3 shows that Sub-Saharan African countries requires more calendar days compared to all other sample countries to legally start a new business, probably due to the bureaucratic complexity, and the unfriendly business environment. The table shows that South and East Asian countries', which are the high performers in exporting garment and textiles, enjoy lower inflation rate among the sample countries. Table 3 also shows that Asian garment and textile products are in general relatively cheaper in terms of US dollar compared to all other sample countries because of lower exchange rates in terms of US dollar.

Table 3 also presents the information related to transportation cost. Table 3 shows that out of 65 sample developing countries, a total of 16 are landlocked, of which two are in South and East Asia, three are in Central Asia, eight are in Sub-Saharan Africa, and three are in Latin America, North Africa and Europe. Similar to the *World Fact book* definition, we define countries' without a sea coast as a landlocked country. The landlocked countries might face a higher transportation cost in international trade compared to the countries with sea ports. The table also shows that out of 65 sample developing countries, a total of 38 are the lower-middle income countries, and the rest 27 are the low-income countries. Importantly, among the sample 27 low-income countries, of 22 are located in Sub-Saharan Africa, three are in South and East Asia, and the rest five are located in Central Asia. In our empirical model, we include dummies for landlocked and lower-middle income country to observe how those affect the labor intensive exports by the developing countries. The last two rows of table 3 presents the one-way linear airline distances from the sample countries to New York, the largest city in the USA, and to the capital city of EU that is Brussels. The longer is the distance the higher might be the trade costs, and thus it might affect the garment and textile exports negatively. Table 3, however, shows that the distance to USA and EU from a South and East Asian countries, who are the best performer in garment and textile exports, on average is higher compared all other sample countries.

In the next section, we develop an empirical model to identify the determinants of garment and textile exports by the developing countries. Before that we present

correlation matrices to demonstrate the one-to-one relationship among garment and textiles exports, and some of the important variables in Table A2 and Table A3 in the annexure.

Table A2 in the annexure shows that all of the correlation coefficients of the variables that represent factor endowment such as, gross fixed capital (FCAP), arable land (ARAL), labor (LAB), and the infrastructure variable such as, electricity consumption per capita (ELEC), internet users per 100 people (INET), and the total road networks (ROAD) are positive and significantly related with garment (GAREX) and textiles (TEX) exports in 2007. Table A3 presents the correlation matrix that presents coefficient of correlation among garment and textiles exports, and all of the business environment and other variables such as, days required to start a new business (TSTBUSI), consumer price inflation (INFLA), currency exchange rate with US dollar (XRATE), a dummy for landlocked country (LALOC), a dummy for lower-middle income country, and the distance to USA (DISUSA) and EU (DISEU). Although the signs of the most of the correlation coefficients are in line with the conventional wisdom and the existing theory, none of them are significant in Table A3. For example, the correlation between days required to start a new business and garment and textiles exports are negative, which shows that the more is the day required to start a new business, the lower may be the export, which is plausible (e.g., Mottaleb and Kalirajan, 2010), however it is not significant. The correlation coefficients in Table A2 and A3, however, present only the one-to-one relationship between variables without considering the effects of other influential variables at the same time. In the next section, we develop an empirical model to isolate the effect of each variable while considering the impact of other variables at the same with an aim to explaining the observed differences in the export performance of garment and textiles by the developing countries.

3.2 Theoretical Background and Empirical Model

The standard framework used to analyze the pattern of trade by a country is that of Hecksher-Ohlin's factor endowment theory. According to the theory, relatively labor

abundant countries will produce and export labor-intensive goods, and relatively capital-intensive countries will produce and export capital intensive products (e.g., Kilpatrick and Miller, 1978). In symbolic form, it can be written as:

$$\ln (EX^{c}_{it)} = \beta_0 + \beta_1 \ln (k^{c}_{t-1}) + \beta_2 \ln (LA^{c}_{t}) + \beta_3 \ln (L^{c}_{t}) + \xi_{it} \text{ ----------(1)}$$

Where EX^{c}_{it} is the export of labor intensive products, which are garment (i=0) and textiles (i=1) in our case, by country c, at time t, and k^{c}_{t}, LA^{c}_{t}, L^{c}_{t} stands for the gross fixed capital per worker (k=Fixed capital//L), arable land per worker (LA=Arable land/L) and the total labor force (L), respectively and β's are the variables of interest. The problem with this model is that it failed to explain why a capital-rich country such as, USA exports labor intensive products, which is famously known as the Leontief paradox (Leontief, 1968 cited in Kilpatrick and Miller, 1978). Recent studies also ruled out the utility of Hecksher-Ohlin's model in explaining the international trade pattern (e.g., Trefler and Zhu, 2000).

To explain the international trade pattern, the gravity model includes trade costs besides the factor endowment (e.g., Limano and Venables, 2001; Anderson and Wyncoop, 2004; Feenstra et al., 2001). Usually, partner country's GDP size is used as a gravity factor, and the distance and other variables such as, the non-availability of port facilities as antigravity factors. Considering the gravity-antigravity factors in explaining the international trade pattern, we rewrite equation (1) into the following form:

$$\ln(EX^{c}_{it}) = \beta_0 + \beta_1 \ln(k^{c}_{t-1}) + \beta_2 \ln(LA^{c}_{t}) + \beta_3 \ln(L^{c}_{t}) + \beta_4 \ln(DISUSA^{c}) + \beta_5 \ln(DISEU^{c}) + \theta_i (LALOC^{c}) + \xi_{it} \text{ ----------(2)}$$

Where DISUSA stands for the distance between a sample country c to New York, USA and DISEU stands for the distance to Brussels EU, and LALOC is a dummy that assumes value 1 if a country is landlocked and 0, otherwise.

In addition to factor endowment and gravity-antigravity variables, the literature on social infrastructure has long been argued that institution or social infrastructure may significantly affect the overall performance of a country (Knack and Keefer 1995; Acemoglu, Johnson and Robinson, 2001; Dollar and Kraay, 2003). Better business environment allows market to function properly, thus enhances the business profitability by reducing market failure (e.g., Kinda, 2010; Mottaleb and Kalirajan, 2010). Eifert, Gelb and Ramchandran (2008) empirically demonstrate that the high operation costs of doing business and market failure in developing countries that stem mainly from insufficient infrastructure, inefficient public services, and stringent rules and regulations, significantly hamper industrial development process in developing countries. Dollar, Halward-Driemeier and Mengistae (2005), particularly identify that the business environment, represented by power outages, delay in getting a telephone connection, and delay in clearing the customs, is the most serious bottlenecks on expansion and growth of labor intensive industries in developing countries. As we intend to examine role of business environment and infrastructure in explaining the performance in exporting labor intensive garment and textiles by the developing countries, we rewrite equation (2) in the following final form:

$$\ln (EX^{c}_{it}) = \beta_0 + \beta_1 \ln(k^{c}_{t-1}) + \beta_2 \ln (LA^{c}_{t}) + \beta_3 \ln (L^{c}_{t}) + \ln(INFRA^{c}_{t})\, \theta_i + \ln(BUSI^{c}_{t})\, \varphi_i + \beta_4 \ln(DISUSA^{c}) + \beta_5 \ln (DISEU^{c}) + \theta_i (LALOC^{c}) + \Sigma\rho_i(LD^{c}) + \Sigma\nu_i (\text{Year dummies}) + \psi_i(LIC^{c}_{t}) + \xi_{it} \text{ ----------(3)}$$

Where $INFRA^{c}_{t}$ is a vector of infrastructure related variables that include electricity consumption per capita, internet users per 100 people, total road networks in country c at time t, and $BUSI^{c}_{t}$ is a vector of business environment related variables that include days required to start a new business, consumer price inflation and the local currency exchange rate with US dollar of country c at time t. Additionally, following Dollar, Halward-Driemeier and Mengistae (2005), we include year dummies where year 2004 is the base year, and location dummies, where South and East Asia is the base, and a dummy for lower-middle income country (LIC) to control for the unobserved heterogeneity problem (if any), ξ is the error term with white-noise property.

Application of the pooled OLS estimation method might provide inefficient estimators by providing reduced standard errors, because of the unobserved heterogeneity problem (if any). Therefore, an appropriate estimation technique (either Fixed effect or Random effect estimation) will be applied for estimating equation (3). To check the robustness of the findings, we perform sensitivity analyses by excluding additional control variables step-by-step in the model.

Table 4 and 5 present the estimated functions that explain the export of garment and textiles by the developing countries. We apply the Random Effect Generalized Least Square estimation process with clustered standard errors corrected at the country level, as the Hausman test suggests. Finally, in the estimation process, to avoid possible endogeneity and simultaneity bias, we have taken a year lag of the per capita fixed capital variable in the empirical model.

4.0 Estimation Results

Table 4 presents the estimated function explaining the export of garment by the developing countries. While column 2 in Table 4 presents the full sets of the explanatory variables, in the subsequent columns, we gradually exclude the insignificant control variables from the estimated functions to check the robustness of the major findings. We take the same approach in Table 5 in the case of estimating the function explaining the textiles export by the developing countries.

Table 4 shows that the gross fixed capital per worker and the total labor forces are significant and positive across the estimated function explaining the garment export by the developing countries. The variable arable land per worker is positive but not significance in any case. The finding is similar in the estimated function explaining textiles export in Table 5. It thus reveals the importance of capital accumulation in developing countries even to enhance the labor intensive industrial development and export.

Among the infrastructure variables, electricity consumption per capita is significant and positive across the function explaining the garment export in Table 4, but insignificant though positive in the estimated function explaining the textiles export in Table 5. The coefficient of total road networks is positive across the estimated functions explaining the garment and textiles exports in Table 4 and in Table 5, but not significant in any case. The coefficient of internet user per 100 people is appeared as negative but insignificant. A plausible explanation might be that because of the strong correlation with gross fixed capital, the coefficient of road networks, and internet users are not significant both in table 4 and in table 5. Days required to start a business is negative and significant across the function explaining the garment export in table 4, but negative and insignificant in the case of the function explaining the textiles export in table 5. Based on Table 4, a one percent reduction in the days required to start a new business in a developing country enhances garment exports by 0.54 to 0.64 percent on average. The finding in Table 4 thus vividly supports the role of business environment in developing countries on labor intensive exports. The consumer price inflation that captures the overall macroeconomic situation, is not significant both in table 4 and 5

Among the trade cost variables, the landlocked country dummy is negative and highly significant across the estimated function explaining the garment export in Table 4. It shows that on average a landlocked country exports garments 2.30 to 2.40 percent lower compared to a country with coast. It thus supports the argument that international trade is significantly affected by the trade cost, where countries with port facilities enjoy the benefit of low cost. The distance to USA and EU negatively affect the garment export by the developing countries. It means countries that locate far from EU and USA are in a disadvantageous position compared to countries that are located nearer. However, the coefficients are insignificant in most of the cases in the estimated functions explaining garment and textile exports by the developing countries in table 4 and 5. Among other dummies, the lower middle income country dummy, and Sub-Saharan Africa dummy are highly significant and negative in the estimated function explaining the garment export by the developing countries in table 4. On average, a lower middle income country export garment 1.80 percent to 2.06 percent lower compared to a low income country. However

the dummy is not significant in the case of estimated function explaining textiles export in table 5. Probably the reason is that the textile industry is relatively more capital intensive compared to the garment industry. As lower-middle income countries are relatively capital rich compared to the low-income countries, lower-middle income countries are in advantageous position in exporting textiles compared to garments. As a result, the dummy for lower-middle income country is highly significant and negative in the estimated function explaining the garment export by the developing countries in table 4 but insignificant in the estimated function explaining textile exports in table 5. Our finding supports the real world scenario. For example, although Bangladesh, a low-income country, is a champion in garment export, mostly depends on imported textiles from China and India, two of the lower-middle income countries (Mottaleb and Sonobe, *forthcoming*). Considering this technological differences, unlike Ninkovic (2009), without merging into one variable, we estimate separate functions for garment and textiles exports by the developing countries.

Table 4: Determinants of Garments Export by the Developing Countries

Estimation method	Random effect Generalized Least Square Estimation			
Dependent variable	ln(Export of garment)			
	2	3	4	5
ln(Gross fixed capital per worker)$_{t-1}$	0.17**	0.18**	0.17**	0.17**
	(2.35)	(2.48)	(2.12)	(2.27)
ln(Arable land per worker)	0.12	0.09	0.09	0.07
	(0.21)	(0.16)	(0.15)	(0.13)
ln(Total labor forces)	0.91*	0.97*	0.94*	0.98*
	(1.74)	(1.81)	(1.64)	(1.69)
ln(Per capita electricity consumption)	0.84*	0.78*	0.75*	0.81*
	(1.79)	(1.70)	(1.72)	(1.92)
ln(Days required to start a business)	-0.54**	-0.59**	-0.59**	-0.61**
	(-1.99)	(-2.11)	(-2.06)	(-2.17)
Landlocked country dummy (yes=1)	-2.30***	-2.39***	-2.40***	-2.36***
	(-2.61)	(-2.69)	(-2.68)	(-2.66)
Lower-middle income country dummy (yes=1)	-2.06**	-1.81*	-1.87*	-1.86*
	(-1.97)	(-1.67)	(-1.65)	(-1.67)
Central Asian country dummy	-2.10	-2.26	-2.31	-2.39
	(-0.91)	(-1.18)	(-1.20)	(-1.27)
Sub-Saharan Africa country dummy	-4.46***	-4.45***	-4.45***	-4.38***
	(-3.06)	(-3.07)	(-3.08)	(-3.07)
Latin America and Other country dummy	0.28	0.21	0.19	0.12

	(0.17)	(0.13)	(0.12)	(0.08)
Year 2005 dummy	-0.24	0.46	-0.30	-0.29*
	(-1.07)	(1.42)	(-1.58)	(-1.68)
Year 2006 dummy	-0.37	0.19	-0.45**	-0.46**
	(-1.40)	(0.92)	(-2.28)	(-2.45)
Year 2007 dummy	-0.43	0.06	-0.51**	-0.53**
	(-1.32)	(0.31)	(-1.96)	(-2.12)
ln(Total road networks)	0.18	0.11	0.13	0.08
	(0.32)	(0.17)	(0.20)	(0.12)
ln(Distance to USA)	-0.55	-0.62	-0.62	-0.59
	(-0.54)	(-0.69)	(-0.69)	(-0.66)
ln(Distance to EU)	-1.07	-1.11	-1.11*	-1.05
	(-1.47)	(-1.62)	(-1.65)	(-1.59)
ln(Annual inflation rate)	0.06	0.07	0.08	
	(0.31)	(0.38)	(0.42)	
ln(Internet users per 100 people)	-0.15	-0.08		
	(-0.32)	(-0.19)		
ln (Currency exchange rate in terms of US dollar)	-0.06			
	(-0.34)			
Constant	15.64	15.85	16.56	15.47
	(1.15)	(1.19)	(1.24)	(1.19)
N	227	235	238	244
No. of countries	63	65	65	65
R squared overall	0.67	0.67	0.67	0.67
Hausman test Fixed over Random effect:χ^2	4.06	4.87	4.53	4.46
Prob>χ^2	0.97	0.90	0.87	0.88

Notes: Numbers in parentheses are z-statistics calculated based on standard errors corrected for clustering of observation at the country level, *, ** and * indicate significance at the 10, 5 and 1 percent levels, respectively.**

The findings in table 4 and 5 support the arguments of Eifert, Gelb and Ramchandran (2008) that the cost of doing business in developing countries particularly in Sub-Saharan Africa is high due to the unfriendly business environment, insufficient infrastructure, and insufficient and ineffective public services, which in turn hamper industrial development process. We have empirically demonstrated that countries that ensure basic infrastructure such as electricity and provide a friendly business environment are more likely to be successful in garment exports. Our findings are also analogous to the findings of Mottaleb and Kalirajan (2010), Kinda (2010) and Kimura and Todo (2010) who demonstrate that business environment and infrastructure significantly affect the decision of foreign investors to invest in a developing country. Our findings also resembles Dollar, Hallward-Driemeier and Mengistae's (2005) findings, who demonstrate that the business

environment measured by power outages, public service quality and the infrastructure significantly affect the growth of the garment industry in Pakistan, India, Bangladesh and China. Finally, unlikely to the findings of Brown, Earle and Lup (2005) our results strongly demonstrate the importance of business environment on the labor intensive exports by the developing countries.

The last few rows in table 4 and 5 present information on overall R squared, number of sample countries and the result of Hausman test on Fixed effect over Random effect estimation. Unfortunately, in the case of the estimated function explaining the textiles export by the developing countries in table 5, in some model specifications, Hausman test suggests to use the Fixed effect estimation method, however, we found almost all of the variables are insignificant when we apply Fixed effect estimation method. Thus, our policy implication is mainly based on the findings in table 4 that presents the estimated function explaining garment export by the developing countries.

Table 5: Determinants of Export of Textiles by the Developing Countries

Estimation method	Random effect Generalized Least Square Estimation			
Dependent variable	ln(Textiles export)			
	2	3	4	5
ln(Gross fixed capital per worker)$_{t-1}$	0.88***	0.72**	0.76**	0.93***
	(2.82)	(2.12)	(2.33)	(2.77)
ln(Arable land per worker)	-0.08	-0.06	-0.05	0.01
	(-0.22)	(-0.17)	(-0.15)	(0.02)
ln(Total labor forces)	1.07***	1.09***	1.09***	1.05***
	(2.90)	(2.66)	(2.64)	(2.59)
ln(Per capita electricity consumption)	0.33	0.28	0.28	0.23
	(0.91)	(0.78)	(0.89)	(0.73)
ln(Days required to start a business)	-0.27	-0.20	-0.19	-0.19
	(-1.12)	(-0.79)	(-0.77)	(-0.73)
ln(Total road networks)	0.33	0.30	0.30	0.43
	(0.88)	(0.69)	(0.69)	(1.01)
Landlocked country dummy	0.32	0.13	0.14	0.21
	(0.54)	(0.22)	(0.23)	(0.35)
Lower-middle income country dummy	-0.81	-0.61	-0.62	-0.92
	(-0.95)	(-0.73)	(-0.73)	(-1.12)
Central Asian country dummy	-0.96	-0.34	-0.29	-0.11
	(-0.89)	(-0.31)	(-0.25)	(-0.09)
Sub-Saharan Africa country dummy	-1.98**	-2.01**	-2.01**	-1.78**
	(-2.41)	(-2.44)	(-2.45)	(-2.17)
Latin America and Other country dummy	0.69	0.80	0.84	1.01
	(0.67)	(0.76)	(0.80)	(0.93)
Year 2005 dummy	-0.014	0.17	0.02	-0.02
	(-0.14)	(0.85)	(0.18)	(-0.22)
Year 2006 dummy	-0.16	0.17	-0.09	-0.14
	(-1.11)	(1.20)	(-0.54)	(-0.83)
Year 2007 dummy	-0.25	0.06	-0.13	-0.20
	(-1.43)	(0.47)	(-0.69)	(-0.97)
ln(Distance to USA)	1.08	1.22	1.25	1.13
	(1.29)	(1.59)	(1.63)	(1.48)
ln(Distance to EU)	0.19	0.12	0.11	0.01
	(0.32)	(0.21)	(0.20)	(0.02)
ln(Annual inflation rate)	0.03	0.03	0.02	
	(0.24)	(0.27)	(0.20)	
ln(Internet users per 100 people)	-0.03	0.05		
	(-0.12)	(0.25)		
ln (Currency exchange rate in terms of US dollar)	-0.012			
	(-0.13)			
Constant	-20.62*	-20.60**	-20.84**	-19.78*
	(-1.95)	(-2.02)	(-2.04)	(-1.90)
N	178	182	185	189
No. of countries	50	51	51	52

R squared overall	0.80	0.79	0.79	0.78
Hausman test Fixed over Random effect:χ^2	21.88	13.45	14.10	18.98
Prob>χ^2	0.001	0.27	0.12	0.02

Notes: Numbers in parentheses are z-statistics calculated based on standard errors corrected for clustering of observation at the country level, *, ** and * indicate significance at the 10, 5 and 1 percent levels, respectively**

5.0 Conclusion and Policy Implications

This paper presents that the export-oriented garment industry has been migrating from high-income to low-income countries. While a few developing countries in the world are highly successful in expanding labor-intensive garment and textiles export, not all of the developing countries are equally successful in exporting garment and textiles. In this paper, an attempt has been made to explain why some developing countries are highly successful in exporting highly labor-intensive garment and textiles and why others are not.

This paper vividly demonstrates that besides the availability of labor, the accumulation of capital, basic infrastructure and a business friendly environment are important to facilitate the export of labor intensive garment and textiles by the developing countries. Particularly, the paper empirically demonstrates that the availability of capital and infrastructure are highly important even to enhance labor-intensive export by developing countries. The paper also empirically demonstrates that the quality of public services that critically affect business environment of a country is important to enhance labor intensive exports. Finally, the paper demonstrates that Sub-Saharan African countries and the landlocked countries are in disadvantageous position in exporting labor-intensive products despite they are endowed with relatively cheap labor.

We thus conclude that only by facilitating a free market access for the developing countries to the developed countries' market, such as AGOA for Sub-Saharan African countries, might not be sufficient enough to boost up industrial development process in the poverty stricken developing countries. Rather, besides ensuring easy market access, international donor agencies should try to develop basic physical infrastructure such as,

roads, highways and electricity that also ensures the availability of minimum fixed capital in the developing country to facilitate export-oriented industrial development.

Based on the findings, the paper also suggests developing an international forum that will strengthen the regional level dialogue and relationship among landlocked countries and their neighboring countries with port facilities so that landlocked countries can use the sea port of their neighboring countries. It may however, require massive investment on infrastructure such as, the construction of transshipment corridor to and from a landlocked country to its neighbor, and also enhancement of the port's capacity of the neighboring country.

The paper thus suggests the government in developing countries, and the donor agencies such as USAID and JICA to invest on basic infrastructure, and to assist to develop a business friendly environment and public services to facilitate export-oriented labor-intensive industrial developing process in the developing countries to achieve faster economic growth and eradicate extreme poverty rapidly.

References

1) Acemoglu, Daron, Simon Johnson and James A. Robinson. 2001. "The Colonial Origins of Comparative Development: An Empirical Investigation". *American Economic Review,* Vol. 91, No.5: 1369-1401.
2) Anderson, James., and Wincoop, Eric Van. 2004. "Trade Costs. *Journal of Economic Literature,* Vo. 42, No. 3: 691-751.
3) African Growth and Opportunity Act (AGOA). *Trade and Development Act of 2000*.Online: http://www.agoa.gov/, accessed on March 11, 2011.
4) Brown, David J., Earle, John S. and Lup, Dana. 2005. "What Makes Small Firms Growth? Finance, Human Capital, Technical Assistance, and the Business Environment in Romania." *World Development,* Vol., 54, No.1: 33-70.
5) Central Intellegance Agency (CIA). *The World Factbook.* Online: https://www.cia.gov/library/publications/the-world-factbook/, accessed on: January 30, 2011-04-24
6) Dollar, David and Kraay, Aart. 2003. "Institutions, Trade and Growth". *Journal ofMonetary Economics,* Vol. 50, No.1 :1369-1401.
7) Dollar, David, Hallward-Driemeier, Mary and Mengistae, Taye. 2005 "Investment Climate and Firm Performance in Developing Economies" *Economic Development and Cultural Change,* Vol. 54, No.1: 1-31.

8) Eifert, Benn, Gelb, Alan and Ramachandran, Vijaya. 2008. "The Cost of Doing Business in Africa: Evidence from the Enterprise Survey Data." *World Development,* Vol., 36, No. 9: 1531-1546.
9) EUROSTAT. 2010. Official Website of the European Commission on Statistics. Online: http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home. Accessed on January 30, 2011.
10) Food and Agriculture Organization (FAO). 2011. FAOSTAT. Online: http://faostat.fao.org/site/377/default.aspx#ancor, accessed on: January 30, 2011.
11) Feenstra, R., Markusen, J., and Rose, A,. 2001. "Using the Gravity Equation to Differentiate Among Alternative Theories of Trade." *Canadian Journal of Economics,* Vol. 38, No. 2: 430-447.
12) Gelb, Bernard A. 2007. "CRS Report for Congress: Textiles and Apparel Trade Issues".Prepared for the Members and Committee of Congress. Washington D.C.: Congressional Research Service. Online:
13) http://ncseonline.org/nle/crsreports/economics/econ-134.cfm, accessed on March 04, 2011.
14) Gereffi, Gary. 1999. "International Trade and Industrial Upgrading in the Apparel Commodity Chain." *Journal of International Economics,* Vol. 48, No.1: 37-70.
15) Hayami, Y. 1998. "Toward an Alternative Path of Economic Development: An Introduction". In Hayami, Y. (ed.) *Toward the Rural-Based Development of Commerce and Industry: Selected Experience from East Asia.* Washington: World Bank Economic Development Institute, Washington D.C.
16) Hayami, Y., Kikuchi, M., and Marchiano, E. 1998. "Structure of Rural-Based Industrialization: Metal Crafts Manufacturing on the Outskirts of Greater Manila, the Philippines." *Developing Economies,* Vol., 36, No. 2: 132-154.
17) International Monetary Fund (IMF). 2009. *International Financial Statistics, 2009*. CD ROM Version: International Monetary Fund, Washington D.C.
18) Joshi, Gopal (ed). 2002. *Garment Industry in South Asia Rags or Riches? Competitiveness,Productivity and Job Quality in the Post-MFA Environment.* New Delhi:International Labor Organization, South Asia Multidisciplinary Advisory Team.
19) Kilpatrick, John A. and Miller, Robert R. 1978. "Determinants of the Commodity Composition of U.S. Trade: A Discriminant Analysis Approach.". *Journal of International Business Studies,* Vol. 9, No. 1: 25-32.
20) Kimura, Hidemi and Todo, Yasuyuki, 2010. "Is Foreign Aid is a Vanguard of Foreign Direct Investment? A Gravity-Equation Approach." *World Development,* Vol., 38, No.4: 482-497.
21) Kinda, Tidiane. 2010. "Investment Climate and FDI in Developing Countries: Firm Level Evidence." *World Development,* Vol., 38, No. 4: 498-513.
22) Knack, Steven and Keefer, Philip. 1995. "Institutions and Economic Performance: Cross- Country Tests Using Alternative Measures." *Economics and Politics,* Vol. 7, No. 3: 207-227.
23) Krueger, Anne. 1980. "Trade Policy as an Input to Development". *American Economic Review Papers and Proceedings,* Vol., 70, No. 2: 288-292.

24) Leontief, W. 1954. "Factor Proportions and the Structure of American Trade: Further Theoretical and Empirical Analysis" *Journal of Economics and Statistics,* Vol.38, No. 4 :386-407.
25) Limano, N., and Venables, A. 2001. "Infrastructure, Geographical Disadvantage, Transportation Costs and Trade." *World Bank Economic Review,* Vol., 15, No. 3: 451-479.
26) Moschos, Demetrios. 1989. "Export Expansion, growth and the Level of Economic Development". *Journal of Development Economics,* Vol., 30, No.1 :93-102.
27) Mottaleb, Kh. A., and Kalirajan, Kaliappa. 2010. "Determinants of Foreign Direct Investment in Developing Countries: A Comparative Analysis". *Margin- The Journal of Applied Economic Research,* Vol. 4, No. 4: 369-404.
28) Mottaleb, Kh. A., and Sonobe, Tetsushi. 2010. "An Inquiry into the Rapid Growth of the Garment Industry in Bangladesh". *Economic Development and Cultural Change,* Forthcoming.
29) Ninkovic, Jasminka. , 2009-02-15 "What Determines Export Success in Labor-Intensive Goods?" *Paper presented at the annual meeting of the ISA's 50th ANNUAL CONVENTION "EXPLORING THE PAST, ANTICIPATING THE FUTURE", New York Marriott Marquis, NEW YORK CITY, NY, USA Online* <PDF>. Online: http://www.allacademic.com/meta/p312839_index.html, accessed on 2011-03-07.
30) Salvatore, D., and Hatcher, Thomas. 1991. "Inward Oriented and Outward Oriented Trade Strategies". *The Journal of Development Studies,* Vol. 27, No.3: 7-25.
31) Schimitz and Knoringa. 2000. "Learning from Global Buyers. *Journal of Development Studies,* Vol., 37, No. 2: 177-205.
32) Sonobe, Tetsushi and Otsuka, Keijiro. 2011. *Cluster-Based Industrial Development: A Comparative Study of Asia and Africa.* Basingstoke: Palgrave McMillan.
33) Trefler, Daniel and Zhu, Susan Chun. 2000. "Beyond the Algebra of Explanation: HOV for the Technology Age". *The American Economic Review. Paper and Proceedings of the One Hundred Twelfth Annual Meeting of the American Economic Association*" Vol., 90, No. 2: 145-149.
34) Tybout, James R. 2000. "Manufacturing Firms in Developing Countries: How Well do They Do and Why?" *Journal of Economic Literature,* Vol., 38, March: 11-44
35) U.S. Department of Commerce. 2010. Office of Textiles and Apparel (OTEXA). Washington, D.C: International Trade Administration. Online: http://otexa.ita.doc.gov/msrpoint.htm, accessed on January 30, 2011.
36) Vernon, Raymond. 1966. "International Investment and International Trade in Product Cycle." *Quarterly Journal of Economics,* Vol. 80. No. 2: 190-207.
37) World Bank. 2007. *World Development Indicators 2007.* CD-ROM Version. Washington D.C.: World Bank
38) World Bank. 2009. *World Development Indicators 2009.* CD-ROM Version. Washington D.C.: World Bank

39) World Bank. 2011. *Infrastructure Database.* Online: http://data.worldbank.org/topic/infrastructure, accessed on January 30, 2011.
40) World Trade Organization. 2010. *Statistics Database.* Online: http://stat.wto.org/StatisticalProgram/WSDBStatProgramHome.aspx?Language=E, accessed on March 10, 2011.
41) Yamagata, Tatsufumi. 2007. "Prospects for Development of the Garment Industry in Developing Countries: What has Happened Since the MFA Phase-Out?" IDE Discussion Paper No. 101.2007.4. Chiba: Institute of Developing Economies. URL: http://hdl.handle.net/2344/551 (accessed on June 12, 2009).
42) Yamamura, Eiji, Sonobe, Tetsushi and Otsuka, Keijiro. 2003. "Human Capital, Cluster Formation and International Relocation: The Case of the Garment industry in Japan 1968-98." *Journal of Economic Geography,* Vol.3, No.1: 37-56.
43) Zakim, Michael. 1999. "A Ready-made Business: The Birth of the Garment Industry in America". *Business History Review,* Vol. 73, Spring: 61-90.

Annexure

Table A1: Data sources

Garment Export:

Export to EU: Online:

http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home.

Export to USA: Online: http://otexa.ita.doc.gov/msrpoint.htm

Textiles Export:

http://stat.wto.org/StatisticalProgram/WSDBStatProgramSeries.aspx?Language=E

Data on gross fixed capital, labor force, days required to start a business, electricity consumption per capita, total road networks, annual inflation rate:

http://databank.worldbank.org/ddp/home.do?Step=2&id=4&hActiveDimensionId=WDI_Series
http://data.worldbank.org/topic/infrastructure

Data on arable land:

Online: http://faostat.fao.org/site/377/default.aspx#ancor

Information on landlocked country:

Online: http://www.wisegeek.com/what-countries-are-landlocked.htm

Distance to EU and USA calculated from:
http://www.distancefromto.net/distance-from/Vietnam/to/Belgium

Table A2: Correlation Matrix Among Garment and Textiles Exports and Factor Endowment and Infrastructure Variable in 2007

	GAREX	TEX	FCAP	ARAL	LAB	ELEC	INET	ROAD
GAREX	1.00							
	[65]							
TEX	0.98***							
	(0.00)	1.0						
	[55]	[55]						
FCAP	0.97***	0.98***						
	(0.00)	(0.00)	1.00					
	[64]	[54]	64					
ARAL	0.62***	0.66***	0.76***					
	(0.00)	(0.00)	(0.00)	1.00				
	[65]	[55]	[64]	65				
LAB	0.91***	0.93***	0.97***	0.87***				
	(0.00)	(0.00)	(0.00)	(0.00)	1.00			
	[65]	[55]	[64]	[65]	[65]			
ELEC	0.30***	0.31**	0.32***	0.23*	0.26**			
	(0.01)	(0.02)	(0.01)	(0.07)	(0.04)	1.00		
	[65]	[55]	[64]	[65]	[65]	[65]		
INET	0.23*	0.21	0.22*	0.19	0.18	0.77***		
	(0.07)	(0.13)	(0.09)	(0.15)	(0.17)	(0.00)	1.00	
	[62]	[52]	[61]	[62]	[62]	[62]	[62]	
ROAD	0.80***	0.83***	0.90***	0.95***	0.97***	0.23*	0.16	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.06)	(0.21)	1.00
	[65]	[55]	[64]	[65]	[65]	[65]	[62]	[65]

Variables in ( ) are p-values and variables in [ ] are number of observations of the corresponding variable. ***, ** and * represents significance at the 1%, 5% and 10% levels, respectively

GAREX=garment export earnings, TEX=textiles export earnings, FCAP= gross fixed capital, ARAL= arable land, LAB=total labor force, ELEC= electricity consumption per capita, INET= nternet users per 100 people, ROAD= total road networks.

Table A3: Correlation Matrix among Garment and Textiles Exports and Factor Endowment and Infrastructure Variable in 2007

	GAREX	TEX	TSTBUSI	INFLA	XRATE	LALOC	LMIC	DISUSA	DISEU
GAREX	1.00 [65]								
TEX	0.98*** (0.00) [55]	1.00 [55]							
TSTBUSI	-0.04 (0.78) [65]	-0.02 (0.89) [55]	1.00 65.00						
INFLA	-0.07 (0.57) [60]	-0.10 (0.48) [51]	-0.02 (0.89) [60]	1.00 [60]					
XRATE	-0.01 (0.91) [63]	-0.04 (0.75) [54]	0.00 (1.00) [63]	0.21 (0.12) [59]	1.00 [63]				
LALOC	-0.12 (0.33) [65]	-0.12 (0.40) [55]	-0.18 (0.14) [65]	-0.05 (0.69) [60]	0.00 (0.99) [63]	1.00 [65]			
LMIC	0.13 (0.32) [65]	0.15 (0.27) [55]	-0.19 (0.13) [65]	-0.14 (0.29) [60]	-0.20 (0.12) [63]	-0.30 (0.02) [65]	1.00 [65]		
DISUSA	0.06 (0.61) [65]	0.08 (0.55) [55]	0.12 (0.33) [65]	0.09 (0.50) [60]	0.15 (0.23) [63]	0.13 (0.32) [65]	-0.32 (0.01) [65]	1.00 [65]	
DISEU	0.10 (0.43)	0.13 (0.33)	0.06 (0.63)	-0.03 (0.84)	0.06 (0.63)	-0.07 (0.55)	0.18 (0.15)	0.17 (0.17)	1.00

[65]	[55]	[65]	[60]	[63]	[65]	[65]	[65]	[65]

Variables in ( ) are p-values and variables in [ ] are number of observations of the corresponding variable. ***, ** and * represents significance at the 1%, 5% and 10% levels, respectively

TSTBUSI= days required to start a new business, INFLA= consumer price inflation, XRATE= currency exchange rate with US dollar, LALOC= dummy for landlocked country, LIMC= dummy for lower-middle income country, DISUSA= distance to USA, DISEU= distance to EU.

Table A4: Name of the Sample Countries by Region

South and East Asia	Central Asia	Sub-Saharan Africa	Europe, Latin America and Others
		Angola	Albania
Bangladesh	Georgia	Cameroon	Bolivia
Bhutan	Iran, Islamic Rep.	Cape Verde	Ecuador
		Central African	
Cambodia	Jordan	Republic	Egypt, Arab Rep.
China	Kyrgyz Republic	Chad	El Salvador
India	Mongolia	Comoros	Guatemala
	Syrian Arab		
Nepal	Republic	Congo, Dem. Rep.	Honduras
Pakistan	Uzbekistan	Congo, Rep.	Moldova
Papua New			
Guinea		Cote d'Ivoire	Morocco
Philippines		Eritrea	Nicaragua
Solomon Islands		Ethiopia	Paraguay
Sri Lanka		Gambia, The	Tonga
Thailand		Ghana	Tunisia
Vietnam		Guinea	Ukraine
		Guinea-Bissau	Vanuatu
		Kenya	
		Madagascar	
		Malawi	
		Mali	
		Mauritania	
		Mozambique	
		Nigeria	
		Rwanda	
		Senegal	
		Sierra Leone	
		Sudan	

Swaziland
Tanzania
Uganda
Zambia

About the Authors

Khondoker Abdul Mottaleb *is Postdoctoral Research Fellow at National Graduate Institute for Policy Studies, Japan and* ***K.P. Kalirajan*** *is Professor in Crawford School of Economics and Government at The Australian National University, Canberra*

Image courtesy: http://www.bizindia.net