

Analyzing Gravity Variables To Determinants Bangladesh Export Performance

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Abstract: The purpose of this paper is to study the impact of export on economic growth in Bangladesh. During the past two decades the Bangladesh economy has gone through huge changes. This study will find out and discuss the most advance gravity variables for Bangladesh export advancement. There is another purpose of this paper is to utilize the Gravity Model of Trade in order to get an understanding of the reasons behind Bangladesh export flows and also compare with other earlier trade variables whether the new variables can explain the Bangladesh export performance or not. While Bangladesh population has on average been increasing during the period, the exports have grown substantially. The study is mainly based on secondary sources of data which was collected from various books, journals, research works, and publications and mostly from the economics and trading organizations. In this study an attempt has been made to review the recent available literatures related to export and economic growth in Bangladesh. This paper will also suggest some strategy to overcome the export barriers for Bangladesh export sector.

Keywords: Bangladesh, Export, GDP, Gravity model, Economic growth.

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I. Introduction

Export sector has been the major driving force of the economy of Bangladesh. This paper will examines the recent performance of the export sector of Bangladesh. We will also look into the details of export scenario and how it has been affecting Bangladesh economic growth. Currently the most popular theory for explain exports of countries is the Gravity Model of Trade. According of the theory the size of international trade flows can be explained by geographic, demographic and economic variables. In this paper we estimate the top ten exported product and having a discussion for their relative field. Not only with the ten exported items we also figure out the top ten partner countries weather Bangladesh are gaining profit on export matter. To discuss the gravity model of trade there will be some variables come out like GDP, culture, population, actual labor, per-capital etc. but non all of this variables are really make an effect over Bangladesh export performance. Therefore the primary research question can be stated as follows “Which variables under gravity model are mostly effect on Bangladesh exports?” through empirical literature regarding gravity model of trade we find out the most significant gravity model variables which really can effect over Bangladesh export performance. The total exports of Bangladesh have increased rapidly during the last two decades, Bangladesh achieved referable success in export continuation, mainly because of the spine performance of the textile industry. For Bangladesh total exports the distance between trading countries has a negative coefficient but doesn’t play a statistically significant role. Bangladesh are highly interest to export her manufacturing goods in a higher GDPs scales country than her GDPs. As Gravity model of trade concern there are common variables like distance between countries, culture and languages barrier have not play an important role when we are talking about the export scenario of Bangladesh. Export making complex day by day in the meantime the patter of trade are changing simultaneously. As we find out for Bangladesh there are five major variables can explain the causes for her success.

1.1 Recent Study: There has been a substantial empirical literature on the effects of exports on growth. Among the early studies, Michaely (1977), Balassa (1978), Chow (1987), Darrat (1987) have provided evidence in support of export-led growth hypothesis for various developing countries. Bangladesh is the country of negative Balance of Payment (BOP). The amount of export of Bangladesh is less than the amount of import. As a result we get a negative BOP. Documented evidence indicates that all independent variables including income, export and import unit values, exchange rates, and membership in regional trade groups are major determinants of trade flows in Bangladesh. Several researches have been conducted on various aspects of export, import and economic growth in Bangladesh and all over the country by the renowned researchers. Giles and Williams

(2000a, 2000b) provide an excellent literature review of the ELG hypothesis. Mamun and Nath (2005) examined the time series evidence to investigate the link between exports and economic growth in Bangladesh. Using quarterly data for the period of 1976 to 2003, the study found that industrial production and exports were co-integrated. Chaudhary, Shirazi and Choudhary (2007) investigated trade policy and economic growth for Bangladesh. Co-integration and multivariate Granger Causality test was used for the period of 1973 to 2002. Their results strongly supported a long-run relationship among the three variables for Bangladesh. The results showed feedback effects between exports and output growth and also between imports and output growth in the short-run. Yuhong, Li and et. al. (2010) did co-integration analyses with the data of import, export and economic growth and the results suggest that growth of import greatly promoted economic growth of China, while that of export performed an opposite one. Vohra (2001) examined the relationship between the export and growth in India, Pakistan, the Philippines, Malaysia, and Thailand for 1973 to 1993. The empirical results showed that when a country has achieved some level of economic development than the exports have a positive and significant impact on economic growth. From my point of view the export performance of Bangladesh is really depends on her gravity variables mostly on GDP variables between partner countries.

II. Bangladesh Recent Condition And Export Performance

The government of Bangladesh has introduced new export policy for the years of (2015-18) with a view to graduating Bangladesh to a Middle income country by 2021. To describe the recent condition of Bangladesh we have to look on three major area over Bangladesh export and economic conditions. For this circumstances three major scenario is Export policy, Bangladesh export performance and The Vision and mission of Bangladesh trade. Whenever we talked about Bangladesh exports condition we have to consider about the Bangladesh's recent export status, her population and geographic placement and her GDP also. As Bangladesh is an over populated country in the world about 170 million people is a small area but its performance over trade and economics are improving day by day.

2.1 Export policy: After the World Trade Organization (WTO) came into being in Bangladesh International trade is being carried out through different rules and regulations. Bangladesh Government is taking necessary steps to modernize and simplify the Trade Policy that can keeping in accordance with the WTO obligations and the country's commercial interests. Bangladesh has come out with an export policy 2015-2018 and establish a vision called vision 2021. Vision-2021 take into consideration the present government aims at, among other things, elevating Bangladesh to a middle income economy by 2021 through socio-economic development. The Government of Bangladesh has recently undertaken many important measures to promote non-traditional exports. The major areas of reform proposed are: a) assurance of free and unrestricted imported inputs for export industries; b) easy access to export financing; c) maintenance of a realistic exchange rate for exporters; d) development of backward linkages from non-traditional exports; e) dealing with the import restrictions imposed by developed countries; and f) promotion of foreign direct investment and technology transfer in non-traditional export industries.

2.2 Major exportable product for Bangladesh: Mostly the manufactural commodities earn a huge capital by foreign trade. Ready-made garments are the most one and around 80% in all exporter commodities. As exportable goods the goods can be divided into two categories one is traditional export goods like Raw Jute, Jute Goods, Tea, Leather, and Leather Products etc. and another is Non-traditional Exports Ready-made garments, Knitwear, Frozen Shrimps, Other Fish products, Jute Carpet, Shoes and other leather goods, Newsprint, Paper, Naphtha, Furnace Oil, Urea, Fruits & Vegetables, Cut Flower, Handicrafts, and Jewelries. Besides these Bangladesh exports, Bangladesh also engaged in the production of rice, tea, sugar wheat, ship scrap metal, textiles, fertilizer, pharmaceuticals, ceramic tableware and newsprint.

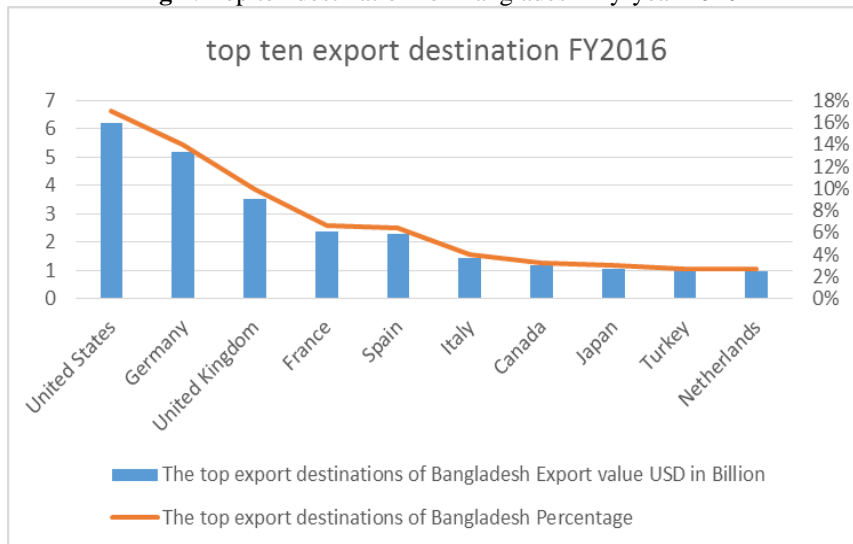
Table 1: Bangladesh major exported product 2016.

| Top 10 Export products- 2016 | | |
|---|----------------------|-------------|
| product | value in USD Billion | percentages |
| Knit or crochet clothing, accessories | 16.8 | 43.40% |
| Clothing, accessories (not knit or crochet) | 16.7 | 43.20% |
| Miscellaneous textiles, worn clothing | 0.977 | 2.50% |
| Footwear | 0.9 | 2.30% |
| Paper yarn, woven fabric | 0.66 | 1.70% |
| Fish | 0.61 | 1.60% |
| Headgear | 0.28 | 0.70% |
| Leather/animal gut articles | 0.26 | 0.70% |
| Raw hides, skins not furskins, leather | 0.21 | 0.50% |
| Vehicles | 0.09 | 0.20% |

Source: Export Promotion Bureau (EPB).

2.3 Bangladesh trade partners: Bangladesh is the 55th largest export economy in the world. In 2015, Bangladesh exported \$35.7B. The top export destinations of Bangladesh are the United States (\$6.19B), Germany (\$5.17B), the United Kingdom (\$3.53B), France (\$2.37B) and Spain (\$2.29B). The EU is Bangladesh's main trading partner, accounting for around 24% of Bangladesh's total trade in 2015. From 2008 to 2015, EU imports from Bangladesh have almost trebled from €5,464 million to €15,145 million, which represents nearly half of Bangladesh's total exports. *EU Commission.

Fig 1: Top ten destination for Bangladesh Fly-year 2016

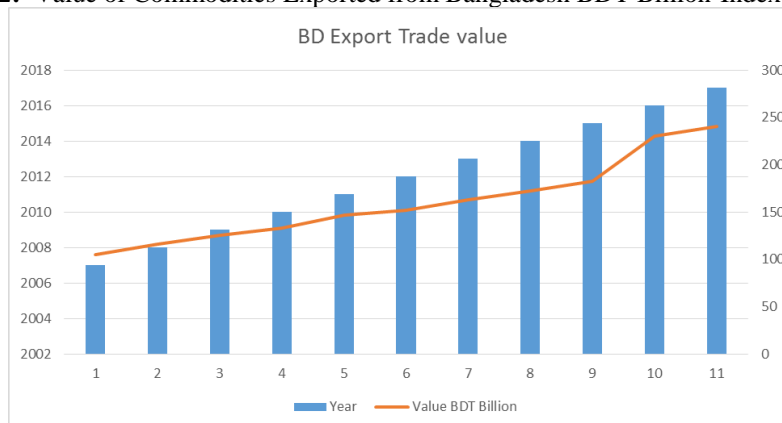


Source: National Accounting Wing, BBS

2.4 Export performance: According to the Asian Development Bank, Bangladesh's economy grew by 7.1% in 2016, the fastest expansion in 30 years. It was also the sixth year in a row that GDP growth was greater than 6%. Most analysts expect this run to continue. Trade is moderately important to Bangladesh's economy; the value of exports and imports taken together equals 42 percent of GDP. The average applied tariff rate is 10.7 percent, and the government has taken steps to reduce bureaucratic barriers to trade and investment.

Exports in Bangladesh increased to 240.22 BDT Billion in August from 231.82 BDT Billion in July of 2017. Exports in Bangladesh averaged 40.75 BDT Billion from 1972 until 2017, reaching an all-time high of 240.22 BDT Billion in August of 2017 and a record low of 0.05 BDT Billion in February of 1972. But Index Points from 1986 until 2015, reaching an all-time high of 182.34 Index Points in 2015 and a record low of 78.90 Index Points in 1986.

Fig 2: Value of Commodities Exported from Bangladesh BDT Billion-Index point.



Source: Bangladesh Bank, Tradingeconomics.com

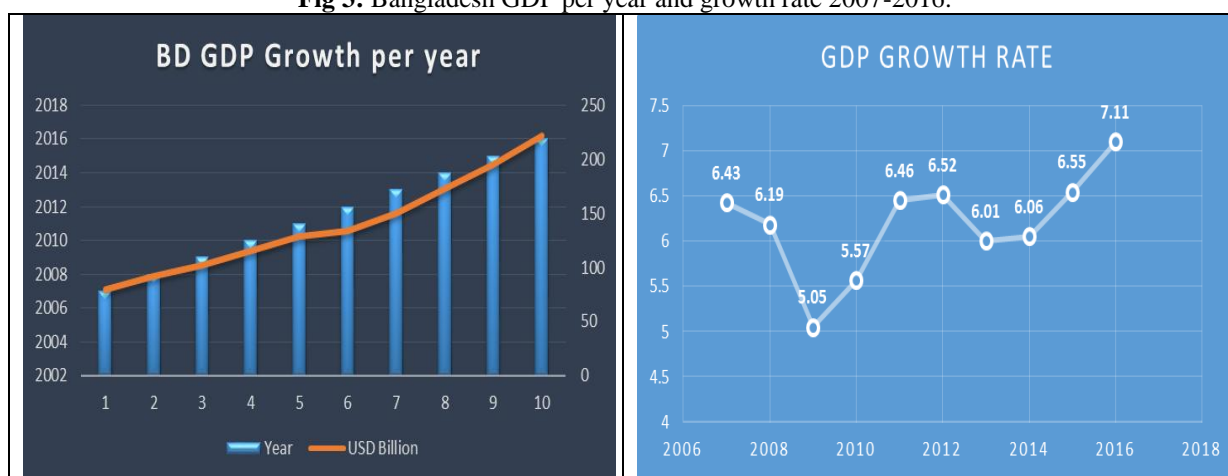
III. Analysis of Variables

3.1 Exports: Like many other third-world countries, Bangladesh relies quite heavily on exports to provide for the needs of its densely populated nation. For overall annual export figures for each country I collected the data from varieties of sources, but the main data I collected from, World Development Indicators, World Bank. The

world development indicators arranged the data from UNCTAD’s volume index series. For economies for which UNCTAD does not publish data, the export volume in the IMF’s International Financial Statistics are used. The export data for Bangladesh are collected from Bangladesh bureau of statistics. The export volume of Bangladesh totally depend on manufacturing goods and producing goods, especially on top four categories that I already mention in chapter 4. To fairly accurately I also have to collect the export volume from these data series. So the main export volume should be come from Manufacturing goods+ production goods+ other exported goods= total export volume. The manufacturing goods mainly in the sector from textile industries. And the production goods can be determine in the agricultural sector and other production industry like leather or beverage industries.

3.2 GDP: GDP is a measure of the size of country’s economy, so countries with high GDP values are assumed to trade more with each other than countries with low GDP values. Annual GDP values are time variant variables and the value are collected from the National Statistical database. All GDP’s values are gross values. From the statistical bureau of Bangladesh and Bangladesh bank they were found in BDT, so we have to convert the value in us dollar which can easily comparable to understand other countries GDP’s values. The other countries GDPs values are collected from World Bank.

Fig 3: Bangladesh GDP per year and growth rate 2007-2016.



Source: Bangladesh Bureau of Statistics (BBS)

3.3 GDP per capital: According to the International Monetary Fund (IMF), with a growing middle class, Bangladesh attained the World Bank’s lower-middle income status in 2015. Bangladesh has one of the lowest wage rates in the world, which has fueled an expanding industrial base led by the RMG industry or other manufacturing industries. Countries with higher per capital income have a trend to be import manufacturing goods from a country having lower per capital income and Bangladesh always stand to get this advantages from the first world. The per capital values are collected from the World Bank to be a fair understand the difference between economics condition.

3.4 Population: Population of all countries are collected from the World Bank indicator database. Population is another time variant variable that should be positively correlated with trade. With a large number of population there will be a great opportunity to produce large number of production volume. Small populated countries don’t have the advantages the produce a large number of production even if a country have a huge land. The bigger country have bigger GDPs growth but they are insufficient to produce large volume of production.

3.5 Actual Labor Force: Not only having huge land and large population to be a much more productive country, the country have to depend how much labor force they have in their hand. To be more production and continue to be export a country have to produce goods continuously in a range of time. The actual labor force must play an important role to be production function. Having large number of labor should play an important role to be export more on this circumstance.

IV. Discussion of Result

The panel data of 10 observations was analyzed by a computer program, “SPSS 21”, provided by IBM. By using “SPSS 21” a correlation between variables and a simple linear regression were estimated respectively. Under the linear regression we will overserve the Coefficient, ANOVA, regression statistics will be discuss.

The correlation between the variables have a significant over export, between this four independent variables the hypothesis found a strong relation which is an average of 97% between them. Correlation is significant at the 0.01 level found all for this four independent variables. In the case of GDP and Per-capital

variables it stand 98% contribution over export. Correlation table indicate that correlation between GDP, Per-capital, Population and labor force is positively significant. ($r = 90^{**}$, $p < 0.01$). The Correlation tell us that if the population and actual labor force is increase then the export is increase partially. But that cannot be explain directly because other variables have their participation.

Table 2: Correlations among variables

| Variables | 1 | 2 | 3 | 4 | 5 |
|--|-------|--------|-------|-------|---|
| 1 Export | | | | | |
| 2 GDP | .98** | | | | |
| 3 Per-capital | .98** | 1.00** | | | |
| 4 Population | .96** | .98** | .98** | | |
| 5 Labour | .97** | .99** | .99** | .98** | |
| *. Correlation is significant at the 0.05 level (2-tailed). | | | | | |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | | | |
| Note N=5, *P<0.05, **p<0.01 | | | | | |

The model summary:

Here is from the model $r = 0.981$ and $r^2 = 0.96$, r^2 can drive from the ANOVA table. So $r = 98\%$ this variation factors is mean a lot over Bangladesh export. These four factors means a lot of effect over Bangladesh export and beside this only 2% variables can make a changes over Bangladesh export but those others variables does not means a lot cos that will variables will be significant but not strongly occupied over Bangladesh export. R is the correlation and its measure how variables moves in relation to each other. R² the termination on co variant is the proportion of variability in Y that is explain by the independent variables. Adjusted R² is a more reliable statistics in this model which consist 94% value. The standard error is 8.64 which measure the variability of actual Y values from the productive Y values as the same is standard division or total number of cases.

Table 3: Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
|---|-------------------|----------|-------------------|----------------------------|-------------------|----------|-----|-----|---------------|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .981 ^a | .963 | .945 | 8.64309 | .963 | 52.371 | 3 | 6 | .000 |
| a. Predictors: (Constant), Labor, Population, Per-capital | | | | | | | | | |
| b. Dependent Variable: Export | | | | | | | | | |

From analysis of variance $f = 52.37$, f value, the terminate is the regulation is significant or indicate the significant probability. Where the regression is 11736 and residual is 448 with a sum of 12184 that is the total sum of square value. From the ANOVA table 13 the degree of freedom is constantly 3, 6 and 9. The ANOVA table shows that the variables is significant but from it not clear that whether the variables are strong or not.

Table 4: ANOVA test result.

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|------------|----------------|----|-------------|--------|-------------------|
| 1 | Regression | 11736.777 | 3 | 3912.259 | 52.371 | .000 ^b |
| | Residual | 448.218 | 6 | 74.703 | | |
| | Total | 12184.995 | 9 | | | |
| a. Dependent Variable: Export | | | | | | |
| b. Predictors: (Constant), Labor, Population, Per-capital | | | | | | |

Table 5: Coefficient result of year 2007-2016

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Correlations | | |
|-------------------------------|-------------|-----------------------------|------------|---------------------------|-------|------|--------------|---------|-------|
| | | B | Std. Error | Beta | | | Zero-order | Partial | Part |
| 1 | Constant | 155.552 | 435.520 | | .357 | .733 | | | |
| | Per-capital | .161 | .078 | 1.153 | 2.075 | .083 | .981 | .646 | .162 |
| | Population | -2.314E-007 | .000 | -.034 | -.080 | .939 | .959 | -.033 | -.006 |
| | Labor | -1.651E-006 | .000 | -.140 | -.267 | .798 | .965 | -.108 | -.021 |
| a. Dependent Variable: Export | | | | | | | | | |

Table 6: Coefficient result of year 2012-2016

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | | |
|-------|-----------------------------|-------------|---------------------------|--------|--------|---------------------------------|-------------|-----------|
| | B | Std. Error | Beta | | | Lower Bound | Upper Bound | |
| 1 | Constant | 2072.207 | 1950.485 | | 1.062 | .481 | -22711.054 | 26855.469 |
| | GDP | 4.691E-009 | .000 | 5.426 | 2.653 | .230 | .000 | .000 |
| | Population | 2.469E-005 | .000 | 2.200 | 1.813 | .321 | .000 | .000 |
| | Labor | -9.583E-005 | .000 | -6.684 | -2.771 | .220 | -.001 | .000 |

Here is the constant for Table 5 is 155 and the constant for Table 6 is 2072. For the last five years the standard error is bigger than the last ten years. Whether the constant value is also in the similar case. By the coefficient result here we can find the t-test result that used to determine the probability. From this different pattern of year’s combination by the coefficient result last five years is more significant then total ten years. But the significant degree is high in last ten years and strongly significant. The signs of the coefficients of the production function are as expected, with the exception of negative sign of the year variable. The input of GDP, capital, labor and per-capital are positively related to output export with high significance. The year has a negative effect on production function, meaning the total value of output was on a downward trend at a small but insignificant rate over the 10 years. The measurement of the changes in the level of output resulting from proportional changes in input.

The mean value of efficiency shows a fluctuating trend from this ten years. The net export share shows a significant positive effect on efficiency. It means that the higher the net export ratio, the more efficient the production. The histogram of regression standardized residual also follow the assumption that its growth are significant over those variables. This is consistent with the literature and the hypothesis in this research. Adequate evidence in the trade history of Bangladesh could be found to prove that exports played an important role in industrialization. Benefits of international trade, which led to expansion in employment and accumulation of a great amount of foreign reserves.

V. Conclusion

The relationship between exports and economic growth has a subject of great interest in the development literature. From many studies, researcher have found exports affecting economic growth favorably in different countries and regions. This paper provides updated estimates of the relationship among exports, GDP growth with economic growth in Bangladesh for the period of 2007-2016. Based on the overall study, in Bangladeshi context the export have the significant positive relationship, and also, export have the significant impact on the economic growth of Bangladesh.

Currently Bangladesh’s main export products are garments, leather, jute and jute-related goods, frozen fish and seafood. The majority of the country’s trade is conducted with the USA. The United States was the number one export destination for Bangladeshi products, and Bangladesh is currently the United States’ 50th largest goods trading partner with \$6.8 billion in total (two-way) goods trade during 2016. Bangladesh also having great export trend with European countries and major of them are Germany, the UK, France and Italy. These does not mean that the country is well-off. Bangladesh is one of the poorest and most densely populated countries in the world, the majority of these profits will generally make their way into the pockets of a few wealthy while the rest will be thinly spread out amongst those involved in the production of these goods. With a growing middle class, Bangladesh attained the World Bank’s lower-middle income status in 2015.

In this research there are some advance variables comes to introduce like GDP per capital and actual labor force. In the regression analysis its clearly mention that this five independent variables suited over Bangladesh export performance. So this paper will help to understand that while the condition is changing over trade issues the method of measurement is also changing at the same time. In further this study shows once again how important the export can make a way to become Bangladesh a middle income country.

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