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Determinants of Industrial Growth in South Asia: Evidence from Panel Data Analysis

ZARA EJAZ, M. AMAN ULLAH, and MUHAMMAD USMAN KHAN

Industrial growth is imperative for socio-economic development of a state. It generates productive jobs, leads to capital accumulation, technological innovations and stirs up economic growth. This paper highlights the impact of political and economic factors on industrial growth using data from 1990 to 2015 for four South Asian countries: India, Pakistan, Sri Lanka and Bangladesh. The key findings from the fixed-effect panel data regression were that per capita income, foreign direct investment, trade openness, governance and government expenditure all have a significant and positive impact on industrial growth. If we look at the patterns of the industrial growth of the major South Asian economies measured by industrial value added it can be seen that industrial sector of all the economies grew at different rate. These differences arise due to differences in industrial strategies or country's characteristics. Examples of industrial strategies include protectionist policies, import substitution, promotion of labour or capital intensive production etc. In order to design industrial policies conducive for industrial development it is a pre-requisite to know exactly what factors promote industrialisation.

Keywords: Economic Development, Industrial Growth, South Asia, China-Pakistan Economic Corridor

1. INTRODUCTION

The performance of the industrial sector of an economy is a key determinant of its growth and development. Developing economies with competitive and sustainable industrial sectors grow at a swifter rate compared to other economies. The advantages of industrial growth are well documented in the literature, these include capital accumulation, economic diversification, unemployment reduction, technological transfers and sustainable development [Samouel and Aram (2016)]. Higher industrial growth and performance of the economy helps to attain higher surpluses that can be further invested to boost the economy and even assist in efficient utilisation of the scarce resources. The growth in industrial sector also has positive spill-over effects for non-industrial sectors of the economy, it creates demand for agricultural products which are used as raw materials and facilitates services sector by providing advanced technological products that enhance efficiency. Thus the growth of this sector is crucial for the development of national economy.

Zara Ejaz <zaraejaz93@gmail.com> is Research Associate, Planning and Development Department, Government of Punjab, Lahore. M. Aman Ullah <m.aman@auckland.ac.nz> is Chief Economist, Planning and Development Department, Government of Punjab, Lahore. Muhammad Usman Khan <usmankhan@lums.edu.pk> is Advisor, Planning and Development Department, Government of Punjab, Lahore.

Industrial development had a vital role in the economic growth of the countries like China, Taiwan, the Korea and Indonesia [Kniivila (2007)]. East and South East Asian countries along with some Latin American countries have also experienced remarkable economic growth linked majorly to the reforms in their industrial strategy [Samouel and Aram (2016)]. The positive experiences of developed countries with industrial growth imply that, developing countries should focus on formulating effective policies for promoting the industrial sectors to achieve rapid economic development. Although the South Asian countries have shown improved industrial growth in past few years, it is still essential to know the factors that are most vital for industrial development and economic growth of the region. If we look at the patterns of the Export and Foreign Direct Investment (FDI) in South Asian countries it is clearly observed that exports and FDI are showing stagnant trend while industrial growth of the major South Asian economies that are India, Pakistan, Bangladesh and Sri Lanka measured by industrial value added grew at different rate (Annexure I & II). These differences arise due to differences in industrial strategies or country's characteristics. Examples of industrial strategies include protectionist policies, import substitution, promotion of labour or capital intensive production etc. Country characteristics on the other hand include stability of the political regime, availability of natural resources, and income level of the population. These characteristics and other factors such as ease in obtaining credit determine how conducive countries are for investment and starting up businesses which can be compared through their 2018 Doing Business Rankings in which India has the highest at 100, followed by Sri Lanka and Bangladesh showing the worst performance at 177. India also has the largest industrial sector in absolute terms due to the size of its economy. Its diverse economy encompasses traditional village farming, modern agriculture, handicrafts, a wide range of modern industries, and a multitude of services. About three-fifths of the work force is still employed in agriculture.

However, in terms of growth rate Bangladesh has been ahead of all the countries in the region since 1985. Economic growth of the country is mainly dependent on a very few sectors like readymade garments, manpower, leather goods, plastic goods, pharmaceuticals, ceramics and a very few agro-processed items. In the financial year 2012-2013 the contribution of industries to the GDP was 29 percent.

Meanwhile Sri Lanka has the highest per capita income in South Asia and the Colombo Stock Exchange reported the highest growth in the world for 2003. While the production and export of tea, rubber, coffee, sugar and other agricultural commodities remains important, the nation has moved steadily towards an industrialised economy with the development of food processing, textiles, telecommunications and finance. By 1996 plantation crops made up only 20 percent of export, and further declined to 16.8 percent in 2005 (compared with 93 percent in 1970), while textiles and garments have reached 63 percent.

Pakistan's economic and political spheres have often been marked by instability, In FY 2016-17, Pakistan's GDP growth touched 5.28 percent with industrial sector witnessing growth of 5.02 percent as compared to 5.8 percent last year. Pakistan's industrial sector has suffered due to energy shortfall however with several new energy projects injecting power into the national grid; the situation is improving. The following table shows the contribution of different sectors in the Gross Domestic Product of these four countries.

Table 1

Contribution of Sectors in GDP

Country	Agriculture (% of GDP)			Industry (% of GDP)			Services (% of GDP)		
Year	1988	1998	2008	1988	1998	2008	1988	1998	2008
Bangladesh	31.1	25.4	19.0	21.2	25.8	28.5	47.8	48.7	52.5
India	30.5	26.0	17.5	26.2	26.1	28.8	43.4	47.9	53.7
Pakistan	26.0	27.3	20.4	24.4	23.8	26.9	49.6	48.9	52.7
Sri Lanka	26.3	21.1	13.4	26.7	27.5	29.4	47.0	51.4	57.3

Source: World Development Indicators.

In order to design industrial policies conducive for industrial development it is a pre-requisite to know exactly what factors promote industrialisation. Many previous studies have focused more on the income per capita and population growth as the most crucial factors for industrial growth. However, now in the era of globalisation and technical advancements it is necessary to study more economic factors along with the political factors to formulate an effective industrial growth and development strategy. In the context of South Asia studies have been done in terms of explaining industrial development especially in determining key economic factors in cross sectional analysis. These studies lack the inclusion of political and some economic factors in defining the patterns of industrialisation in South Asia.

Previous studies show that economic variables like living standards of the population, the level of trade and foreign direct investment have a resolute effect on the industrial growth of an economy. There is conclusive evidence in the literature that as the income per capita increases the share of the industrial and manufacturing sector in the national income increases. In the case of the foreign direct investment and trade openness both have a positive impact on the industrial growth as shown by Khan (1980) that after 1958 and up to mid-sixties the large foreign inflows with the liberal monetary and fiscal policies created a very conducive investment climate in Pakistan and gave rise to immense industrial activity. Along with these economic variables, human capital is also considered a major driving force for the sustainable industrial development. Investing in the human capital that produces scientifically and technically sound personnel leads to competitive industrial growth environment and enhances the attractiveness of local investments for foreign investors. So, investing in the human capital through education, vocational trainings, and efficient healthcare spending sets the base for the industrial growth [Samouel and Aram (2016)]. Dutta and Ahmed (2004) also referred to human capital by quoting Lucas model (1988) that increasing returns to scale in industrial production due to increased human capital is the driving force behind the economy's sustainable positive growth.

Along with these economic variables it is essential to consider the political factors that contribute to the industrial development such as the type of the government regime and its willingness to create an environment for the industrial development. Government spending can have a prolific role for the formulation of human capital and physical assets through effective and efficient spending on the education, healthcare, infrastructure and technological developments. Political stability of a nation plays a substantial role for its effective policy formulation and implementation. If a nation has significant governance deficiencies it would not be able to set the base for solid industrial sector. Ng and Yeats

(1999) proved that governance regulations influence 60 percent of the variance in measures of economic performance which shows that country's own national rules and regulations and policies set the path for industrialisation and economic growth.

This study attempts to examine the implication of the economic and political variables on the industrial growth in South Asia. Specifically, the questions that this study is addressing are: (1) What are the significant economic variables that affect the industrial growth in South Asia? (2) What are the significant political variables that affect the industrial growth in South Asia? Addressing these questions involves a thorough examination of the empirical relation between the exogenous variables and the industrial growth of the region.

The determination of these factors would help in the policy formulation for industrial growth and prosperity in the region. This study is particularly important for Pakistan due to the initiative of China-Pakistan Economic Corridor (CPEC) that would open a lot of industrial investment avenues for the country. CPEC is a framework of regional connectivity, economic regionalisation and industrial diversification with investments in major sectors of Pakistan's economy.

2. LITERATURE REVIEW

One of the earliest studies that analysed the impact of political and economic factors on industrial growth was Story (1980), who examined the role of different factors in explaining the industrial growth of five Latin American. Most previous studies like Hoselitz (1961), Temin (1967), and Chenery and Taylor (1968) limited the analysis to just two economic causes: population and per capita income. Moreover, the political factors of economic growth were also ignored by most economist. Keeping into consideration the lack of various economic factors along with political factors in the previous studies, Story (1980) made an effort to expand previous studies by adding distinctions regarding the economic factors and political factors of industrialisation. The dependent variable of Industrial growth was defined as industrial value-added in dollars, while economic independent variables included income per capita, population, exports, foreign direct investment (FDI). Political factors considered were government expenditure, trade-openness and type of government. The study used 25-year data from 1955 to 1975 of five Latin American countries that were Argentina, Brazil, Chile, Mexico and Venezuela. The methodology employed was pseudo Generalised Least Squares (GLS).

The results of the study confirmed the findings of the previous studies that income and population growth had the most crucial impact on industrial growth. The political variable of government expenditure also exerted a significant impact on industrial growth. This finding of significance of political factors is in line with the study of Holt and Turner (1966) in which the role of political factors in the economic growth had been emphasised. Furthermore, the variables of US foreign investment in manufacturing sector, protectionist policies and the type of government regime showed no significant effect on the industrial development in Latin America. This study highlights that for the formulation of industrial policy it is essential to consider economic as well as political factors. However, the conclusions made in the article were quite simplified which set a path for further research. The variables like government expenditure and exports could be disaggregated to identify specific areas that were contributing most to industrial progress.

In contrast to results of Story (1980) that protectionist policies had no significant impact on industrial growth. Udegbunam (2002) found that trade-openness was a key determinant of industrial growth in Nigeria. The objective of Udegbunam (2002) study was to measure the impact of stock market development and openness to trade on industrial development in Nigeria. For the analysis of determinants of industrial output Udegbunam (2002) used 27 years data from 1970 to 1997. The independent variables considered were the ratio of stock market capitalisation to GDP, the ratio of non-military expenditure to GDP, school enrolment, inflation rate, maximum lending rate, openness to international trade, and gross domestic product. From the Ordinary Least Squares (OLS) analysis it was observed that the trade openness and the stock market development are positively correlated to the industrial output production in Nigeria.

These results were in line with Dorbusch and Reynoso (1989) findings that liberalisation and openness to trade were majorly responsible for economic growth of South Korea in the 1980's. Trade openness facilitates developing countries in industrial development through spillover effects from research and development in advanced countries [Coe (1995)]. Like Udegbunam (2002) the significance of stock market development in enhancing economic development through efficient allocation of investments and savings was supported by Becsi and Wang (1997), Greenwood and Boyan (1990) and Khan (2000). Moreover, Obstfeld (1994) and Devereux and Smith (1994) proved that an expedited rate of industrial development could be attained with financial integration, free capital flows, risk diversification and trade openness. The empirical results of the Udegbunam (2002) corresponded with the previous studies that the stock market development and openness to trade have a significant positive correlation with the industrial output growth. Furthermore, the other key factors of industrial growth came out to be human capital, non-military expenditure, Gross domestic product and inflation rate. Although the results of the Udegbunam (2002) were in line of previous studies but there is a criticism on the indicators that Udegbunam (2002) had employed to measure certain variables like the measures of the openness, stock market development and human capital particularly in the case of Nigeria.

Dutta and Ahmed (2004) studied the impact of trade liberalisation on industrial growth in Pakistan. There are several studies like Savvides (1995), Bakht (1998), and Onafowra and Owoye (1998) that linked economic growth to the trade liberalisation and concluded a positive correlation between them. However, the impact of human capital in explaining economic and industrial growth received a little attention. Dutta and Ahmed (2004) tried to bridge this gap as this paper employed human capital model of endogenous growth which was development by Lucas (1988) to gain empirical understanding of relationship between trade liberalisation and human capital with industrial growth in the context of Pakistan from 1973 to 1995. The industrial value added as a dependent variable explained by the independent variables of capital inputs, labour inputs, human capital and trade liberalisation index that consists of real exports and rate of average import tariff collection.

The results of the study showed that the capital formulation, labour force and real exports had a significant impact on the industrial development of Pakistan. The result of trade liberalisation having a positive and significant impact on industrial growth was in compliance with the results of Udegbanum (2002) for Nigeria. Dutta and Ahmed (2004)

and Udegbanum (2002) both faced the limitation with the use of education indicator to measure human capital. Another limitation of the Dutta and Ahmed (2004) was the aggregated nature of the model employed as it is vital to consider data at the disaggregated level for effective policy analysis.

Markusen and Venables (1998) also presented a theoretical framework suggesting that foreign direct investment promoted industrial growth in scenarios where Foreign Direct Investments are complementary to domestic industries. They showed that their model of standard oligopoly in international trade was consistent with the experience of many newly industrialised countries. Gao (2004) studied industrial development in the light of three broadly defined factors that possibly contribute to regional industrial growth, these were natural advantage and local market conditions, externalities from technological spillovers, exports and FDI. The study used data for twenty nine Chinese provinces from 1985–1993. The results showed that externalities in the long run and market conditions and regional infrastructure in the short run facilitated industrial growth. In addition to that exports and FDI had a great positive effect on the regional industrial growth. The result for FDI contrasted with Story's (1980) findings that FDI had no significant impact on industrial growth. The differences in these results could be because regional factors for Latin American countries and China are considerably different.

Zhao and Zhang (2010) in their study FDI and Industrial productivity in China investigated that how FDI had an impact on the China's industrial productivity in the panel data analysis of five years from 2001-2006. The study employed the OLS regression methodology with dependent variable measured as current value added of an industry. The independent variables considered were total number of employees, domestic capital formulation, human capital, technological efforts, direct effects of FDI and indirect of FDI. Like, Gao (2004) found that FDI had a significant effect. The contribution of FDI in industrial productivity was heightened by its interaction with human capital of the country. It was also stated that the labour intensive industries benefitted more by the direct effects of the FDI. While capital intensive industries gained more from the spillover effects of the FDI. It is worth noticing here that China is a special case as it has a huge market size, strong centralised government, and certain bargaining powers due to which FDI brought extra gains to China in enhancing its industrial productivity. Additionally there were some factors like trade openness that were not addressed in this study so it cannot be considered as an exhaustive study of China's industrial growth.

One of the most recent study done on the determinants of industrialisation is by the Samouel and Aram (2016). Generalised Method of Moments (GMM) methodology was employed in this study to analyse the panel model for 35 African countries from the time period of 1970-2012. This study aimed to fill the void in the context of African countries by describing the linkage between industrialisation and several regressors consisting of socio economic indicators as well as institutional and political variables. The results of the study showed that for the whole considered region economic development, labour market flexibility, financial development and the real effective exchange rate (REER) were the key drivers of the industrialisation. It was also stated that Foreign Direct Investment (FDI) was the most crucial for the industrial development. Likewise the study of Khadaroo and Seetanah (2007) also emphasised the role of FDI in the Sub-Saharan

Africa. Moreover, in line with the study of Samouel and Aram (2016) the significance of exchange rate in the industrial growth was also identified by Greenwald and Stiglitz (2006) and Rodrik (2008) in which it was mentioned that lower exchange rate helps to promote exports especially for the sectors with higher learning elasticities which leads to industrial development.

The brief review of the literature highlights that there are some significant determinants of the industrial growth like FDI, trade openness, economic development, financial liberalisation, exchange rate, human capital, governance and government type. However, it is also shown that there is no unequivocal evidence of effect of different political and economic variables on industrial growth. Studies from different regions have found varying evidence on the effect of these variables on industrial growth due to the pertaining regional variance among the countries. In such a scenario it is important to study the key economic and political determinants of industrial growth in South Asia. The results of the study can be used to map out the path for industrial and economic prosperity in South Asia. Industrial sector is a cornerstone for an economy as mentioned by Weiss (2002) that East Asian countries as well as several Latin American countries have experienced remarkable growth linked essentially to the amendments in their industrial strategy. This study would also help in determining the impact of these variables on Pakistan's industrial sector as most South Asian countries share similar regional characteristics. Moreover, this study would also add value to literature by analysing the variables using most recent data available, this is particularly important as recent trends of increased globalisation and connectivity may alter the impact these variables have on industrial growth in South Asia.

3. DATA AND METHODOLOGY

In order to find the determinants of Industrial growth in South Asia, This study employs a panel-data set of 4 countries, namely Pakistan, India, Bangladesh and Sri Lanka for 25 years from 1990 to 2015. To address the issue of lack of inclusion of political factors of economic and industrial development, this study includes government expenditure and governance indicators as proxies of political factors. Other regressors include Income per capita, trade openness, foreign direct investment, labour force and human capital.

The dependent variable of industrial growth is measured by the industrial value added in millions (constant 2010 US$). The independent continuous variables are measured as per capita income, gross domestic product per capita (constant 2010 US$), Trade openness of the nation is estimated by the total trade (sum of exports and imports) as the share of gross domestic product, Labour force is expressed in total labour as the percentage of the total population count. The measurement used for the estimation of human capital is the secondary school enrolment as supported by the studies of Dutta and Ahmed (2004), Samouel and Aram (2016) and Udegbunam (2002). The political variable of gross national expenditure is the total expenditure of each national government (constant 2010 US$). Governance is measured by an index that comprises of voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption. The data for most of these variables is obtained from world development statistics, whereas data for governance

index is calculated as the average of six governance indicators published by World Bank's Worldwide Governance Indicators. The basic economic model formulated with these variables is given below. The primary econometric methodology employed for the panel data analysis was determined after performing the Chow F test. It was found out that fixed effects panel data regression is suitable for the data set.

$$Y_{it} = \beta_0 + \beta_1 X_{1it,} + \ldots + \beta_7 X_{7it} + u_{it,}$$

Where:

Y= Industrial value added (in US$)
X_1 = Per capita income (in US$)
X_2 = Labour force as the percentage of the total population
X_3 = Trade openness (Trade as the % GDP)
X_4 = Foreign direct investment (net inflows in US$)
X_5 = Gross national expenditure (in US$)
X_6 = Human Capital (secondary school enrolment)
X_7 = Governance Index.

4. RESULTS

The results of the fixed effects regression on the basis of the Equation (1) are mentioned in the Table 1. The results in the table show that the traditional economic variable of per capita income is a significant predictor of the industrial development in South Asia. This result is similar to the findings of the previous studies of China and Latin America. High income leads to more capital accumulation, innovation and investments supplementing the industrial development. It is worth noticing that the FDI and trade openness both have a significant and positive impact on the industrial growth. This depicts that for a country or region to grow industrially and economically, it is essential to build ties with other countries. Guadagno (2012) proved that trade is the constant determinant of the industrialisation in Africa as it allows for access to technology, capital, and leads to competitive exchange rate. Trade augments specialisation in production of commodities with comparative advantage and import of commodities which are costly for local production resulting in higher revenue generation for further investments [Kniivila (2007)]. It was also mentioned by Kniivila (2007) that trade openness facilitates foreign investment into the country. The results in table 1 show that a dollar increase in FDI leads to 0.059 dollar increase in the industrial value added. The relationship with FDI is positive as it lifts the transfer of capital, technology, financial and resource management techniques that improve exports and economic growth which further reinforce the industrialisation process. FDI also enhances the local productivity as the domestic companies face external competition. There has been a change in the FDI environment in South Asia, adopting a more deregulated approach has made South Asia an attractive option for investors. However apart from India the share and absolute value of FDI in Sri Lanka, Pakistan and Bangladesh has been negligible. According to the United Nations Conference on Trade and Development (UNCTAD) WIR 2017 "investment and digital economy". The results also show that human capital have a significant impact on the industrial growth in South Asia. The relationship of industrial growth with the percentage of labour in total population is insignificant which

implies that just having a bulge of youth is not sufficient for industrial growth, the labour force must be strategically utilised. In the developing areas of South Asia, a substantial part of the labour force does not contribute effectively in the industrial production process due to which direct relation with the industrial output is not observed. Another possible reason is that in South Asia most of the labour is involved in agriculture sector for example in Pakistan 43.2 percent of the labour force is part of the agriculture practices in FY 2015. So, they do not have the relevant skill set to contribute in the industrial output growth.

Table 2

Results of Regression Analysis

Variable	Co-efficient	T-value	P-value
Per Capita Income	2.166	2.35	0.024**
Labour Force	0.019	0.44	0.662
Trade Openness	0.002	2.67	0.009*
Foreign Direct Investment	0.059	4.4	0.00*
Gross National Expenditure	0.275	4.24	0.00*
Human Capital	0.362	2.11	0.140*
Governance Index	3.14	2.15	0.034**
Constant	5.61	8.02	0.001*

*Significant at .05 level.

** Significant at 0.1 level.

Government expenditure has a positive impact on the industrial growth at the 5 percent level of significance. It is observed that a dollar increase in the government expenditure results in 0.275 dollars increase in the industrial value added. Government expenditure is considered to provide both demand and supply side stimulus to industrial growth. Developmental expenditures of government lessens infrastructure bottlenecks, while on the other hand, consumption expenditure provides a short run demand-side stimulus [Palibandla and Mallikarjun (1996)]. The improvements in the supply side factors facilitated by government leads to fall in costs that is depicted in lower prices consequently. The reduction in prices increases the income in real terms which increases the demand for production and savings for the investment overall, having a catalytic effect on the industrial development. Hambroack and Hauptmann (1999) states that policymakers and economist in the developing countries have long agreed to the role of government in maintaining stable macroeconomic policies and providing infrastructure for prosperous industrial development. The government needs to play an active role in the strategic planning for the industrial development as it is a key driver for flourishing industrial sector. Along with government's role in providing infrastructure, supporting innovation and technological up gradation, it is also essential for them to provide better educational avenues for poor population in South Asia. This will open better employment opportunities for them, making them capable of participating in the industrial development process.

Though this analysis shows the importance of economic predictors of industrial growth, some political variables have also influenced the dependent variable. The overall

governance conditions in the region also have a significant impact on the industrial growth of the South Asia. The presence of strong institutions capable of ensuring better transparency, rules and regulation enforcement, absence of corruption, and political stability improves business and investment climate and encourages local and foreign investment for that boost industrial growth.

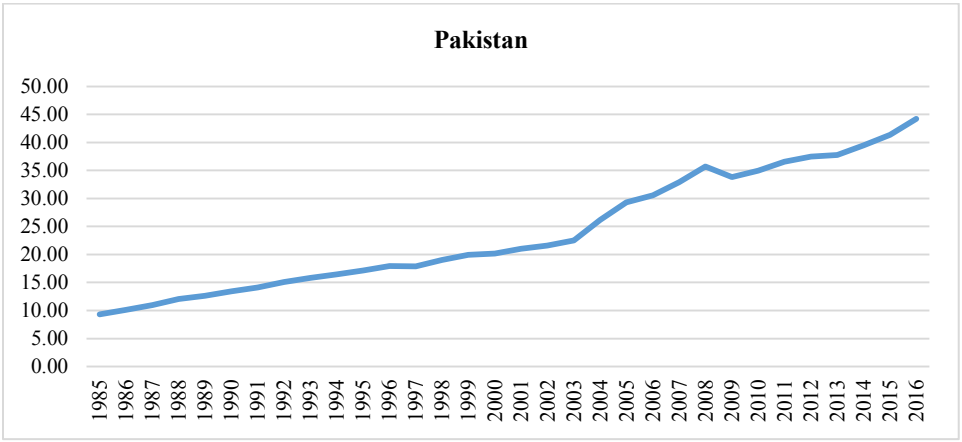
4. CONCLUSION

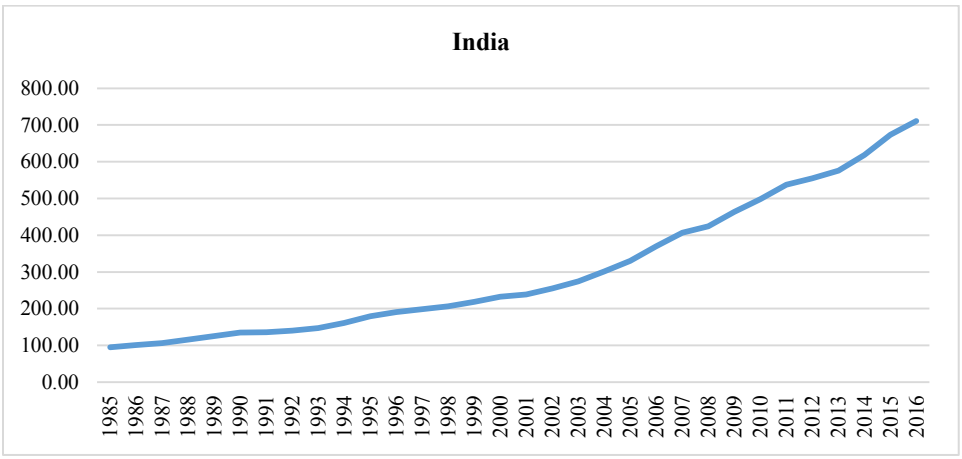
In this study, a panel-data model was employed to describe the relationship between industrial growth and it's different political and socio-economic determinants for four South Asian countries over the period of 1990-2015. In conclusion, some economic variables i.e. per capita income, foreign direct investment, and trade openness showed a significant impact on the industrial growth of South Asia. Both political regressors also showed a positive and significant influence on industrial production. It is essential to take these significant variables into consideration for developing an industrial policy that leads to a sustainable development of the industrial sector. The governments in South Asia must focus on improving business environment, mobilising resources, building sound macroeconomic stability, and insuring good governance to improve industrial growth rates in the region. In the case of Pakistan, where there is a great potential for industrial advancements due to the CPEC initiative. The government needs to have policy reforms focused on creating special economic zones, development of financial sector, increasing trade liberalisation and improving regional economic integration. For a conducive investment and business environment it is important to provide facilitation for startups, easy credit, and access to electricity. It was concluded in a study by Patibandla and Mallikarjun (1996) that countries which have highly skewed income distribution have a highly volatile growth mechanism. So, policy reform have to cater the issue of income disparities for sustained industrial growth.

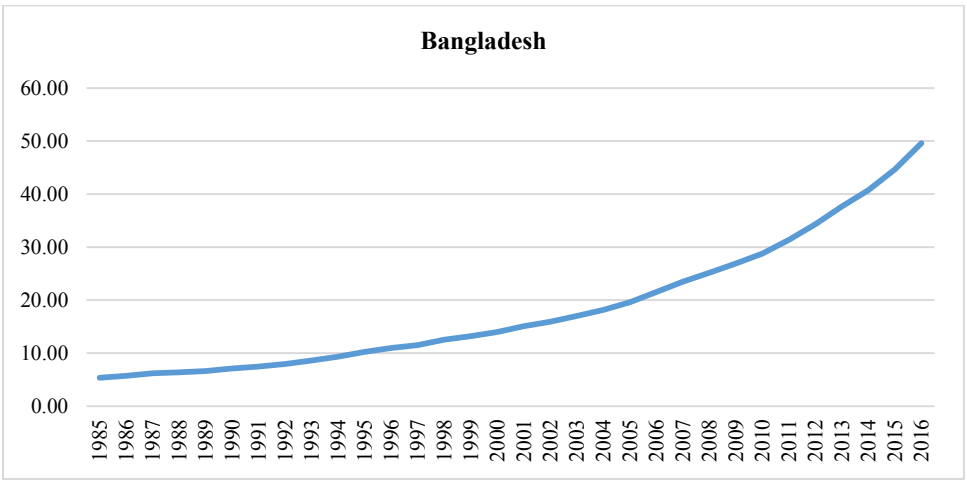
The conclusions made in this study are admittedly quite simplified. Disaggregated data on the government expenditure, imports, and exports need to be analysed in depth to identify specific factors that are majorly contributing in the industrial development of the region. Yet this study is important as it sets a policy guideline specific to South Asian countries by incorporating important political and economic factors and showing their impact on industrial growth.

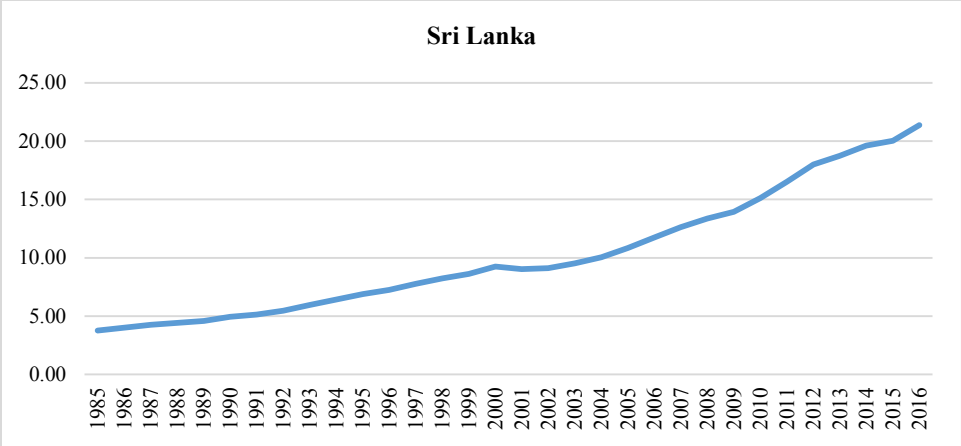
ANNEXURE - I

GRAPHS OF THE INDUSTRIAL VALUE ADDED ($US BILLON)



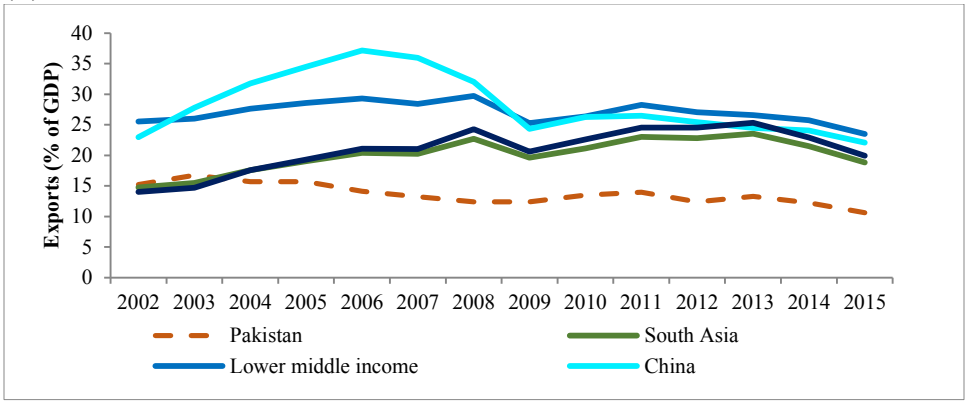




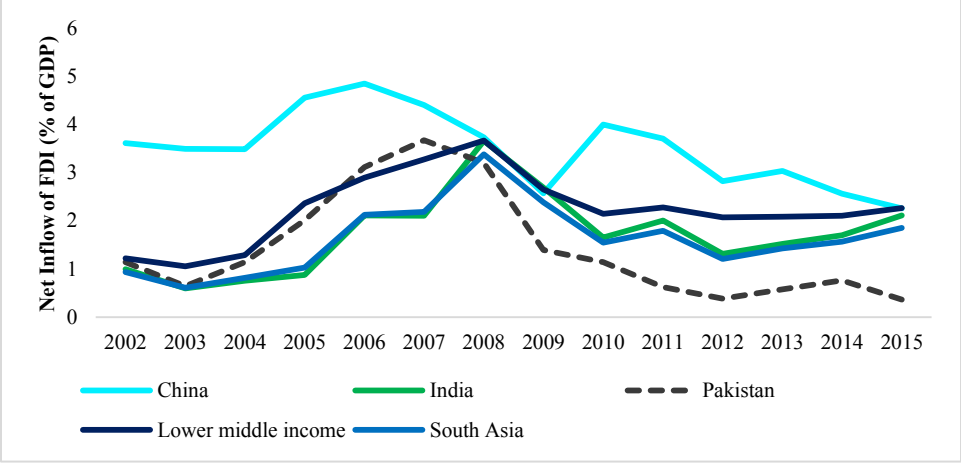


ANNEXURE — II

(A) STAGNANT EXPORTS FOR SOUTH ASIAN COUNTRIES



(B) FALLING FDI



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