

## COMPETITIVENESS, LOGISTICS, FOREIGN INFLUENCES, AND GDP: A PATH ANALYSIS

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### ABSTRACT

This paper examines the complex relationship between competitiveness, foreign direct investment, trade turnover, logistics, and GDP for 123 countries for the year 2016, using path analysis. Our results indicate a significant and positive relationship between competitiveness and foreign direct investment, between foreign direct investment and GDP but not between competitiveness and GDP. Further testing shows the indirect effect of competitiveness on GDP via the mediating effect of foreign direct investment. Competitiveness also positively and significantly impacts logistics performance. However, contrary to expectations, trade turnover does not impact logistics performance and logistics performance does not impact GDP. Also, we find negative but significant relationship between trade turnover and GDP. The results of this paper, though useful for academics and policy makers, need to be replicated for other years to confirm the findings and also to test how relationships between variables evolve overtime.

**Key words:** Competitiveness, foreign direct investment, trade turnover, logistics performance, GDP, path analysis.

**JEL codes:** F20, O19, O43

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### INTRODUCTION

Innovations in the last 3 centuries have transformed the way we live and conduct business. The use of water and steam power led to mechanization of production, followed by the use of electricity for mass production, and now use of electronics and information technology to automate production. All these developments have, inter-alia, resulted in an almost continuous and steep decrease in cost of transportation and communication. Thus, overtime the world has become more connected. All this has resulted in greater flow of ideas, products, and services

across the globe. In this changed environment, businesses/producers face greater competition (particularly global), cater to much larger markets and thus reap the benefits of economies of scale. Competition ensures that entrepreneurs look for production & management techniques that lead to development of new products and lower costs of existing products. All these have resulted in availability of more choices at lower prices to consumers. Thus, there is greater support for a relatively open business environment which promotes availability and adoption of innovative ideas and technologies. It is not surprising, therefore, that a large number of countries have now switched to an open business strategy, promoting greater competition, reaping advantages of economies of scale, and taking advantage of international influences (foreign trade and investments).

Though GDP of a country depends upon both factor endowments and productivity, most of the earlier research work (theoretical and empirical) focused more on how factor inputs such as investments (domestic and foreign in production and infrastructure) and labor supply impact economic growth. In the 1940s and 50s, the beneficial role of foreign influences, particularly role of knowledge and ideas, on economic growth was not widely accepted and various development economists (see, for example, Rosenstein-Rodan, 1943; Myrdal, 1957; and Hirschman, 1958) recommended limited role of foreign trade and foreign investments in economic development. Most of the developing countries thus pursued the strategy of import substituting industrialization (ISI) to promote economic development. Experience with ISI shows that this strategy led to implementation of policies that severely restricted local industries to domestic as well as international competition and thus limited economic growth. Research on development experiences of different countries showed that countries that pursued outward (export) oriented strategy relative to countries that pursued inward (ISI) oriented strategy were able to attain higher economic growth (see, for example, World Development Report, 1987). Thus, starting around 1980s, a number of developing countries switched to outward oriented strategies to step up economic growth.

In addition, in the last three to four decades there has been significant research focusing on how productivity can be raised. Theoretical research on endogenous growth models (Lucas 1988, Romer 1990, and Young 1991) and its extension to open economy (Grossman and Helpman, 1991) emphasized the role of foreign trade and investment as a source of technological and organizational knowledge diffusion. This body of research recognized the importance of knowledge diffusion as the source of competitive advantage

and thus economic growth. Exchange and diffusion of technology/ideas has witnessed a spurt due to widespread use of the internet in the last 20 to 30 years. Though research work on endogenous growth models highlighted the role of knowledge spillover in economic growth, this body of research overlooked the presence of entrepreneurial activity to accommodate knowledge spillover (Acs and Audretsch, 2003; Audretsch and Keilbach, 2004).

Availability of information through foreign influences or otherwise and the presence of entrepreneurs to use this information to innovate have become both necessary and sufficient conditions for productivity increase. Basic human instincts of survival and accumulation of wealth encourages individuals to become entrepreneurial in an environment that promotes individual wealth creation and accumulation (Lal and Clement, 2005). If there is restricted dissemination of information, the productivity levels would be insulated from what is taking place elsewhere (Findlay, 1996 and Findlay and Jones, 2001). Given the importance of role of information/knowledge in raising productivity and thus economic growth, there has been a burst of energy in research that examines the role of foreign trade and foreign investments in economic growth. A part of research has also focused on how a country can become an important source for foreign trade and an important destination for foreign direct investments.

World Economic Forum, through Global Competitive Index (GCI), emphasizes the role of pre-existing conditions that enable a country to take advantages of unlimited number of domestic and global opportunities. GCI is based on 12 indicators and these indicators attempt to capture entrepreneurial culture, companies embracing disruptive ideas, multi-stakeholder collaboration, critical thinking, meritocracy, social trust along with traditional components such as infrastructure (ICT and physical), macroeconomic stability, property rights, and education. Thus, according to World Economic Forum, competitiveness of a country is comprised of set of institutions, policies, and factors that determine the productive potential or preparedness of a country to reap benefits of business opportunities. Further, recent research discussed above has shown the beneficial effects of how well integrated a country (foreign trade and foreign direct investments) on GDP. In this changed environment of a more interconnected world and the benefits of greater integration of an economy with the rest of the world, it is useful to understand how pre-existing competitiveness of a country (as measured by Global Competitive Index) impacts GDP directly and also indirectly via FDI. Further, competitiveness may influence logistics performance (the ability to move goods & services within

and across countries). Better logistics may positively impact productivity and thus GDP directly. Similarly, foreign trade may influence GDP directly as well as indirectly via FDI and logistics performance. Though researchers have found correlations between foreign trade and logistics performance, the causality between the two has been an underdeveloped area of research. In addition, both foreign trade and logistics may influence GDP.

Thus, it may be useful to examine the role of competitiveness, logistics performance, foreign trade and FDI in economic growth. The formal legal framework and informal norms of behavior can lower transaction cost and thus become an important determinant of foreign trade and investments (North, 1990). The ability to reduce transaction costs could have direct as well as indirect impact on a nation's GDP. Thus, this paper attempts to contribute to the developing literature that examines the impact of competitiveness and foreign trade directly on GDP as well as indirectly via FDI and logistics. Since the attempt is to measure direct as well as indirect effects on GDP, path analysis technique is deemed appropriate to estimate the relationships between variables.

The paper is organized in five sections, including the Introduction. Section two reviews the literature and develops the hypothesis. The third section discusses the selection of variables, their definition, sources of data, summary of hypothesis, and justification for use of appropriate statistical technique. The fourth section discusses statistical results of the estimated model. The fifth section summarizes the highlights of our findings and suggests potential for further research.

## **LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT**

Given the complex relationships between variables, literature and hypothesis development is organized in the following manner, where we discuss the relationship between two variables at a time: (a) Competitiveness and FDI; (b) Competitiveness and GDP; (c) Competitiveness and Logistics Performance; (d) Trade Turnover (sum of merchandise exports and imports or foreign trade) and FDI; (e) Trade Turnover and GDP; (f) Trade Turnover and Logistics Performance; (g) FDI and GDP; (h) Logistics Performance and GDP.

### **Competitiveness and FDI**

The World Economic Forum has been publishing GCI annually since 2004 and according to the report, competitiveness is defined as the set of institutions, policies, and factors that determine the level of productivity of a country. Since

productivity is an important determinant of economic growth, more competitive countries attain higher level of economic growth. Productivity also influences rate of return on investments and thus promotes higher level of investments, both domestic and foreign (Porter, 1990; Ozawa, 1992; Wyokinska, 1998). Although the effects of FDI on various aspects of competitiveness (such as productivity, labor, human capital and innovation (Aldaba and Aldaba, 2010; Basu *et al.*, 2003)) have been found in literature, overall competitiveness, as a determinant of FDI, still needs to be studied. The relationship between various aspects of competitiveness and FDI have been addressed by some studies. For example, Ismael and Yussof (2003) found that different aspects of the labor markets in Malaysia, Thailand and the Philippines determined FDI inflows. Narula and Wakelin (1998) found technology and human capital to be important in attracting FDI inflows in industrial countries and labor cost advantage and opportunity to extract natural resources to be an important factor in attracting FDI inflows in developing countries. The relationship between overall competitiveness and FDI inflows is well illustrated in the case of Georgia (Schueth, 2010). The Georgian government, by undertaking various policy reforms, improved country's ranking in the World Bank's Ease of doing Business and in the World Economic Forum's GCI. As a result of this policy reform, FDI inflows tripled between 2005 and 2007. This leads to the following hypothesis:

*Hypothesis 1: Competitiveness will positively predict FDI inflows.*

### **Competitiveness and GDP**

For the last 2 to 3 centuries, economists/philosophers have looked for important factors that explain wealth of nations or differences in GDP across nations. While Adam Smith, in 18th century, argued that division of labor and specialization lead to differences in wealth of nations, Thomas Malthus and David Ricardo believed that diminishing returns reduces long term economic growth. Neo-classical economists of the 20th century emphasized the role of physical capital and infrastructure in economic growth of nations. Empirical evidence shows that developing countries failed to grow despite huge investments. Economists then looked for other determinants of economic growth such as human capital, technical progress, macroeconomics stability, good governance, rule of law, lack of corruption, well-functioning institutions, firm sophistication, demand conditions, market size, etc. Research shows that all these factors explain economic growth of nations. GCI, published by World

Economic Forum since 2004, as discussed earlier, attempts to capture all these components via 12 different pillars – institutions, infrastructure, macroeconomy, health and primary education, higher education and training, goods market efficiency, financial market sophistication, technological readiness, market size, business sophistication, and innovation. These factors reflect competitiveness of a country and also a country's readiness to grow in this fast-changing environment.

World Economic Forum finds a strong correlation between GCI and level of GDP. Using panel Granger causality analysis for 114 countries between 2006 and 2014, Kordalska and Olczyk (2016) found a strong uni-directional causality between GCI and economic growth. They also found that GCI successfully explains economic growth amongst different groups of countries classified according to income levels. Dadgar, Nazari, and Fahimifar (2018) examined the role of GCI on economic growth of high income and upper middle- income countries during 2006-2016 and found positive and significant role of competitiveness on economic growth of nations in these two categories.

*Hypothesis 2: Competitiveness will positively predict GDP.*

### **Competitiveness and Logistics Performance**

The ability of a firm or a country to move goods and services quickly and at lower costs (logistics performance) is an important component of a firm's or a country's competitiveness (Porter 1985). Serhat and Harun (2011), in a study of 155 countries, found a strong positive correlation between logistics performance and national competitiveness. Lee and Van Wyk (2015a, 2015b) also found a positive correlation between the two variables. A number of other studies have found strong relationship between logistics performance and a nation's competitiveness (Lakshmanan and Anderson 2002; Navickas *et al.* 2011; Ravn and Mazzenga 2004; United Nations 2002; World Trade Organization 2004). Results show that the differences in high and low competitiveness are related to logistics infrastructure. Better logistics performance increase business turnover by lowering costs and improving a firm's response time (Poon and Lau 2000; Dumond 1996). Thus, competitive pressures may influence logistics performance viz., the ability to move goods and services within and across countries. This leads to the following hypothesis:

*Hypothesis 3: Competitiveness will positively predict logistics performance.*

### **Trade Turnover and FDI**

In International Economics, the relationship between trade turnover and foreign direct investments has been examined in great detail. Economists argue that type of FDI may negatively or positively impact trade turnover. For example, “market-seeking” FDI may displace domestic production. On the other hand, “resource-seeking” or “efficiency-seeking” FDI may spur trade turnover (UNCTAD 2006). The relationship between trade turnover and FDI has also been examined under the framework of Heckscher-Ohlin model. Trade turnover, if based on factors such as differences in technology or differences in firm – specific assets, etc., complements FDI i.e. higher trade turnover will lead to higher FDI (Markusen 1998). If, on the other hand, trade turnover is based on differences in factor endowments (such as labor and capital), then trade turnover will lead to equalization of factor returns and thus trade turnover and FDI become substitutes of another i.e. higher trade turnover will lead to lower FDI. Based on aforementioned discussion, the following hypothesis is offered:

*Hypothesis 4: Trade turnover will positively predict FDI inflows.*

### **Trade Turnover and GDP**

The last three centuries have shown a positive correlation between trade turnover and GDP. Correlation does not imply causation, but international economists believe that by gearing production towards world markets enables firms to reap benefits of economies of scale and also force them to stay competitive by becoming more innovative by introducing new products and also by undertaking cost-cutting measures. Thus, export growth may lead to higher productivity and thus enable higher levels of GDP. An increase in export earnings may also lead to import liberalization that enable making better inputs (intermediate capital, or technology) available at lower costs and all this helps production geared toward domestic as well as foreign markets. As stated earlier, Grossman and Helpman 1991 also emphasized the role of knowledge diffusion through foreign trade and FDI. It is entirely possible that higher imports due to import liberalization may lead to a significant displacement of domestic firms and thus negatively impact GDP. However, we believe that the negative impact should not be a universal phenomenon and thus, which leads to the following hypothesis:

*Hypothesis 5: Trade turnover will positively predict GDP.*

### **Trade Turnover and Logistics Performance**

Logistics represents methods and procedures a country uses to move goods and services within and across borders. Infrastructure, procedures, regulations, geographic characteristics and even political economy play a role in defining the strength of country's logistics. It is important for sellers to reach out to a larger population or market, domestically as well as internationally. For consumers, it is important to have more buying options. All this is possible, when we can move goods and services efficiently. Inability to do so, prevents an economy to reap gains from economies of scale, innovation, staying competitive, etc. Desire to export and import more and more, may put pressure on the country to create an environment to undertake policies that support the physical movement of goods, commerce within and with other countries (The World Bank, 2018).

According to the World Bank 2007, high logistics costs and low levels of service restrict trade turnover and FDI and thus reduce potential for economic growth. For example, consider the case of landlocked Chad and a landlocked country in East Europe – a container shipped from Shanghai would cost \$6,500 and take 10 weeks to ship to Chad as compared to \$3,000 and 4 weeks when shipped to a landlocked European country. As stated earlier, economic liberalization and technical progress have created immense opportunities for various countries to exploit world markets for economic growth. In addition, production networks and expanded supply chains highlights the importance of moving goods and services in timely, cost-effective, and predictable manner. Thus, a country like Chile can be a major player in the high-end world food market, supplying fresh fish and perishable fruits to consumers in Asia, Europe, and North America.

International logistics and trade turnover have an inseparable and complementary relationship. This relationship is dynamic and, as in the case of China, international logistics grew because of pressure to engage in trade turnover and later, international logistics helped higher trade turnover (see, for example, Jian and Wu, 2017). A number of researchers have examined the relationship between logistics and trade turnover. Using VAR model, studies examined the relationship between logistics and trade turnover on the basis of bilateral trade between countries – for example, Tongzon and Nguyen (2009) found that trade turnover accelerated the development of international logistics. Nguyen and Tongzon (2010) also found lagged growth of logistics failed to promote trade turnover. Yang (2007) found bilateral causality between the



logistics and trade turnover. On the other hand, Wang and Wang (2011) and Gao and Meng (2012) found a significant influence of international logistics on trade turnover and did not find evidence of causality from trade turnover to logistics in the case of Taiwan and Guangdong province in China. Given such mixed results from research, we test whether trade turnover is a driver of logistics development.

*Hypothesis 6: Trade turnover will influence logistics performance.*

### **FDI and GDP**

The relationship between FDI and GDP has been examined extensively in economics literature. FDI can directly impact GDP by raising total investments and employment. Further, better use of technology and management techniques may lead to higher productivity and thus impact GDP directly. FDI may also impact GDP indirectly via spill-over effects such backward and forward linkages (Hirschman 1958). Empirical research shows that positive or negative impact of FDI on GDP depends on a number of factors such as pre-existing economic conditions (such as trade and investments environment, macroeconomic stability, infrastructures, labor market conditions, human capital, etc.), type of FDI, firm-specific characteristics, etc. (See, for example, Blomström *et al.* 2000; Basu *et al.* 2003; De Vita and Kyaw 2008). For example, protectionist trade policies may encourage “market-seeking” FDI, based on tariff jumping, may result in replacement of domestic production by FDI. Similarly, the beneficial effects of “resource-seeking” FDI were not realized in Africa. However, “efficiency-seeking” FDI may contribute to higher GDP, particularly when recipient countries are able to exploit spill-over effects to their advantage as in the case of East Asian nations such as Japan, South Korea, Taiwan, and China. Thus, it is not surprising that researchers have found mixed results with respect to effect of FDI on GDP (see, for example, Nair- Reichart and Weinhold 2001; Zhang 2001). This leads to the following hypothesis:

*Hypothesis 7: FDI inflows will positively predict GDP.*

### **Logistics Performance and GDP**

Higher efficiency to move goods and services within a country, using new management techniques, better policy environment, and new technologies leads to reduction in transaction costs and this enables productivity gains and thus GDP. In addition, investments in infrastructure (railways, roads & road transport,

ports, electricity generation) may lead to more employment and income and thus benefit GDP.

Logistics is a network of services that support the physical movement of goods, trade across countries, and commerce within a country (The World Bank, 2018). It is likely that, *ceteris-paribus*, efficient logistic network, by reducing transaction costs, will encourage trade turnover and make countries attractive destination for foreign direct investments. According to the World Bank, inefficient logistics raises the cost of doing business and reduces the potential for both international and domestic integration. Thus, it is not surprising that an effective logistics sector is now recognized as one of the core enablers of economic development. In a highly competitive world, the quality of logistics can have a major bearing on a firm's decisions about which country to locate in, which buyers to buy from, and which consumers market to enter. According to the World Bank 2007, high logistics costs and more importantly, low levels of service are a barrier to trade and foreign direct investment and thus to economic growth.

Consider the case of fast-growing China. China recognized the importance of logistics in economic growth and put forth 'Top Ten Industry Promotion Planning' in 2009 and logistics was the only service industry to be included in this document. Though a large number of previous studies have examined the link between parts of the logistics sector (for example, public expenditure on ICT, transport and infrastructure, etc.), not much work has been done to investigate the link between logistics performance and economic growth. Efficient logistics reduce the cost of goods & services from the producer to the consumer and thus raise productivity and hence economic growth. Better logistics also attract FDI.

Chu (2012) examined the link between logistics and economic growth in 30 provinces in China from 1998 – 2007 using conditional convergence framework with the dynamic approval found that logistics investments (sum of public and private expenditures) does positively influence growth of real GDP per capita across 30 provinces in China. He found that investing in logistics is significant for fostering economic growth, especially for relatively underdeveloped regions.

*Hypothesis 8: Logistics performance will positively predict GDP.*

## **DATA AND METHODOLOGY**

The data for the present study were obtained from the international organizations' websites such as the United Nations Conference on Trade and

Development (UNCTAD), the World Bank, and the World Economic Forum. Global Competitiveness Index, attempts to capture different dimensions of competitiveness through 12 pillars of competitiveness, is compiled for each country on annual basis by the World Economic Forum. Data on merchandise exports, merchandise imports, and inward FDI flows (US\$ in millions) were obtained from World Investment Report of the UNCTAD website. Merchandise exports and imports are aggregated to compute trade turnover for each country. The data on LPI and GDP at purchaser price (US\$ in millions) were obtained from World Development Indicators available at the World Bank. For purposes of testing the model, we have used data for 123 countries (only those countries for which data for all variables under consideration were available) for the year 2016, the latest year for which data were available at the time of research. Table 1 on data sources below summarizes the measure, variable, brief description of the variable, and the source of the data.

**Table 1: Data Sources**

<i>Measure</i>	<i>Variable</i>	<i>Description of the variable</i>	<i>Data Source</i>
Competitiveness	COM	12 pillars of global competitiveness	World Economic Forum
Logistics Performance Index	LPI	6 dimensions of trade — including customs performance, infrastructure quality, and timeliness of shipments	The World Bank
Trade Turnover	TRA	Merchandise exports plus imports	UNCTAD
FDI (Foreign Direct Investment)	FDI	Inward foreign direct investment flows	UNCTAD
GDP (Gross Domestic Product)	GDP	The sum of gross value added by all resident producers in the economy plus any product taxes, minus any subsidies not included in the value of the products.	The World Bank

Our review of literature shows that competitiveness impacts both FDI and GDP and FDI impacts GDP. Further, trade turnover impacts FDI, logistics performance, and GDP. Also, logistics performance impacts GDP. Thus, based on our survey of literature, the following is a summary of hypotheses to be tested.

**Table 2: Summary of Hypothesis to be tested**

<i>Hypothesis</i>	<i>Description</i>
H1	Competitiveness will positively predict FDI inflows.
H2	Competitiveness will positively predict GDP.
H3	Competitiveness will positively predict logistics performance.
H4	Trade turnover will positively predict FDI inflows.
H5	Trade turnover will positively predict GDP.
H6	Trade turnover will influence logistics performance.
H7	FDI inflows will positively predict GDP.
H8	Logistics performance will positively predict GDP.

As far as we are aware, almost all the research reviewed have used regression analysis using one endogenous and multiple exogenous variables. Based on our review of the literature and our postulated hypothesis, it is clear that the relationships are more complex and the relationships cannot be tested through use multiple regression analysis. For example, Competitiveness (COM) impacts both foreign direct investment (FDI) and Gross Domestic Product (GDP) and, at the same time, FDI impacts GDP. Thus, COM can impact GDP directly and also indirectly via FDI. Similarly, trade turnover (TRA) impacts FDI, logistic performance index (LPI) , and GDP or trade turnover impacts GDP directly and indirectly via FDI and LPI. These complex relationships, where we need to include both direct and indirect effects can be estimated by path analysis.

Path analysis is to test causality between multiple independent variables and multiple dependent variables. Unlike structural equation method, which also tests relationship between multiple independent constructs and multiple dependent constructs but uses latent variables, path analysis uses only observed variables (Wright 1918). Path analysis is, however, by no means restricted to causal relations (Wright 1954). Lee and Van Wyk used path analysis to examine the influence of multiple institutional constructs on logistics (2015a). As such, path analysis is used to test for chain of influence (where we can identify variables that have a mediating impact of a variable on relationship between two variables). Based on the importance of the role of mediating factors in relationship between variables, we chose path analysis for estimation.

Based on postulated hypotheses, the following diagram provides a model depicting complex relationship between variables.

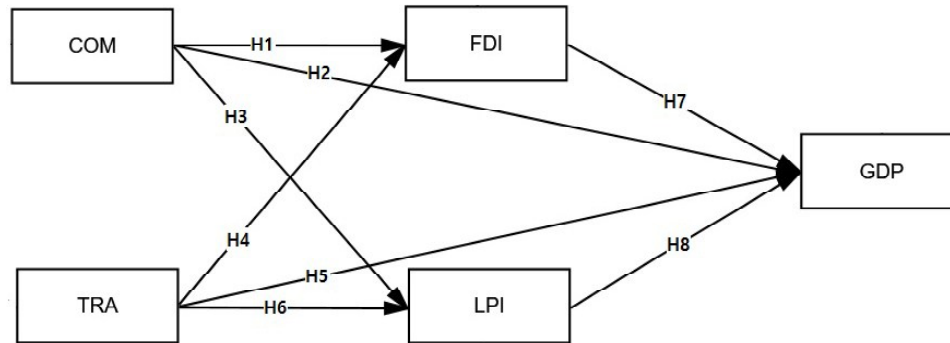


Figure 1: Research model with the hypotheses

## DISCUSSION OF RESULTS

The aforementioned path analysis model was estimated using AMOS. Based on various criteria, our results indicate an overall good fit of the model. One, Chi-square statistic is 0.768 ( $\chi^2$  (CMIN) with degrees of freedom =1). Thus, the normalized  $\chi^2$  that is adjusted for degrees of freedom (CMIN/DF) is 0.768, and this value is below the maximum recommended value of 2 for the model to be acceptable. Therefore, Chi-square values suggest a good model fit. Two, RMSEA (Root Mean Square Error of Approximation) is .000, which is less than 0.06, the recommended maximum acceptable value. The baseline comparisons, including NFI (Normed Fit Index), RFI (Relative Fit Index), IFI (Incremental Fit Index), TLI (Turker-Lewis Index) and CFI (Comparative Fit Index), have values close to or greater than 0.9, the minimum acceptable value for a good model fit. Three, PNFI (Parsimonious Normed Fit Index) and PCFI (Parsimonious Comparative Fit Index), the parsimony-adjusted measures, have somewhat lower values for both indices. Based on the rules suggested for acceptable model for fit indices, the path model fits the data reasonably well (Bentler and Bonett, 1980; Bagozzi and Yi, 1988; Byrne, 2001). Table 2 below summarizes the values of the fit indices for our model.

Table 3: Model fit indices

$\chi^2_{\text{GoF}}$	<i>df</i>	<i>NFI</i>	<i>RFI</i>	<i>IFI</i>	<i>TLI</i>	<i>CFI</i>	<i>PNFI</i>	<i>PCFI</i>	<i>RMSEA</i>
0.768	1	0.998	0.982	1.002	1.006	1.000	0.100	0.100	0.000

Table 3 below presents results of estimation, including the properties of the causal paths, including unstandardized path coefficients, standardized

coefficients ( $\beta$ ), standard errors, critical ratios, p-values, and whether the hypothesis is statistically supported by our results.

**Table 4: Results of path analysis**

<i>H</i>	<i>Path</i>	<i>Unstandardized Coefficient</i>	<i>Standardized Coefficient (<math>\beta</math>)</i>	<i>Standard Error</i>	<i>Critical Ratio</i>	<i>p-value</i>	<i>Supported?</i>
H1	FDI $\leftarrow$ COM	23316.74	0.482	4183.76	5.57	***	Yes
H2	GDP $\leftarrow$ COM	49931.56	0.015	275392.18	.18	0.86	No
H3	LPI $\leftarrow$ COM	0.771	0.856	.042	18.46	***	Yes
H4	FDI $\leftarrow$ TRA	-72.11	-0.131	47.654	-1.51	0.13	No
H5	GDP $\leftarrow$ TRA	-8779.30	-0.239	1583.44	-5.54	***	No
H6	LPI $\leftarrow$ TRA	0.001	0.058	.000	1.26	0.21	No
H7	GDP $\leftarrow$ FDI	57.02	0.853	2.96	19.25	***	Yes
H8	GDP $\leftarrow$ LPI	210825.81	0.059	296670.90	.71	0.48	No

*Note:* \*\*\* indicates significant 5% level, |Critical Ratio| > 2.58

Hypothesis 1 states that COM will positively influence FDI inflows. Since the effect of COM on FDI is positive and statistically significant ( $\beta = 0.482$ ,  $p < 0.01$ ), Hypothesis 1 is supported. Hypothesis 2 is not supported because the effect of COM on GDP is not statistically significant at 5% level. Hypothesis 3, that postulates that COM will positively influence LPI, is supported ( $\beta = 0.856$ ,  $p < 0.01$ ). Our results show a negative relationship between TRA and FDI, suggesting that trade turnover is based on differences in factor endowments across 123 countries in our sample. However, the relationship is not statistically significant and thus Hypothesis 4 is not supported by our estimated model. Hypothesis 5 states that TRA will have a positive influence on GDP. Our results show that though the relationship between TRA and GDP is statistically significant ( $\beta = -0.239$ ,  $p < 0.01$ ), the direction of the relationship is contrary to what is hypothesized. As mentioned earlier, it is entirely possible that higher trade turnover (particularly imports) led to significant displacement of domestic industries in 2016. However, this needs to be investigated further, but falls outside the purview of current research. Hypothesis 6 is not supported because the effect of TRA on LPI, though positive, is not statistically significant. Hypothesis 7 states that FDI inflows will positively influence GDP. The results indicate that FDI inflows have a positive and statistically significant on GDP ( $\beta = -0.853$ ,  $p < 0.01$ ) and thus Hypothesis

7 is supported by our estimated model. Hypothesis 8 is not supported because the effect of LPI on GDP was not significant.

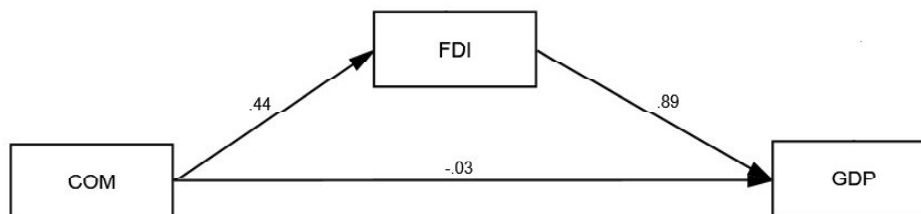
Thus, our results show positive and statistically significant impact of COM on FDI, FDI on GDP, and no statistically significant impact of COM on GDP. It is entirely possible that COM impacts GDP via FDI. To investigate the mediating effect of FDI between COM and GDP, we followed the steps suggested by Hair *et al.* (2006) based on earlier work of Baron and Kenny (1986). In addition to the bivariate significances, a path analysis also allows testing of mediation effects. According to the results stated above, there is one significant path sequence existing from competitiveness to FDI and from FDI to GDP. The first condition for a mediation effect is that the correlations of the three bivariate relationships must be significant. Partial correlation coefficients summarized in Table 4 below indicate that correlation coefficients between competitiveness and FDI, FDI and GDP, and competitiveness and GDP are all statistically significant at 1% level.

**Table 5: Partial Correlations between Competitiveness, FDI, and GDP**

	<i>Competition</i>	<i>FDI</i>	<i>GDP</i>
Competition	1	0.44**	0.35**
FDI	0.44**	1	0.87**
GDP	0.35**	0.87**	1

Note: \*\* indicates significant 1% level.

The second step is to test the mediation model and see how the mediating variable changes the path loading between the independent variable and the dependent variable. Figure 2 is the mediation model in AMOS and Table 5 summarizes the results of estimation.



**Figure 2: Mediation model in AMOS**

**Table 6: Result of Mediation model**

<i>Path</i>	<i>Unstandardized Coefficient</i>	<i>Standardized Coefficient (<math>\beta</math>)</i>	<i>Standard Error</i>	<i>Critical Ratio</i>	<i>p-value</i>
FDI←COM	21041.15	0.44	3940.56	5.34	***
GDP←FDI	59.39	0.89	3.28	18.09	***
GDP←COM	-110528.02	-0.03	158681.67	-0.70	0.49

*Note:* \*\*\* indicates significant 5% level.

A bivariate correlation test of COM and GDP was significant ( $\beta=0.352$ ,  $p=.000$ ) as shown in Table 4. However, when introducing FDI as a mediating variable, as shown in Figure 2, the path COM and GDP became insignificant ( $p=0.486$ ) as indicated in Table 5. Baron and Kenny (1986) called this ‘complete mediation’. The next step is to test the significance of the indirect effect of COM on GDP. A bootstrap approximation in AMOS revealed that the standardized indirect (mediated by FDI) effect of COM on GDP is statistically significant ( $p = 0.02$ ) at 5% level as shown in Table 6.

**Table 7: Standardized indirect effects**

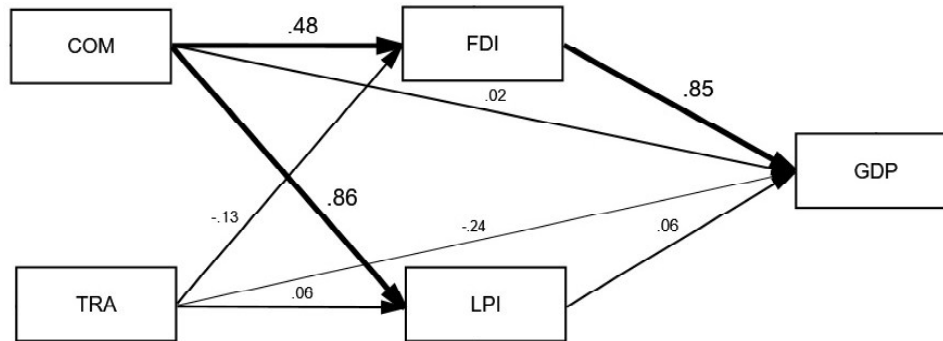
	<i>TRA</i>	<i>COM</i>	<i>FDI</i>	<i>LPI</i>
FDI	...	...	...	...
LPI	...	...	...	...
GDP	0.56	0.02	...	...

The next step is to estimate the total effect, which is the direct effect plus the indirect effect. As shown in Table 3, the direct (unmediated) effect that COM had on GDP is not significant. Therefore, the total effect of competitiveness on GDP is only the indirect effect through FDI, which is the product of the paths from competitiveness to FDI and FDI to GDP ( $0.48 \times 0.85 = 0.41$ ). Due to the indirect (mediated) effect, when competitiveness goes up by 1 standard deviation, GDP goes up by 0.41 standard deviations only through FDI. Figure 3 shows the significant paths of the research model in bold.

## CONCLUSION AND SUGGESTIONS

This study has examined the complex relationship between competitiveness, FDI inflows, trade turnover, LPI, and GDP for a set of 123 countries (all countries for which data on various variables proposed in this study were





**Figure 3: Standardized path loadings**

available) for 2016 using path analysis. Our results indicate positive and significant relationship between competitiveness and FDI and also between competitiveness and LPI. Our results also find a positive and significant relationship between FDI and GDP but not between competitiveness and GDP. Based on earlier works of Hair et.al. (2006) and Baron and Kenny (1986), we tested for mediating effect of foreign direct investment in the relationship between competitiveness and GDP. Our results confirmed what Baron and Kenny (1986) have called ‘complete mediation’ when a significant relationship between competitiveness and GDP becomes insignificant with the introduction of FDI. This result highlights the importance of competitiveness in inviting FDI inflows, which in turn have a positive influence on GDP. This result confirms the earlier findings of separate studies that find influence of competitiveness on FDI and influence of FDI on GDP. Our results also indicate the positive role of competitiveness in LPI. Contrary to expectations, our model found to no statistically significant impact of trade turnover on LPI and also no statistically significant impact of LPI on GDP. Our model shows a negative and statistically significant relationship between trade turnover and GDP. This result is surprising, as far as we know, there is no evidence of large-scale displacement of domestic production due to imports (or import liberalization).

The results of this paper, though useful for academics and policy makers, need to be replicated for other years to confirm the findings and also to test how relationships between variables evolve overtime. Future studies may find more dynamic relationships between the institutional variables using latent variables. Structural equation modeling with latent variables can investigate the relationships between the changes of institutional variables over a certain period of time.

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