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Global Competitiveness and Potential for Higher Exports

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Aamir Hussain Siddiqui[1*] | Syed Ammad Ali[2] | UsmanAzhar[3]

Abstract

The objective of this research is to examine the possibility of higher export level for the countries which have a higher level of competitiveness. The study has taken the Global Competitiveness Index (GCI) as a proxy for the level of Competitiveness and the countries are divided into high and low export countries on the basis of export volume. Furthermore, the study also analyzes the relative efficacy of different components' of competitiveness index. The estimated results based on the binary probability distribution model showed a positive relationship between higher export level probability and level of Competitiveness. This result is consistent with the hypothesis that the economies having higher levels of competitiveness would have greater possibilities of generating higher exports. GCI is considered as most acceptable index for measuring competitiveness level of a country in the globalized economic system. However, realization of importance through empirical investigation is almost negligible, particularly for the developing countries. The results suggest that developing countries should concentrate on enhancing competitiveness level to achieve the goal of higher exports. The result further suggested that the sub-index "basic requirement" is more important for the enhancement of exports and countries should concentrate on improving the pillars of basic requirements for enhancing competitiveness.

Keywords: *Competitiveness, Export, GCI, World Economic Forum, Panel Probit*

JEL Classification: *B17, B27, F13, F16, F17, G12, O24*

Author's Affiliation:

Institution:	University of Karachi[1]	University of Karachi[2]	BUITEMS[3]
Country:	Pakistan	Pakistan	Pakistan
Corresponding Author's Email:	*ahseconomics@gmail.com		

1) INTRODUCTION:

Economic managers of developing countries believe in export-led economic growth (Feder, 1982 and Krueger, 1978, Tyler, 1981; Balassa, 1978) and for this purpose, policies are designed to promote exports through various policy measures. Generally,the ability to export is known as "competitiveness" of any country or product which has different definitions. The International Trade Centre (ITC) definition is attributed to the demonstrated ability to design, produce and commercialize an offer, which fulfills the needs of targeted market segments. A similar definition has also given by UNCTAD (2005) and USESCAP (2009). Porter (1990) also argued that "productivity" is the only instrument through which we can judge a nation's "competitiveness". Although there are some criticisms on the concept of "national competitiveness" by Porter (1990), most important are Krugman (1994) and Lall (2001).

The debate of competitveness is further augmented by Ketels, C. (2010) who explained the concept of export competitiveness in more detailand argued that competitive strategies imply a commitment to enhancingthe performance of the entire economy regardless of just export-oriented sectors, as it is concerned with enhancing the productivity of the entire economy. However, the strategies may be highly country-specific, depending upon the various factors and timing of the implementation of the strategies. He further emphasized that the exports level of any particular industry shows different sets of strengths due to which it is conducive for successful export growth, while low level of exports indicates weaknesses existing which limit the productivity of companies' capabilities to access international markets. This fact implies that the policymakers should consider all the relevant factors which increase the productivity of any particular industry or sector which is essential for sustainable high-level export growth.

On the other hand, the World Economic Forum (WEF) argued that higher productivity is "competitiveness," and it developed 12 pillars that determine the level of "competitiveness". Through these 12 pillars, WEF estimates an index of competitiveness called "Global Competitiveness Index (GCI) for most of the countries, every year. This competitiveness index is used by most of the countries to assess their level of competitiveness.

On the other hand, the World Economic Forum (WEF) defined competitiveness as the productivity level of a country which is affected by a set of socio economics conditions. The forum declare 12 pillars of competitiveness, which consist of 114 variables. These pillars are further divided into three sub-indexes; (1) basic requirements, (2) efficiency enhancers and (3) innovation and sophistication factors. These 12 pillars are interdependent and every pillar reinforces the others for attaining a higher competitiveness level. A summary of the variables and pillars is given in table-1 below, that measuring the overall Global Competitiveness Index (GCI).

Table 1

GCI measurement

Sub-Indexes	Pillars		Number of variables
basic requirements	1st	Institutions	21
	2nd	Infrastructure	9
	3rd	Macroeconomic environment	5
	4th	Health and primary education	10
efficiency enhancers	5th	Higher education and training	8
	6th	Goods market efficiency	16
	7th	Labor market efficiency	10
	8th	Financial market development	8
	9th	Technological readiness	7
	10th	Market size	4
innovation and sophistication factors	11th	Business sophistication	9
	12th	Innovation	7

Another important factor while measuring the overall index (the GCI) of a country is that the sub-indexes are given different weights, depending upon the development level of the economies. The development level of any country is proxied by its per capita GDP, which is adjusted by the share of raw material exports. This is summarized in Table-2.

Table 2

Sub-index weights and income threshold for different level of development

Items	**Stages of Development**				
	Stage – 1 Factor Driven	**Stage – 2 Transition Stage 1–2**	**Stage – 3 Efficiency Driven**	**Stage – 4 Transition Stage 2–3**	**Stage – 5 Innovation Driven**
Per Capita GDP threshold (in US$)	**<2,000**	**2,000-2,999**	**3,000-8,999**	**9,000-17,000**	**>18,000**
Weight for basic requirements	60%	40%-60%	40%	20%-40%	20%
Weights for Efficiency Enhancer	35%	35%-50%	50%	50%	50%
Weight for Innovation and Sophistication Factor	5%	5%-10%	10%	10%-30%	30%

The GCI considered almost all relevant and important economic variables thatare necessary for higher productivity level and hence for “competitiveness”. As

mentioned earlier that there are 12 different pillars which are seen as contributing to affect the competitiveness of any country. There are 114 economic and social variables which are fit into these 12 pillars. These variables include both numeric values of economic variables and a significant number of opinion polls. It is important to mention here that the numbers of variables generated through opinion polls are greater than the economic variables measured by numeric statistics. However, the Global Competitiveness Index is the most significant available source or dataset on competitiveness.

According to the Global Competitiveness Report 2018, a positive relationship between GCI and real GDP growth rate is statistically proven. However, a more logical relationship needed to be examined i.e. the relationship between GCI and export.

In order to fill this gap the core objective of this research is to analyze the possibility of higher export level for the countries which have a higher level of competitiveness(GCI-Index). In other words, this article would seek the answer as to what extent a country having a higher competitiveness level would have a higher export level. The GCI scores would be considered as competitiveness level, where a higher the GCI value means the higher the level of competitiveness. Furthermore, this study will also shed the light on the relative efficacy of all three sub-indexes i.e. basic requirements, efficiency enhancers and innovation & sophistication factors.

The rest of the study is divided as follows. Section-II reviews the literature and empirical findings where the role of competitiveness is discussed, Section-III explains the construction of our economic models based on our objectives and previous research studies, Section-IV explains data and methodology to be used for empirical analysis, Section-V presents the results of the estimation and the concluding remarks and policy implications are expressed in section-VI

2) LITERATURE REVIEW:

The Global Competitiveness Index(GCI), nowadays, is being considered as standard for measuring the competitiveness of any economy. The contemporary literature also discuess this issue, various authors examined different relationship between GCI and macroeconomics indicators; especially economic growth. is now focusing with various studies which and empirical works relating to GCI are not very large.However, some important recent studies have been discussed in the following paragraphs.

There is an ongoing debate in the literature on the conceptual meaning of competitiveness;Krugman (1994) discussed this concept in the light of the competitiveness of a country. He stated that the concept of competitiveness is meaningless concerning national economies, as it is firms that compete in the market not nations.Krugman's criticism is further confirmed by Smit (2010). Furthermore,Lall (2001) who rose important questions regarding GCI measurements and called it 'misleading'. He first disputed its assumption that the markets are efficient and policy intervention must be market-friendly. In developing countries,

market failure called for selective responses. Second,WEF's broader definition of 'competitiveness' diverts the concept from direct competition between countries. He is of the view that this is a business strategy that has been transposed to the national level which could not work well. Most importantly, quantitative data (opinion surveys) are highly dubious, as the extensive use of the company's managers' responses, with many questions posed in an unclear manner. He, therefore, proposed for benchmarking of national competitive capabilities.

The relationship between competiteveness and economic growth is also examined by few authors as Xia R. (2012) used the Total Entrepreneurial Activities (TEA) Index and compared it to GCI's effect on economic growth for 40 developing countries and found that GCI has weaker predictability with regards to economic growth. Petryle, V. (2016) also proved that there is no relationship between the GCI scores and GDP growth of the respective countries. Her finding concluded that GCI scores do not demonstrate the resilience of countries to the economic crisis.

In addition to these findings,some studies showed a positive relationship between GCI and economic growth. Amar and Hamdi (2012) studied the nexus of competitiveness and economic development of 23 selected African countries. They measured competitiveness through GCI scores and found a positive and significant impact of GCI on the economic development of the African countries. They used panel data for a period covering 2004-2009 and the model was estimated through the fixed-effect method. However, the model didn't incorporate any trade-related variables. Dadgar et al. (2018) investigated the impact of GCI on GDP growth for 37 upper-income group countries and 24 upper-middle-income group countries for the period 2006-2016. Their estimation showed a positive impact of GCI on GDP growth for both groups of countries; however, the coefficient of upper-middle-income countries was higher than the upper-income economies. Kordalska and Olczyk (2016) investigated the causal relationship between GDP growth and GCI for 5 different country groups, created by the World Economic Forum as five different stages of development. They used a panel Granger causality technique to analyze the direction of causality and found unidirectional causality from GDP growth to GCI for most of the economies. Nababan (2019) investigated various aspects of GCI of the ASEAN-7 countries as an illustration of economic development. The objective of the study was to investigate the impact of GDP on GCI scores of the ASEAN-7 countries. The study was unique in the sense that GCI was taken as a dependent variable, where the majority of the studies have analyzed the impact of GCI on economic growth. The models of the study were very simple, where GCI scores were the dependent and GDP were the independent variables. The model was estimated for each of the7 countries and the results werethe same for all countries that growth of GDP has a significant positive impact on GCI scores. All the above studies didn't consider any trade-related or external economic variables for their research.

Kalim et al (2019) hypothesized that GCI could create a favorable environment to affect GDP growth. Their study employed interaction term of GCI and growth of three broader sectors of the economy i.e, Agriculture, Industry and Services. These three sectors' performance, in the presence of higher GCI score, positively affects

GDP growth. The results of the estimation confirmed their hypothesis for 16 low-income countries and showed that Agriculture and Industry have positive while the Service sector showed a negative but significant relationship with the overall GDP growth. Similar to the above studies, this also did not consider the external trade sector.

Athari et al. (2018) investigated the effect of GCI on capital outflow and inflow. This paper is unique as this is the only paper thatestimated international capital mobility. They examined the impact of competitiveness on international capital flows for five different groups of economies according to their developmental level. In fact, the groups are arranged by the World Economic Forum, where stage-1 is for lower developed and stage-5 is for highly developed countries. Their findings showed a positive and significant impact of GCI on capital flows both at aggregated and disaggregated level. The overall capital inflow for countries stage-1 (Factor driven economies) and for stage-5 (innovation-driven economies) showed a positive relationship with GCI scores, while for Capital outflow the relationship was significant and positive for innovation-driven economies only.

Schwab and Sala(2017) showed that there is a strong link between higher competitiveness level and export diversification. They have calculated a correlation between IMF diversification index and GCI scores of various countries for the period 2007-2010 and found a strong link between these indices. According to their calculation countries with high GCI rank have higher export diversification. Contrary to this finding Siddiqui (2018) concluded that GCI has a very weak link to export diversification for Pakistan.

The above discussion showed mixed results for a nexus between GCI and economic growth, while the last three studies showthe diverse type of relationship between GCI and external economic variables. The concept of competitiveness implies that competitive firms have a greater presence in international markets and thus have a larger export volume. But to the best of our knowledge,we didn't find any study which analyzes the effect of GCI on exports. We, therefore, have developed a model that would explain the effect of GCI on the possibility of higher exports. This model is explained in the next section.

Econometric Model and Data Sources:
In order to estimate the probability of being a high exporting country given the value of global competitativeness index(GCI). To focus on this question, we have developed a binary response export demand functions where

$$EXPit=f(GCIit, PGDPit, EXCHit) \text{ ----------(1)}$$

For our model, we have included Competitiveness, Economic Development and Exchange rate as a function of exports. The exchange rate has been taken as an important determinant of exports by various studies such as (Vierira and MacDonald 2016; Wong 2017; Belke and Kronen, 2019; Gellego and Rodriguez 2019 and Oskooee and Arize 2019). Equation (1) has taken GCIit, which is, in fact, the overall GCI score of the country "i" at the time "t". This study would replace

this overall GCI with its sub-indices; basic requirement, efficiency enhancement and innovation drive.

In above models Exp is a latent variable which defines the high export and low export countries, GCI is the index score of global comparativeness (Overall and Sub-Indexes; Basic Requirement, Efficiency Enhancement and Innovation Factor are taken separately), PGDP is the Per Capita GDP and EXCH is the exchange rate in terms of per US$. Since the dependent variable is binary nature and it takes value 1 if a country's annual exports more than US$ 50 billion otherwise zero, we, therefore, applied a discrete choice Panel Probit model. Where

$$Exp_{it} = \begin{Bmatrix} 1 if\ Exp_{it}{}^{*} > 50 billion \\ 0 if\ Exp_{it}{}^{*} \leq 50 billion \end{Bmatrix}$$

Using this definition of denpendent variable (Expit) a model for response probability, P(Expit=1), can be established as

The probability of a high export country over a low-income country can be model through the cumulative normal probability distribution function as equation 2.

$$P(Expit = 1 | X it) = \Phi(X' it\ \beta) = \Phi(Zi) \text{----------(2)}$$

The above equation-2 Probit model follows the cumulative distribution of a normal variable, which lies $0 \leq P \leq 1$, which is represented by Φ, X is a vector of explanatory variables which are the variable of interest and β is the vector of estimated probit coefficients. The index i indicates the countries and t is time period.

$$P(Exp_{it} = 1 | X_{it}) = \Phi(X'_{it}\beta) = \int_{-\infty}^{X'_{it}\beta} \Phi(s)ds = \int_{-\infty}^{X'_{it}\beta} \frac{1}{\sqrt{2\pi}} e - \frac{1}{2} s^2 ds \text{ ----------(3)}$$

To estimate the specific effect of explanatory variables on the probability of explained variable margins are estimated as

$$\frac{\partial P(Y_t=1 | X_t)}{\partial X_{tj}} = \beta_j \emptyset(X_t\beta) \text{----------(4)}$$

The study covers 138 countries across the globe and all the data is procured from the World Bank data tools, which comprises on 2008 to 2017. However due to some missing observations an unbalance panel is constituted. Data for EXPis procured from UNCOMTRADE through WITS. Data for PGDP and Exchange rate is taken from World Development Indicators (WDI) and data for GCI is taken from TCdata260 which is also administered by the World Bank.

3) ESTIMATED RESULTS:

The average marginal effect of estimated models is shown in table-3.This is estimated based onprobit estimation presented in table-4. The estimated average marginal effects show that log of GDP per capita(LnGDP), and exchange rate(EXCH) is highly significant with positive signs for all models,

However, our major variable GCI overall and three sub-indexes have shown, to some extent, mixed results. Model 1, 2 and 4, which has taken overall, basic requirements and innovation factors, have shown a positive and highly significant relationship, while model-3, which has taken the GCI sub-index of "efficiency enhancement" has shown a weaker relationship.

Table 3 Average Marginal Effects

Dependent: Export(EXPRT)= 1 if Annual Export> US$50 Billion				
Explanatory Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**
LnGDP	0.1593724* (0.0204262) [0.000]	0.1208986* 0.0299174 0.000	0.1690006* 0.02994 0.000	0.1797856* 0.017511 0.000
EXCH	0.0000209* 0.00000549 0.000	0.0000325* 0.00000605 0.000	0.0000239* 0.00000755 0.002	0.0000329* 0.00000533 0.000
GCI_Overall	0.1337659* 0.0417489 0.001			
GCI_Basic Requirement		0.1395793* 0.0432358 0.001		
GCI_Efficiency			0.1201364 0.0749663 0.109	
GCI_Innovation				0.0601141* 0.0211931 0.005
Log likelihood	-167.78068	-167.69763	-171.13138	-167.48095
Prob> chi2	0.0000	0.0000	0.0000	0.0000
Prob>= chibar2	0.0000	0.0000	0.0000	0.0000
Wald chi2(4)	154.84	188.71	151.65	303.01
Note: * indicates significant at 1% level, values in () are the standard errors and values in [] are the p-values				

Its level of significant is closed to 11 percent and in various studies, this is broadly considered as insignificant. The coefficient of log of GDP per capita indicates that a unit change is per capita GDP will increase the probability to become a high export country is varied from 12% to 17% for all 4 models. The global competitiveness also has a positive significant effect and increases the probability for a country to move towards the high export countries. For Model-1, a unit increase in the GCI_ Overall score would increase the probability of higher exports to 13%. Model-2 for sub-index "basic requirement" shows almost similar results as of Model-1.

On the other hand, Model-3 shows a very weak relationship between the probability of higher exporter and sub-index "efficiency enhancement". However, model-4 shows that a unit increase in the GCI sub-index "innovation factor" would increase the probability of higher exporter to 6%. Among all sub-indexes, the first sub-index "basic requirement" is the most influential sub-index.

Table 4 Panel Probit Results

Dependent: Export= 1 if Annual Export> US$50 Billion	**Model1**	**Model2**	**Model3**	**Model4**
Number of obs	1,297	1,297	1,297	1,297
Number of groups	138	138	138	138
Obs per group: min =	3	3	3	3
avg	9.4	9.4	9.4	9.4
max	10	10	10	10
Wald chi2(4)	154.84	188.71	151.65	303.01
Prob> chi2	0.0000	0.0000	0.0000	0.0000
Log likelihood	-167.78068	-167.69763	-171.13138	-167.48095
Explanatory Variables	**Coef.**	**Coef.**	**Coef.**	**Coef.**
LnGDP	3.023912 (0.519) [0.000]	1.335604 (0.276075) [0.000]	2.927223 (0.8061015) [0.000]	3.317533 (0.3139881) [0.000]
EXCH	0.0003968 (0.0001279) [0.002]	0.0003588 (0.0000716) [0.000]	0.0004133 (0.0001701) [0.015]	0.0006064 (0.0001109) [0.000]
GCI_Overall	2.538058 (0.7228424) [0.000]			
GCI_Basic Requirement		1.541975 (0.5676348) [0.007]		

GCI_Efficiency			2.080858 (1.097991) [0.058]	
GCI_Innovation				1.109268 (0.4016793) [0.006]
_Cons	-40.6351 (3.507957) [0.000]	-20.51134 (1.499468) [0.000]	-37.4355 (3.987346) [0.000]	-36.46392 (2.206375) [0.000]
/lnsig2u	3.386405	2.479819	3.283842	3.255727
[95% Conf. Interval]	2.822651- 3.950159	1.903081- 3.056557	2.616808- 3.950876	2.722926- 3.788527
sigma_u	5.436864	3.455301	5.165082	5.092982
[95% Conf. Interval]	4.101389- 7.207191	2.589696- 4.610234	3.700263- 7.209777	3.901899- 6.647651
Rho	0.9672769	0.9227149	0.9638703	0.9628784
[95% Conf. Interval]	0.9438877- 0.981112	0.8702398- 0.9550648	0.9319355- 0.9811253	0.938366- 0.9778718

Note: * indicates significant at 1% level, values in () are the standard errors and values in [] are the p-values

4) CONCLUSION:

This paper is an attempt to investigate the possibility of achieving a high level of exports through a greater level of competitiveness.Global Competitiveness Index (GCI) estimated by World Economic Forum, is taken as a proxy for the level of Competitiveness, while a binary value for an export level above the US$ 50 billion is taken as a benchmark for higher export level. The panel probit regression model is selected for empirical estimation and results showed a positive relationship between higher export level probability and level of Competitiveness. This result is consistent with the hypothesis that the economies having a higher level of competitiveness would have a greater possibility of higher export. On the other hand, the GCI sub-index showed somewhat a mixed result. The sub-indexes “basic requirement” and “innovation factor” proved statistically highly significant but the coefficient value of basic requirement is double than the coefficient for “innovation factor”, while sub-index “efficiency enhancement” showed positive and significant at 11%, which is mostly considered as a very weak relationship.

It is, therefore, suggested that the developing countries should concentrate on enhancing competitiveness level to achieve the goal of higher exports. The result further suggested that the sub-index “basic requirement” is more important for the enhancement of exports and countries should concentrate on improving the pillars of basic requirements for enhancing competitiveness.

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