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Growth Environment Score and Economic Growth Nexus in Next Eleven Countries

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Contents:

Abstract: *This paper investigates the relationship between growth environment score and economic growth of N11 (Next eleven) countries over the period of 20 years that is; 1999-2018. A panel data regression, fixed effect model, random effect model and Hausman test are applied in our study. According to the Hausman specification test, the fixed-effect model is a suitable model for the study. Econometrics findings suggested that macroeconomic stability (external debt), macroeconomic conditions (investment) and human capital (education) have a significant impact on the economic growth of N11 countries. Our empirical findings provide insights on strategies that the countrywide government should enforce to enhance financial boom and improvement throughout the N11 countries.*

Key Words: Economic Growth, Next Eleven Countries, Growth Environment Score, Panel Regression, Hausman Specification Test

Introduction

Growth is a signal of evolution. For ages, economic growth has been substantially studied for underdeveloped, developing, emerging and developed economies. Extensive research including both empirical and theory have been conducted for determining the factors affecting economic growth (Upreti, 2015). Romer, Swan and Solow have provided theoretical groundings on the cases of economic growth. In order to achieve a sustainable growth level, governments across the world should list the economic growth agenda as a priority (Batrancea, Rathnaswamy, & Batrancea, 2021).

It is significant to examine the capability of a region politically, economically and social welfare. Regional growth helps in promoting economic well-being as well as standards of living through human capital, infrastructure and business developments (Saha, Saha, & Saha, 2019). A significant boost long term economic development requires policy maker's focus on advancing structural reforms. In the year 2019, the downward trend in GDP growth in both developed and developing regions was mainly found to be due to weakening trade activity and less interest in investments (Nations, 2020).

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A set of N11 economies has been recognized firstly by Jim O'Neil and Goldman Sachs in the year 2005 as a substitute for BRIC economies. A group of N11 countries includes Pakistan, Bangladesh, Iran, Nigeria, Egypt, Philippines, South Korea, Mexico, Turkey, Indonesia and Vietnam. The major attribute of N11 countries is allocating developing communities linked with industrial capability. All the N11 economies share similar attributes in expressing a highly greater economic perspective. Sachs, (2007) stated that N11 nations imply a collection of eleven nations which has the potential for fast-growing trade that may feasibly emerge to be a segment of the world's economies. According to Padhan, Haouas, Sahoo, and Heshmati, (2019), N11 economies are greatly depicted as the major influencers of the economy worldwide and environmental strategies next to BRICS economies although different to these in an interval of their sample of economic growth accompanied by a greater degree of trade and financial openness.

Figure 1 Summarizes the Research Model of our Study

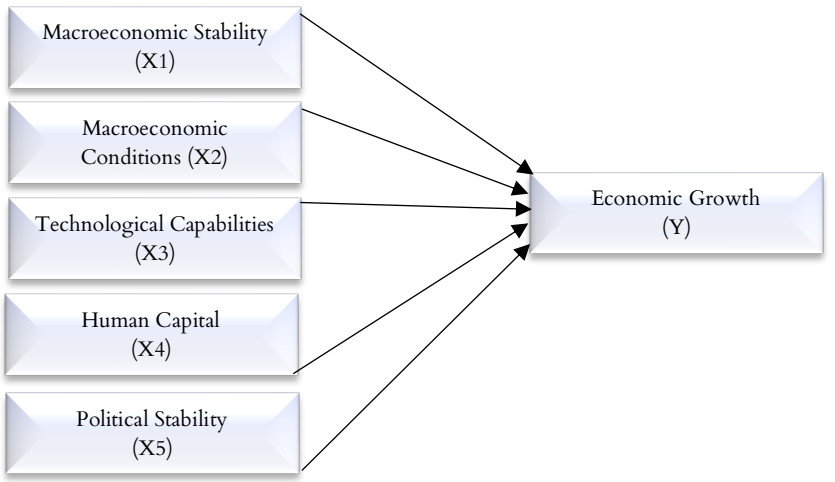

Figure 1: Research Model

For ages, one of the significant signs of progress is the joining of countrywide economies into a worldwide economic system, (Ortiz-Ospina & Roser, 2018). Fundamentally, macroeconomic stability and conditions, technological innovation, skilled and knowledgeable workforce and political stability open up a nation to the rest of the world in context with international trade, regulations, commencement and expansion of businesses and other areas that generally enhance economic growth. Liberalized economies bring opportunities for foreign investment, and savings and allow free flow of capital between the nations so that, each nation can make use of efficient resources available (Bist & Bista, 2018).

In order to sustain economic growth, a nation needs to maintain the right set of conditions for growth. A key undertaking for investors in gaining growth potential is to choose how properly nations are doing in retaining those essential and crucial situations in place. For that, nations need to formulate appropriate policies to promote economic growth. However, unfortunately, in recent decades no developing country has achieved significant economic success (IMF, 2018). Hence, there is a dire need to study an objective summary measure of a broad set of conditions that help to achieve the growth potential of a group of those N11 countries that are expected to become a world power by 2050 (O'Neill, Wilson, Purushothaman, & Stupnytska, 2005). This study contributed to relevant literature via a special focus on Goldman Sach's proposed GES and economic growth of N11.

In a nutshell, this research examined to

Underline core objective in reference to the above problem by examining the effects of growth environment score on the economic growth of the next eleven countries. Economic development is multifaceted, it does not only include the development of the entire output, but rather it also includes economic change via sectoral change, demographic, geographic, social, political, environmental and institutional set-up. This leads to a rich array of inquiries and the need for an assortment of new approaches to encountering basic questions that are related to economic growth. Interaction of societies and countries on one facet harmonized the trade, in addition to the transformation of knowledge, expertise, skill, technology and exchange of specialized goods and services that drive the pace of development.

Literature Review

Economic development is highly multi-faceted, the term economic growth does not only include an aggregate output rather it is about the essential transformation of an economy including geographical, demographic, political, human development, social, institutional and sectoral structure (Acemoglu, 2012).

Macroeconomic Stability and Economic Growth

Economic stability refers to stable prices, sustainable and stable economic growth, job opportunities and balance of payments of any nation. Unfortunately, there is an increase in economic shocks including commodity price, and supply-side and demand-side shocks. It is vital to promote economic stability in order to avoid any financial and economic crises in the world (IMF, 2021). Friedman, (1977) a Nobel prize winner, found that high fluctuations in inflation affect the economic growth of any nation. As per the theory of Friedman, (1977), economies that face unstable and high volatile inflation mainly distort the relevant information about commodity prices making nations unable to make efficient allocation of resources. Moreover, companies fail to make effective financial and investment decisions, inefficient detection of profitable investment opportunities in the market and external debt due to an increase in information asymmetries (Lyziak, 2016). Consequently, companies have to either postpone or opt for lower investment projects leads to low economic growth. Policymakers focus on minimizing the inflation rate for sustainable economic growth (Ayyoub, Chaudary, & Farooq, 2011).

A government deficit or budget deficit occurs when a nation's overall expenses exceed its total revenue. One of the prime consequences of the budget deficit is inflation in the country that is, a consistent increase in the price level. The budget deficit (or surplus) is one of the major macroeconomic factors affecting economic growth (Fisher, 1993). It is the result of the government fiscal policy and is found to be the most measurable and reliable indicator of economic growth. A budget deficit is the expenditure of any organization that exceeds the income is earned. It is a major concern of any nation to achieve sustainable economic growth and development (Mweni, Njuguna, & Oketch, 2016). Across the world, every nation tries to raise sufficient funds to finance government projects however, no nation has ample resources available to meet all its budgetary needs. Above all, it is a major challenge for any emerging nation to implement primary policies. Government decisions and actions significantly affect the nation's economic growth. A budget deficit leads to a trigger tax rate, adversely affecting productivity and investment in a nation (Van & Sudhipongpracha, 2015).

As per economics theories, a reasonable level of debt help develop as well as developed nations to enhance their economic growth. In this regard, the *debt overhang theory* has been used earlier to consider the role of debt on economic growth (Krugman, 1988; Kharusi & Ada, 2018). When the government follows a poor economic policy and fails to meet its targeted growth needs, government oblige to welcome and move ahead towards financial assistance from external sources that are usually in the form of debt (Dey & Tareque, 2020). According to the empirical findings of the study conducted by Kharusi and Ada, (2018), there is a negative impact of external debt on economic

growth. The authors recommended that productive use of external debt will boost economic growth in Oman. Literature found that government debt and economic growth have a positive significant relationship (Reinhart & Rogoff, 2010).

Macroeconomic Conditions and Economic Growth

Macroeconomic conditions tend to vary with time depending upon the economic conditions or business activities in a nation or region. The economy of any nation may pass through two phases including expansion and contraction. In the case of expansion, economic conditions tend to be better, positive and fruitful for the nation while nations face adverse macroeconomic conditions during the contraction period. Capital formation is one of the numerous factors affecting economic growth. There is a positive significant relationship between capital formation and economic growth both in the short-run and long-run in Nigeria (Stupnikova & Sukhadolets, 2019; Gibescu, 2010).

Trade liberalization is always been under discussion for economic development and growth. However, in the latest decade, IMF highlights effective trade policy to be considered an essential role in achieving higher economic growth. Trade openness has a significant impact on its economic growth (Fatima, Chen, Ramzan, & Abbas, 2020). A statistically significant relationship was found with obvious regional heterogeneity (Kong, Peng, Ni, Jiang, & Wang, 2021). Countries equipped with advanced technology and support in their financial system, are more likely to avail of benefits from trade openness and are found to have a favourable influence of trade openness in enhancing economic growth (Huang & Chang, 2014).

Technological Capability and Economic Growth

In a worldwide economy, technological advancements highlight the reasons for differences in inter-country income inequality and economic growth. Extensive research on technology and science notably put forward a need to enable all stakeholders to friendly use technology efficiently, so it will result in reducing costs and enhance productivity gains (Caliskan, 2015).

For ages, the impact of information and technology on economic growth has been of great interest. Solow, (1956) predicted that advanced machinery and factories as a result of technical development may lead to the per capita production of any country. The researcher highlights a major factor behind the economic growth that is an increase in capital stock boost greater per capita production. Mobile phone technology is one of the information and communication technologies. Currently, it is been observed that mobile phone technology is increasingly penetrating developed nations as well as developing nations (Pak, 2018). The study explores that mobile phone penetration is reduced when mobile calls costs rise, on the other hand, it was found to be positively correlated with GDP per capita. David and Grobler, (2020) study finds that mobile penetration is growing faster and have a positive significant impact on the economic growth in Africa. Whereas, Niebel, (2018) studied a combined sample of 59 developing, developed and emerging countries over the period of 1995-2010. The empirical findings show that developed economies are gaining more investments in information and communication technology as compared to developing and emerging economies.

There is a dire need of assessing the relationship between economic growth with information and communication technology penetration based on the mobile, internet and broadband subscriptions in the current era (Siddiqui & Singh, 2020). During the Covid-19 global outbreak, there is a sharp increase in the demand for connecting people to bring them back into their regular life (ITU, 2020). As, a large number of the world population was asked to stay and work from home, therefore there has been observed stress in the Wi-Fi capacity due to an 80 percent increase in PCs. People moved towards the excessive use of computers and smartphones as a lifeline and perform their in-person activities via these tools. Thus pandemic had an immediate impact on the telecommunication financial performance and yet it has become a challenge for the governments to take concrete actionable measures for the telecommunication

sector considering the cost of investment, and social and economic benefit. According to the research of Zaborovskaia, Nedezhina, and Avduevskaya, (2020), access to the latest information and Wi-Fi connection along with the availability of computers has a vital role in human development. Hence, the increasing number of personal computers allows people to grab new information and technology and to improve and equip new technical skills leading to a knowledge-based economy (Anguelov & Angelova, 2021).

With the passage of time, well-renowned concepts including electronic commerce and electronic businesses have been broadened. It becomes a profitable way of doing business all over the world rather than sticking to the traditional way. Nations are more into generating excessive internet business at the doorstep of their consumers at the national and international levels. As a result, boosting e-business and e-commerce rise exports and GDP growth of a country (Apavaloaie, 2014). In April 2021, around 4.72 billion people worldwide use the internet which is about 60 percent higher than the world population (Kemp, 2021). Every year there is a change in the internet users globally, due to the Covid-19 pandemic in the last 12 months, the internet users increase by 332 million and more than 900,000 new users per day. Empirical results found a positive significant linear impact of broadband penetration in lower-middle-income economies (Sulong, 2017).

Human Capital and Economic Growth

Human capital is one of the major factors that can help the economy of any nation to grow through a set of skills, knowledge and experience of its workforce. These workforces, knowledgeable skills and expertise help to raise the productivity level and economic growth of the country (Ngepah, Saba, & Mabindisa, 2021; Wang & Cazurra, 2017). It is, therefore, necessary to make an investment in educating people for bringing quality and effective outcomes. Human capital is a concept that encounters the difference in skills and knowledge that every employee, labour or workforce has (Gruzna, Firsova, & Strielkowski, 2021). There is a strong relationship between human capital and economic development. Empirical findings indicate a positive impact of the human capital via life expectancy and education proxies on economic growth (Barro & Lee, 2013; Khan, Sarwar & Khan, 2020). Growth rates of the nations are a highly dependent investment on human capital investment as education level and life expectancy of the skilled workforce influence labour productivity.

According to Becker, (1964), education is a major component of human capital just like investments in physical capital. The main objective of economics is to understand and alleviate poverty and investment in human capital via educating the workforce will lead to maximising productivity and employment opportunities (Li, Loyalka, Rozelle, & Wu, 2017). Becker, (1964) award-winning research focuses on microeconomics in the significant relationship between economic growth, human capital and human behaviour. *The endogenous growth model* proposed investment in human capital resulting in boosting the economic growth of any economy (Osiobe, 2019; Yeo & Lee, 2020).

Life expectancy is defined to be the average age a human lives. Extensive studies examined the significant impact of life expectancy on economic growth on the basis of more investment in human capital (Li, Loyalka, Rozelle, & Wu, 2017; B. Freeman, 1977; Ozsoy, 2019). Empirical results found that significant relationships may vary across different aging levels. A longer life expectancy means a higher return from human capital that encourages more human capital investment thus leading to economic growth. Those nations that offer good health services will find people more productive and hence it results in enhancing their productivity and working hours that cause increasing economic growth (Ruhm, 2015; Alatas & Cakir, 2016). However, the results were found to be insignificant in middle-income economies with insufficient improvement in life expectancy (Ngwen & Manfred, 2015).

Political Stability and Economic Growth

The economic system is reflected by a trend of continuous development, innovations, technological changes as well as political conflicts

that result in several interests and representing institutions. Therefore, political factors must be undertaken in order to analyze the economic growth of a nation (Radu, 2015). Frieden, (2020) states that;

"Those with the gold make the rule".

Political conditions of a nation must adhere to policies that are good for society as a whole. Political stability is determined to be a causing low level of economic growth and development (Radu, 2015). Political instability is a major reason resulting in slow economic growth, reduces investment and production levels, boosting high risk and inflation and makes exports costly for any nation (Mustafa, Nawaz, & Rubab, 2017; Gnangnon, 2021; Tabi & Ondoa, 2011; Aisen & Veiga, 2013). Whereby, a healthy stable political environment helps any nation in building a continuous and coherent path for its sustainable development. In addition, by maintaining a certain political stability level, nations would have more confidence and trust as a result which enhances production and economic growth (Shabbir, Anwar, & Adil, 2016). Empirical results found a long-run relationship between political stability and economic growth in Tanzania (Ramadhan, Jian, Henry, & Kossele, 2016; Murad & Alshyab, 2019). Nobel winning economist North, (1990) expresses institutions as

"Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that human interactions".

It is relevant to study the relationship between an economy and its institutional structure. It is vital for all institutions to make efficient decision making by eliminating distortions (Ozpolat, Guven, Ozsoy, & Bahar, 2016). In 2004, UN Secretariat General states rule of law as

"All individuals and institutions including government agencies may be accessible and they may be held accountable under the laws consistent with the international legal norms and principles".

Setayesh and Daryaei, (2017) examine panel data of eight developing Islamic countries. Empirical statistics examined a significant relationship between corruption and rule of law and economic growth. However, Hichem, Houssem and Nidhal, (2017) find similar findings indicating that effective governance promotes GDP per capita of 20 OECD and 34 developing and emerging countries from a time period of 1985-to 2010. In addition, Bhagat and Hubbard, (2021) analyzed 134 countries over a period of 1984-to 2019, empirical results show a positive impact of rule of law on GDP per capita. The author highlighted that the countries that adhere to an efficient rule of law are found to be less income equality.

Corruption is a set of illegal and unfair activities taken by any person who is in power (Shabbir, Anwar, & Adil, 2016). It has been found in the literature that a large number of developing countries are ranked among the corrupt countries, especially in the Asian region and Africa. Empirical findings indicated that for maximized growth of any nation, the corruption level needs not be zero (Ahmad, Ullah, & Arfeen, 2012). A study found a U-shaped style in corruption- growth rate relationship of a panel set of 71 countries, resulting in the growth rate raises as there is a reduction in corruption level. Findings are similar to the study of Vaal and Ebben, (2011), who reported that corruption leads to lower economic growth as it exceeds some threshold level.

New Economic Growth Theory

Paul Romer and Robert Lucas in the 1980s proposed a new economic growth theory (also known as the endogenous growth model). The theory proposed that economic growth is primarily caused by internal factors instead of external factors. Investment in human capital development results in educated labor and skilled workforce, more training and knowledge, increased capital investment, more attractive investment opportunities, increase in jobs, better health conditions, opportunities for new businesses and expansion of businesses across the boundaries of a nation. Poor political governance and high corruption affect effective services, lower human capital, and reduce private productivity by lowering expected returns of investors and public investment resulting in affecting economic growth (Kostakis, 2014). Political stability and economic growth are interconnected. Any uncertainty in context with an unstable political environment and

inefficient workforce lead to reduce investment and slow down the economic growth process.

Methodology

Sample and Procedures

In order to examine the relationship between economic growth and its determinants selected by Goldman Sachs's GES including macroeconomic stability, macroeconomic conditions, technological innovations, human capital and political conditions, cross-sectional data of N11 countries were gathered. Our study is descriptive and quantitative in nature. The time horizon of this study analysis is 20 years (1999 – 2018).

This study has been analyzed through descriptive analysis, correlation analysis, panel regression analysis, fixed effect model, random effect model and Hausman specification tests. Secondary data has been collected from World Bank indicators, worldwide governance indicators and world telecommunication indicators. Following are the study variables of this study:

Table 1. Study Variables

S. No	Variable	Type of Variable	Proxies	Measures
1	Economic growth	Dependent variable	GDP per capital	Current US$
2	Macroeconomic Stability	Independent variable	• Inflation	%
			• Government Deficit	% of GDP
			• External debt	% of GDP
3	Macroeconomic Conditions	Independent variable	• Investment rates	GFCF as % of GDP
			• Trade openness	Trade share as an amount of GDP
4	Technological Innovations	Independent variable	• Penetration of phones	Mainlines per 1,000 people
			• Penetration of internet	Internet usage per 1,000 people
5	Human Capital	Independent variable	• Life expectancy	Years
			• Average years of secondary education	School enrollment secondary, gross %
6	Political Conditions	Independent variable	• Rule of law	Estimate
			• Political stability	Estimate
			• corruption	Estimate

Results

Descriptive and Correlation Analysis

Table 2. Descriptive and Correlation Analysis

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. LogGDP	7.344	1.32	-												
2. LogCORR	20.62	8.337	-.0365	-											
3. LogEDU	78.88	55.805	.3722	.0464	-										
4. LogExtD	7.752	.481	.1845	.2443	.5412	-									
5. LogGOV	3.105	5.906	-.0513	.0274	-.2014	-.1164	-								
6. LogINF	54.425	33.435	.1525	-.1385	.2062	-.0449	-.3805	-							
7. LogINV	1.35	.116	.2824	-.4983	.3974	.3106	.0245	.1654	-						
8. LogLIFE	1.835	.051	.0915	.6192	.0625	.2273	.0027	-.1454	-.1715	-					
9. LogTRD	1.714	.199	-.0756	-.2108	-.1032	.1141	-.0915	-.0239	.4834	.1264	-				
10. LogPOP	1.43	.784	-.0756	.2556	.3777	.6732	-.1193	-.0367	.2320	.3674	.3193	-			
11. LogPOI	79.56	54.021	.1463	.1280	.3764	.4468	-.2792	.0133	.3292	.1545	.3748	.6259	-		
12. LogPOLS	34.11	28.462	.0569	-.0700	.0645	.0426	-.2047	-.0356	.2079	.1131	.2692	.1043	.0761	-	

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
13. LogROL	1.64	2.242	-.0335	.7631	.0384	.2574	-.0871	-.1095	-.3152	.6872	.0639	.2140	.0408	.0307	-

Source: Data has been extracted from Stata 14.

Table 4.1 shows descriptive statistics and correlation analysis of study variables. In the above table, log values of all variables have been taken for empirical analysis which are as follows; LogGDP is taken for GDP per capita, LogCORR for corruption, LogEDU for education, LogExtD for external debt, LogGOV for government deficit, LogINF for the inflation rate, LogINV for investment, LogLIFE for life expectancy, LogTRD for Trade openness, LogPOP for penetration of phones, LogPOI for penetration of internet, LogPOLS for political stability and LogROL for Rule of law. The average growth per capita is 7.344, while the standard deviation is 1.32. This is a good indication of variant performance which can be observed by these results.

The Pearson correlation matrix has been presented in the above table. The correlation between inflation and GDP is positive and significant. External debt and GDP were found to have a negative significant correlation. In addition, the Government deficit has an insignificant correlation with GDP. Similarly, Investment rates show a statistically significant and positive coefficient correlation with GDP however, trade openness shows a highly significant but negative correlation with GDP.

Multicollinearity Analysis

Table 3. Multicolinearity Analysis

Variables	VIF	Tolerance
1. LogCORR	2.88	0.35
2. LogEDU	2.30	0.44
3. LogExtD	1.78	0.56
4. LogGOV	1.35	0.74
5. LogINF	1.22	0.82
6. LogINV	1.38	0.73
7. LogLIFE	2.16	0.46
8. LogTRD	1.80	0.56
9. LogPOP	1.86	0.54
10. LogPOI	2.24	0.45
11. LogPOLS	1.10	0.91
12. LogROL	1.25	0.80

Source: Data has been extracted from Stata 14.

Table 4.2 shows the variation inflation factor (VIF) and tolerance of all independent variables. All VIF values are found to be less than 10 and the tolerance level of all variables is higher than 0.05 indicating that there is no multicolinearity in the data.

Pooled Regression Model

Table 4. Pooled Regression Model

Variables	Coef.	Robust St. Err.	Significant
1. LogCORR	-0.004 (0.773)	0.15	
2. LogEDU	0.005	0.002	**

Variables	Coef.	Robust St. Err.	Significant
	(0.011)		
3. LogExtD	-0.136	0.208	
	(0.514)		
4. LogGOV	0.005	0.014	
	(0.71)		
5. LogINF	0.008	0.003	***
	(0.002)		
6. LogINV	2.012	0.87	**
	(0.022)		
7. LogLIFE	8.111	2	***
	(0.000)		
8. LogTRD	-1.223	0.499	**
	(0.015)		
9. LogPOP	-0.485	0.112	***
	(0.000)		
10. LogPOI	-0.007	0.002	***
	(0.000)		
11. LogPOLS	0.002	0.003	
	(0.377)		
12. LogROL	-0.055	0.035	
	(0.119)		
Constant	-6.639	3.823	*
	(0.084)		
R-squared	0.332	Number of observations: 200	
F-Test	15.993	Prob > F 0.000	
AIC	622.714	BIC 665.592	

****p<0.01, **p<0.05, *p<0.1*
Source: Data has been extracted from Stata 14.

In table 4.3, robust standard errors have been undertaken to remove heteroscedasticity from the panel data _(Gujarati & Porter, 2009). The above results showed a pooled regression analysis after removing heteroscedasticity. The model is found to be significant at a p-value of 5%. R squared value indicates that there is a 33% change in GDP due to the independent variables. Education, investment and trade openness are found to be significant at 0.05 while, inflation, life expectancy, penetration of phones and penetration of the internet are found to be significant at a p-value of 0.10. In contrast, corruption, government deficit, external debt, political stability and rule of law were found to be insignificant. F statistic is 15.993 and found to be significant at 0.000. The robust standard error of education and penetration of the internet is 0.002.

Fixed Effect Model

Table 5. Fixed Effect Model

Variables	Coef.	St. Err.	Significant
1. LogCORR	0.002	0.017	
	(0.899)		
2. LogEDU	-0.012	0.004	***

Variables	Coef.	St. Err.	Significant
	(0.001)		
3. LogExtD	.374	0.435	***
	(0.002)		
4. LogGOV	-0.008	0.014	
	(0.585)		
5. LogINF	0.002	0.003	
	(0.598)		
6. LogINV	2.85	1.025	***
	(0.006)		
7. LogLIFE	-6.429	11.213	
	(0.567)		
8. LogTRD	-1.087	0.964	
	(0.261)		
9. LogPOP	-0.033	0.172	
	(0.849)		
10. LogPOI	-0.003	0.002	
	(0.17)		
11. LogPOLS	0.001	0.002	
	(0.76)		
12. LogROL	-0.048	0.036	
	(0.186)		
Constant	28.976	20.866	
	(0.167)		
Mean dependent variable	7.344	S.D dependent variable 1.320	
R-squared	0.357	Number of observations: 200	
F-Test	8.225	Prob > F 0.000	
AIC	530.454	BIC 573.332	

****p<0.01, **p<0.05, *p<0.1*
Source: Data has been extracted from Stata 14.

Table 4.4 shows fixed effect regression results. Our model is found to be significant at a p-value of 0.05. F test statistic is 8.225 and significant at 0.000. R squared value shows that there are 35.7% variation causes in GDP due to independent variables. Education is found to have a significant impact on GDP as its p-value is 0.001. In addition, external debt and investment also have a significant relationship between GDP as their p values are 0.002 and 0.006 respectively. Whereby, this fixed-effect model does not find a significant impact on corruption, government deficit, inflation, life expectancy, trade openness, penetration of phones, penetration of internet, political stability and rule of law on GDP.

Random Effect Model

Table 6. Random Effect Model

Variables	Coef.	St. Err.	Significant
1. LogCORR	-0.004	0.016	
	(0.783)		
2. LogEDU	0.005	0.002	**
	(0.011)		

Variables	Coef.	St. Err.	Significant
3. LogExtD	-0.136 (0.534)	0.219	
4. LogGOV	0.005 (0.074)	0.016	
5. LogINF	0.008 (0.002)	0.003	***
6. LogINV	2.012 (0.012)	0.8	**
7. LogLIFE	8.111 (0.000)	2.285	***
8. LogTRD	-1.223 (0.021)	0.532	**
9. LogPOP	-0.485 (0.000)	0.137	***
10. LogPOI	-0.007 (0.001)	0.002	***
11. LogPOLS	0.002 (0.389)	0.003	
12. LogROL	-0.055 (0.165)	0.039	
Constant	-6.639 (0.116)	4.22	
Mean dependent variable	7.344	Standard deviations dependent variable 1.320	
Overall R-squared	0.332	Number of observations: 200	
Chi-square	93.034	Prob > Chi2 0.000	
R-square within	0.207	R-square between 0.590	

****p<0.01, **p<0.05, *p<0.1*
Source: Data has been extracted from Stata 14.

Above Table 4.5 shows random effect model statistical results and is found to be appropriate as its p-value is less than 0.05. Overall R-square value determines that there is a 33.2% variation in economic growth due to the explanatory variables. Empirical results show that education (p-value 0.011), inflation (p-value 0.002), investment (p-value 0.012), life expectancy (p-value 0.000), trade openness (p-value 0.021), penetration of phones (p-value 0.000) and penetration of internet (p-value 0.001) are found to have significant impact on GDP. Whereas, corruption, external debt, government deficit, political stability and rule of law have no significant impact on the GDP of N11 countries.

Hausman Specification Test

Table 7. Hausman Specification Test

Chi-Square test value (Coef.)	P-value
62.974	0.000

Source: *Data has been extracted from Stata 14.*

Table 4.6 shows Hausman specification test results. Hausman test determines whether the fixed effect model or random effect model is appropriate for the study (Gujarati & Porter, 2009; Larsson, Lyhagen, & Westerlund, 2016). Since the p-value is found to be less than 0.05, so we do not accept the null hypothesis. Hence fixed effect model is found to be appropriate for our study.

Discussion of Results

We investigated a panel data regression analysis to examine the impact of GES on GDP. The overall empirical findings of our fixed effect model found that human capital (education), macroeconomic stability (external debt) and macroeconomic conditions (investment) have a significant effect economic growth of N11 countries. Descriptive analysis shows that the mean of education, external debt and investment are 78.88, 7.752 and 1.35 respectively.

Supporting our hypothesis H_{1c}, external debt has a significant impact on the economic growth of N11 countries. As per economics theories, a reasonable level of debt help develop as well as developed nations to enhance their economic growth. Empirical findings in earlier literature have been found to be consistent, which examine a significant relationship between government debt and economic growth (Reinhart & Rogoff, 2010).

In line with hypothesis H_{2a}, investment has a direct significant relationship with the economic growth of N11 countries. Moreover, gross capital formation positively affects economic growth therefore, effective government policies investment in capital goods will enhance economic growth (Pasara & Garidzirai, 2020; Stupnikova & Sukhadolets, 2019; Omri and Kahouli, 2014).

Congruent to hypothesis $H_{4a,}$ average years of secondary education lead to enhance economic growth of N11 economies. These workforce knowledgeable skills and expertise help to raise the productivity level and economic growth of the country (Nickolas, 2021; Wang & Cuervo-Cazurra, 2017). The study found a positive impact of investment in education on economic growth in developing and developed nations.

Theoretical Contribution

Our study contributes to the literature. This study undertakes a new set of growth environment score variables as a whole for the first time in analyzing the economic growth of N11 countries. This study is pioneer research that theoretically contributes in context to examining objective measures proposed by Sachs, O'Neill, Wilson, Purushothaman, and Stupnytska (2005). In addition, analyzing political stability in reference to underpinning theory is a contribution to the existing literature. Hence, this study focus on the economy's potential to lead the world by the year 2050 and boost world economic growth.

Limitations and Future Directions

Our study has few limitations and the study's empirical findings can be based on future research. We could not include South Korea in our study due to the unavailability of data. Although according to the World Bank, for the fiscal year 2021-2022. South Korea has now been referred to under the category of high-income economies ($12,696 or more). By including this country in statistical analysis, results will be more authentic and meaningful.

In addition, as per Goldman Sachs criterion for selection technological capabilities, out of three proxies, one proxy that is the penetration of PCs has been omitted from our study due to the unavailability of the data. Future research can be conducted by undertaking penetration of PCs or substituting any other technological capabilities proxies, for instance, research expenditure, trademark applications, researchers in research and development etc.

Conclusion

Our study aims to analyze the impact of GES on the economic growth of N11 countries over the period of 20 years (1999-2018). It is an endeavour to contribute to the existing literature that the current study analyzed this set of GES first time in literature. Hausman's test suggested a fixed effect model that is suitable for studies. The empirical findings of the fixed-effect model endorsed that only three GES; human capital (education), macroeconomic stability (external debt) and macroeconomic conditions (investment) have found a significant impact on the

economic growth of the next eleven countries. Hence, it is concluded that healthy investment, skilled workforce and external debt of N11 countries lead to boost economic growth. This research highlights the significant factors that affect the economic growth of N11 countries. We expect that future research on this topic will contribute more to the literature by adding more variables.

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