

Determinants of Economic Growth: Empirical Evidence from China

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Abstract

This study analyzes the determinants of Economic growth in China over the period 1990-2017. Besides FDI, four other variables including population, trade, domestic investment, and unemployment have been included in the study, to regress ahead GDP of this country. The methodology to test the impact of these variables on china's economy has been limited to the least-squares method. The co-integration of the variables has been established throughout the application of the Augmented Dickey-Fuller Test and is found to hold in the long run. Our findings indicate that china's economic performance is negatively affected by foreign direct investment whereas its domestic investment has advantage its economy. Moreover, the nations four other variables including population, trade, domestic investment, and unemployment have found to have a negative impact on its GDP. The study recommends a number of policy implications.

Keywords: Economic growth, Macroeconomic variables, Granger causality, China

1. INTRODUCTION

Since starting market reforms in 1978, Republic of China has moved from a centrally-planned to a more market-based economy and experienced fast social and economic advancement, entrepreneurship, which had been covered up for more than two decades. GDP growth has averaged nearly 10% a year-the quickest supported development by a major economy in history and also 800 million out of poverty.

China reached all the Millennium Development Goals (MDGs) and made a major commitment to the accomplishment of the MDGs universally. While China's GDP growth has regularly slowed since 2012, it is still remarkable by current global standards. With a population of 1.3 billion, China is the second-largest economy and is gradually more playing an important and important role in global and in the developing economy. China has been the largest single contributor to world growth since the global financial crisis of 2008.

Esther & Folorunso (2011) [1] have explored the effect of FDI streams on economic growth in Nigeria. Their research found that FDI has an advantageous effect on economic growth. Be that as it may, they moreover report that the degree to which FDI positive impacts in economic growth emphatically might be constrained by human capital. Zakia & Ziad (2007) [2] have also investigated and found the impact of FDI on the economic growth of Jordan, in conjunction with testing the imports on the same dependent variable, between the period (1976-2003). The evaluated comes about point toward the presence of bidirectional connections between FDI and output, and between imports and output as well. The result comes about have demonstrated supporting prove of FDI and import-Led Growth Hypothesis for Jordan. Buckley et al. (2002b)[3] have examined and found FDI favors GDP growth in the economically stronger regions where GDP per capita, infrastructure, and R&D expenditure level are high.

Zhang (2007)[4] showed that FDI produced positive and significant effects on GDP growth only in the coastal region. Azman-Saini et al. (2010) [5] investigate and found the results to the heterogeneity of locational characteristics of host countries which in turn impacts on their capability to draw in and make the most of FDI inflows to support economic growth. Economic Performance and economic growth of a country are influenced by multiple factors. For economies in general and developing economies in particular, Foreign Direct Investment (FDI) has been experimental and argued as a significant determinant. This study is an attempt to examine the impact of FDI on economic growth in concurrence of four other variables including population, trade, domestic investment, and unemployment.

1.1. Population

The relationship between population and economic development is a topic of intense interest among both demographers and economists. In spite of this high level of interest, though an ordinary understanding of that relationship has yet to appear. Abdouli et al. (2017) [6] investigate and explore the existence of the Kuznets Curve in the BRICS countries (i.e. Russia, Brazil China, India, and South Africa) using a panel model. They find that carbon emissions reduce significantly when the population density and foreign direct investment (FDI) reach a certain threshold value. in the same way, Xu and Lin (2017)[7] have used Vector Autoregressive Model and find urbanization in China produces an inverted “U-shaped” effect due to motor vehicle use and population mobility. However, population strategies have significant long-term impacts on economies and populations, and national governments have been worried by problems nearby the question of how to implement population strategies and policies that are balanced. A major example of such a government is that of China, which is still considered to be a developing country.

1.2. Foreign Direct Investment Per Capita

Some literature investigates the direction of causality between foreign direct investment and economic growth. Here a Supply-leading hypothesis (SLH) recommends that there is unidirectional causality from foreign direct investment to economic growth. Many papers and researchers have found results supporting this Supply-leading hypothesis (SLH) including Abdelhafidh (2013)[8] , Lean and Tan (2011) [9], Tang and Wang (2011) [10] , Lee (2010) [11] , Qi (2007)[12], Hsiao and Hsiao (2006) [13] , Yao (2006) [14] , Lee and Tan (2006) [15] , Fedderke and Romm (2006) [16], Cuadros et al. (2004) [17] , Zhang (2001) [18], Ramírez (2000) [19] , and Dua and Rashid (1998) [20]. Foreign Direct Investment (FDI) is a vital and significant predictor of Economic Growth. Foreign Direct Investment, in the long run, has a negative relationship with Economic Growth. Foreign Direct Investment is a stimulator for economic growth in under-developed countries. Foreign Direct Investment provides advance technology and external capital to the economy which takes actions as an engine to economic growth. Many Researchers provide mixed results of FDI impact on the economic performance of the country.

1.3. Gross Domestic Investment:

Gross Domestic Investment relates to the contribution of the Government of the country in the direction of its economy. Interaction between foreign investors and domestic investment is of paramount importance and both have been connected in an economy. Public investment explains the development in infrastructure and thus reduction in the cost of doing business while the increase in private investment signals a high return on investment in the domestic economy. These roles of domestic investment encourage foreign investors to collect the benefits of high return [21]. The study made by Eregha [22] for African countries discloses that even though the foreign direct investment inflow to Africa is low, foreign direct investment has a positive impact on economic growth and domestic investment.

1.4. Trade:

Trade has been taken as one of the key variables affecting economic growth. Trade openness has been extensively used with a proxy of trade to GDP ratio in the literature. An empirical study on the Ghanaian economy declares that trade openness promotes economic growth in the long run Aseidu, 2013[23]. Adebisi, 2006 [24] found a supportive result that the Nigerian economy can accelerate economic growth by implementing a comprehensive trade openness program. On the other hand, the gained welfare effect in Pakistan has been reached through trade openness Iqbal and Zahid, 1998[25]. We have used Trade as a percentage of GDP as a proxy for trade variable and expect this variable to have a negative sign because of high imports as compared to exports.

2. METHODOLOGY AND DATA:

The data for China is taken from World Development Indicators which deemed reliable source of information. The time series data pertains to years 1990 till 2017. For this study, E-views Microsoft package has been applied.

$$\text{GDP}_t = \beta_0 + \beta_1 \text{POPT}_t + \beta_2 \text{T}_t + \beta_3 \text{GDI}_t + \beta_4 \text{FDI}_t + \beta_6 \text{UNEMP}_t + \epsilon_t$$

Where:

GDP _t	=	GDP Per Capita
POPT _t	=	Total population
T _t	=	Trade (% of GDP)

GDI _t	=	Gross domestic savings (% of GDP)
FDI _t	=	Foreign direct investment, net inflows (% of GDP)
UNEMP _t	=	Unemployment, total (% of total labor force) (national estimate)
ε _t	=	Error Term

Table 1: Determinants of economic performance, Time series data of China

Variables	Expected Sign	Proxy	Data Source	
Dependent Variable				
Economic Performance		GDP Per Capita at PPP (\$)	World Development	
Explanatory Variables				
Total Population of Country	+	Log of total population	World Indicators	Development
Trade	-	Trade (% of GDP)	World Indicators	Development
Gross Domestic Investment	+	Gross domestic savings (% of GDP)	World Indicators	Development
Foreign Direct Investment	-	Foreign direct investment, net inflows (% of GDP)	World Indicators	Development
Unemployment	-	Unemployment, total (% of total labor force) (national estimate)	World Indicators	Development

Table 1 shows the explanatory variables and their expected signs along with the proxy used and the source of the data. The model consists of six variables, GDP per Capita (GDP), Log of Total Population, Trade as a percentage of GDP (Trade), Gross Domestic Saving (GDS) as percentage of GDP, foreign direct investment net inflows as percentage of GDP, Unemployment as percentage of total labor force (National Estimate). The subscript 't' represents respective variables at time t. Amongst these variables, GDP is specified as the dependent variable and the remaining five as the explanatory variables.

4. EMPIRICAL RESULTS

Multiple linear regressions assume that data should contain little or no multicollinearity. This phenomenon occurs when a high correlation exists among independent variables. If independent variables have a high correlation with each other, it becomes difficult to interpret which predictor variable is explaining the variance in the dependent variable. Another important problem caused by multicollinearity is that it increases standard errors of coefficients which can lead toward

statistical insignificance of some variables which could be significant if there was not a case of multicollinearity.

Table 2: Covariance Analysis: Ordinary

Correlation	GDP	POPT	TRADE	GDI	FDI	UNEMP
GDP	1.000000					
POPT	0.897796	1.000000				
TRADE	-0.617239	0.597934	1.000000			
GDI	0.758536	0.715634	0.670019	1.000000		
FDI	-0.442521	-0.223336	0.271107	-0.042481	1.000000	
UNEMP	-0.710160	0.656931	0.777019	0.757063	-0.106932	1.000000

Source: Authors' Estimation

Table 2 provides Correlation coefficients among independent variables and dependent variables. The analysis shows that all independent variables have a strong relationship with the dependent variable, however, among independent variables, all correlations are weak to moderate, ranging between $r = -.04$ and $r = .77$. Thus, analysis indicates that all independent variables are a good predictor of the dependent variable and multicollinearity does not exist between variables.

Before running the Ordinary Least Square (OLS) method to approximate the coefficients of the regression equation, we tested for the stationary of the variables. The augmented Dicky -Fuller (ADF) and Phillips-Perron (PP) tests of stationarity were used(Dickey and Fuller, 1981; Phillips and Perron, 1988)[26].

Table 3: Stationarity test results

Variables	ADF test statistics					
	I(0)		I(1)		I(2)	
	T	C	T	C	T	C
GDP	22.69	-1.95	2.09	-1.95	-3.56*	-2.66*
POPT	-7.38*	-4.34*	-	-	-	-
TRADE	.148	-1.95	-3.37*	-2.66*	-	-
GDI	1.30	-1.95	-2.59**	-1.95**	-	-
FDI	-3.00	-3.58	-4.33**	-3.60**	-	-
UNEMP	1.32	-1.95	-3.16*	-2.66*	-	-

Note: *1%, **5% and ***10% level of significance.

Source: Authors' estimation.

Each series is tested at levels, and with the only exception of ‘POPT’, all variables are found to have unit-root and the series are non-stationary at levels. POPT is stationary at $I(0)$ at 1% significance level. ADF is again employed at first difference and the results exhibit that ‘TRADE’, ‘GDI’, ‘FDI’ and ‘UNEMP’ are stationary at 1st difference, at 1% and 5% level of significance. Our dependent variable ‘GDP’ is found to be stationary at 2nd difference at a 1% level of significance.

Table 4: Summary of results for time series of 1990-2017

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-290.1754	13.21290	-21.96153	0.0000
LOG(POPT)	13.96111	0.651816	21.41878	0.0000
TRADE	-0.006205	0.002339	-2.652683	0.0145
LOG(GDI)	1.769089	0.179908	9.833320	0.0000
FDI	-0.044343	0.010841	-4.090421	0.0005
UNEMP	-0.124928	0.064562	-1.935020	0.0459
R-squared	0.996099	Mean dependent var		8.389469
Adjusted R-squared	0.995213	S.D. dependent var		0.878602
S.E. of regression	0.060792	Akaike info criterion		-2.575321
Sum squared resid	0.081304	Schwarz criterion		-2.289848
Log likelihood	42.05449	Hannan-Quinn criter.		-2.488049
F-statistic	1123.554	Durbin-Watson stat		1.792852
Prob(F-statistic)	0.000000			

Source: Authors’ Estimation

Our findings indicate a positive and significant relationship between our focus variable POPT, GDI and dependent variable GDP. Similarly TRADE, FDI and UNEMP have also exhibited a negative relationship with GDP. Durbin Watson's significance table at 1% of significance level provides the critical values corresponding to $(n=28, k=5)$ as dL .83, and dU 1.62. Therefore based on Durbin Watson statistic of 1.79 we accept the null hypothesis that the above model is free of autocorrelation. The Lagrange Multiplier test is used for further investigation of autocorrelation. Again, based on results we can conclude that the null hypothesis is accepted and there is no autocorrelation.

Table 5: Lagrange Multiplier(LM) Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.642101	Prob. F(2,20)	0.2186
Obs*R-squared	3.949359	Prob. Chi-Square(2)	0.1388

Source: Authors' Estimation

All variables of interest have shown a significant influence on our dependent variable. However, co-integration must exist for this relationship to be valid in the long-term. According to Engle Granger (1987) [27] procedure, co-integration exists if the residuals are found to be stationary. Hence, we employed the Augmented Dickey-Fuller Test for this purpose and found it to be stationary. Table 5 is an exhibit of this test.

Table 6: Co-integration Analysis

Null Hypothesis: Residual has a unit root
 Exogenous: None
 Lag Length: 0 (Automatic - based on SIC, maxlag=0)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.366136	0.0001
Test critical values:		
1% level	-2.653401	
5% level	-1.953858	
10% level	-1.609571	

*MacKinnon (1996) one-sided p-values.

Table 6 shows that the ADF statistic is greater than the critical value at all levels, hence we can state that the error term is stationary at a high significance level. And therefore we conclude that the positive relationship of POPT and GDP hold in the long run.

5. CONCLUSION:

The conflicting evidence found in the empirical literature led us to expect that the foreign direct investment in a developing nation like China would be negatively affecting its economic performance and growth. Our research findings have remained reliable with our initial

expectations and have indicated that FDI has a negative role to play in this economy. Not just FDI, but Trade and Unemployment have also been found to negatively influence China's economic performance. A developing nation like China that is plentiful in many resources may help from the capital formation. Domestic investment in this look upon would benefit the country's economy, and consequently dependency on foreign investment should remain limited. Furthermore, in our study, the relationship of the variables is also proving to hold in the long run. Therefore, economic policies limiting FDI in China and encouraging domestic saving and investment should be prepared and implemented. It seems that most of the benefits of Foreign Investment get weak at the hands of the repatriation of profits back to the investor nation. This can be explained by the limited capacity of the host country to attract the transfer of technology and knowledge for further development.

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