FACTORS AFFECTING ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM DEVELOPING COUNTRIES

Marta Zieba¹, Thi-Kieu-Trang Dong², Rahab Njeri Mbugua³

Abstract

The question around factors affecting economic growth in developing nations is widely debated as it influences the policies to promote economic welfare. This paper, therefore, determines the factors influencing economic growth in developing countries. By estimating a fixed-effect model with a panel dataset for 62 developing countries from 2010 to 2018, the study found that government spending and natural resource rents have a favourable impact on per capita GDP growth. In contrast, rising labour force participation and inflation stifle economic growth in these countries.

Keywords: developing countries, economic growth, Fixed Effect model, and panel data

¹ Lecturer, Kemmy Business School, University of Limerick

² Student, Kemmy Business School, University of Limerick

³ Student, Kemmy Business School, University of Limerick

1. Introduction

Poverty, high population growth, and outdated technologies have been the main challenges facing developing countries with heavily reliant economies on government activities (Upreti, 2015). On the other hand, neoclassical economist Robert Solow established labour, capital, and technology as the key factors influencing economic growth. Keynesians further developed the theory by introducing government expenditure as a critical driver to economic growth. Notably, developing countries still lag in economic growth despite being abundantly endowed with natural resources and high populations (Barbier 2012). Therefore, understanding variables that influence developing countries' economic growth is critical for designing suitable economic policies for any government or institution. Researchers have explored this area using a variety of tools and approaches. These studies, however, did not employ recent datasets, which are consistent with the dynamics of economic growth.

This study examines factors influencing economic growth in developing countries using an updated dataset from 2010 to 2018 based on World Bank data. Section 2 presents an empirical literature review highlighting some critical traits of developing countries. Section 3 sets the empirical method with which our model will be tested. Section 4 presents the dataset and our summary statistics, while section 5 and 6 discusses the empirical results and the arguments on the validity of the findings. Finally, section 7 presents the conclusions, policy implications, and study's limitations.

2. Literature Review

This section examines previous studies on economic growth factors, focusing on the labour force, natural resources, public expenditure, and inflation.

2.1. Labour force

Banda (2015) established a consistent positive relationship between the labour force and output per worker, a measure of economic productivity in Mauritius and South Africa from 2002 to 2012. However, a hindrance to optimum productivity was a mismatch in specialized skills

produced from the education system to the labour market requirements. As the population grew in the developing nations, the labour force also increased due to the high absorption rate in 1960-1985 hence the positive economic growth (Bloom and Freeman 1986).

2.2. Public Expenditure

According to the Keynesian theory of economic growth, government expenditure positively impacts economic growth (Parui 2021). Public expenditure spurs domestic consumption, exports, and employment through the multiplier effect, thus generating more national income. Barro's (1996) research established that current and development expenditure had a positive relationship in 100 countries in their sample for 1960-1995. Thus, he concluded that governments should spend more to boost economic growth. Additionally, Kimaro *et al.* (2017) also established a positive impact of public expenditure on economic growth in 25 Sub-Saharan Africa countries using the Gaussian Mixture model. However, other researches demonstrated the negative effect of government expenditure on economic growth. According to Devarajan *et al.* (1996), excessive government expenditure was unproductive in the 25 developing countries based on their research.

2.3. Natural Resources

The abundance of natural resources has been theoretically associated with increased economic development as they lead to more exports and generate natural resource rent (Auty 2003). However, recent studies indicate that developing nations do not benefit economically from their abundant natural capital stock. Barbier (2012) established stagnant growth from low and middle-income developing countries with significant natural resources stocks. His panel data analysis on 867 low-income countries showed increased agricultural land expansion in a lower per capita income level. This result confirmed the inverse relationship between natural resources and income per capita growth on mineral-driven economies study by Wright and Czelusta (2011). They concluded that the abundance of natural resources was more of a curse than a blessing to a developing country.

2.4. Inflation

The subject of inflation and economic growth in developing countries has been of interest to many policymakers and researchers. Some economists argue that some inflation is necessary for economic growth, while others consider it detrimental (Omotunde 1984). Andrés and Hernando (2014) established a significantly negative relationship between economic growth

and inflation in OECD countries. Their research showed that inflation negatively affected the propensity to invest and reduced the efficiency of inputs used in production. On the other hand, Ndoricimpa (2017) estimated an inflation threshold of 9% for low-income countries and 6.5% for middle-income countries to positively impact growth. Above the threshold, it was considered detrimental to these countries' economic development.

Given the various studies on factors influencing economic growth in developing countries, it is worthwhile to estimate the factors currently affecting developing nations for better policy development.

3. Empirical Approach

Following Upreti (2015), we estimated the OLS model as follows:

$$GROWTH_{it} = \beta_0 + \beta_1 LF_{it} + \beta_2 EXP_{it} + \beta_3 RESOURCE_{it} + \beta_4 INFLA + \mu_i$$

Where:

i is the Country

t is the year 2010, ..., 2018

μ_i is the error term

The dependent variable for the model is economic growth as GDP per capita (GROWTH) and is measured as a percentage growth rate. GDP per capita is a measure of a country's economic production per person, computed by dividing a country's GDP by its population.

The first control variable is the labour force growth rate (LF) which we predicted to have a positive outcome. The labour force growth rate is the percentage change in labour force participation, which is the proportion of the population aged 15 and older who is economically active: all people who supply labour to produce goods and services, from the previous year to the next. Increasing the size of the labour force generates additional human resources, which contributes positively to economic growth. With significant and cheap labour resources, developing countries will attract investment, ultimately encouraging economic expansion (see Abounoori and Nademi (2010) and Akpan and Abang (2013)).

The second explanatory variable is general government final consumption expenditure (EXP), where we predicted a positive coefficient. General government final consumption expenditure includes all government current expenditures for purchases of goods and services. According to Keynes (1937), the government needs to take adequate measures to increase demand and stimulate production and consumption. Besides, the government can use the budget to carry

out orders, provide financial subsidies, and ensure stable profits for the private sector (Alshahrani and Alsadiq 2014). Furthermore, the government could provide public goods and services essential for socio-economic development (Hong and Ahmed 2009).

The third independent variable is the total natural resource rents (RESOURCE) measured as a percentage of GDP. Total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents. Previous studies showed that resource export could have a good influence, assisting countries in developing (see Ben-Salha *et al.* (2018)), or a negative impact, owing to the Dutch Disease (see Abdulahi (2019)). The predicted sign of the coefficient, therefore, is ambiguous.

Finally, the fourth variable is the consumer price inflation rate (INFLA). As measured by the consumer price index, inflation represents the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be set or altered at predetermined intervals, such as annually. For several decades, research conducted on the relationship between inflation and economic growth in developing countries has agreed that continuously rising inflation is harmful to economic development and growth (Boyd *et al.* (1996) and Azariadis and Smith (1996)). However, some scholars have attempted to demonstrate that, to some extent, inflation could be beneficial to growth in developing countries (see Omotunde (1984) and Tobin (1972)). Similar to natural resource rent, the coefficient's predicted sign of INFLA is vague.

Table 1 below presents details of variables, including their units, sources and predicted effects.

Table 1. Description of the variables, their units, their predicted effects on economic growth and their sources

Variable name	Description	Unit	Source	Predicted effect
GDPGROWTH	GDP per capita growth	%	World Bank	DV
LF	Labour force growth rate	%	World Bank	+
EXP	General government final consumption expenditure	% GDP	World Bank	+
RESOURCE	Total natural resource rents	% GDP	World Bank	+/-
INFL	Inflation consumer price	%	World Bank	+/-

4. Data

The panel data used in this research was sourced from The World Bank (2020) for 62 developing countries and included the World Bank's list of low-income and lower-middle-income economies (See Table 1 - list of countries in appendix). The timeframe 2010-2018 was

selected to avoid the impacts of global economic slumps. 2010 is considered the global economy's first return to "normal" after the 2007 financial crisis (Rich 2013). Furthermore, the Covid-19 pandemic has had no effects on the global economy before 2018.

Table 2 below represents the summary statistics of the data for the 62 countries used in the study

Table 2. Descriptive statistics for 62 developing countries

Variable	Obs	Mean	Std. dev.	Min	Max
GDP growth	555	2.321045	4.421558	-47.59	18.07
Labor force growth rate	558	0.022043	0.016567	-0.1	0.1
Expenditure	557	26.44575	9.200079	9.49	61.71
Inflation	554	7.187852	18.99172	-2.81	380
Natural Resource Rent	555	8.38236	8.505355	0.07	57.2

Source: Own calculations

This dataset was imperfect as there are some missing observations in some variables. The countries GDP growth has a significant disparity indicated by the standard error while the range of GDP growth rate is -47.59% (South Sudan) and 18.07% (Zimbabwe) and an average growth rate of 2.32%. The positive mean is an indication that the countries' GDP is growing. The labour force growth rate ranges between -0.1% and 0.1%, with a mean of 0.022%, which is relatively low. This result could be because these countries' labour force growth rate is already high.

Interestingly, government expenditure ranges from 9.49% GDP (Nigeria in 2016) and 61.71% GDP (Republic of Congo in 2014), with an average of 26.44% GDP. The government spending is relatively close to the world government expenditure, which is 27.89% (World Bank 2021a). The countries depicted significant disparity in inflation as indicated by the standard error with the rate ranging between -2.81% (Burundi in 2018) and 380% (South Sudan in 2013) and an average of 7.18%. 380% indicates the hyperinflation rate experienced in South Sudan since 2013 during the fight for independence and is an outlier in the dataset. Notably, the average inflation rate is still relatively high compared to the developed nations, whose inflation was 1.85% for European Union countries and 1.85% for the USA in 2018 (World Bank 2021b). Finally, the natural resource rent has a mean of 8.5%, with the highest rate of 57.2% (South Sudan in 2011) and the lowest rate of 0.07% (Sri Lanka in 2018). This implies that developing countries are using natural resources quite efficiently when compared with this value for developed countries in the period 2010-2018 of 1.64% (World Bank 2021c).

5. Empirical Results

The model is initially estimated using the Pooled OLS model with no provision for country-specific differences (fixed-effects). However, under the null hypothesis (H_0), the F-statistics that the country-specific effects (individual intercepts) are jointly zero is larger than the critical value at the 1% level. Thus, we rejected H_0 and applied the fixed effects model (see *Table 3* below for details).

We then tested the suitability of the fixed effects (FE) model and compared it with the random-effects (RE) model by using the Hausman test (Gujarati 2015). With a significance level of 5% and p-value of $0.000 < 0.05$, we accept the null hypothesis- H_0 , indicating that the FE is more appropriate than the RE (see *Table 6* in the appendix for details). The advantage of the fixed effects (FE) model is its ability to control variables whose characteristics are constant over time. Various studies have used the FE model, including Guseh (1997) and Ram (1986). These studies showed that the FE model effectively assesses the impact of the exploratory variables on economic growth.

Our FE model does not have multicollinearity and autocorrelation at 5% (see *Tables 2* and *4* in the appendix for details). However, we found that the model has heteroskedasticity by applying the Modified Wald test (Baum 2000). The test result is shown in *Table 5* in the appendix. Therefore, the robust standard errors were used in the FE model to adjust for the heteroscedastic variance of the error term, and the final results are presented in *Table 3*.⁴ Finally, by adopting the Ramsey Reset test (*Table 6* in the Appendix) using the *resetxt* command in Stata, developed by Shehata and Mickael (2015), we concluded that at a 5% significance level, the model was correctly specified. This result means that the independent variables can describe the variations in the dependent variable.

Table 3. FE model with the robust standard errors

Dependent variables	(1) Coefficient	(2) Robust Std. Error	(3) t-value	(4) p-value
Labour force growth rate	-27.259**	(0.039)	-2.07	0.039
Government expenditure	0.084*	(0.055)	1.92	0.055
Inflation	-0.237***	(0.000)	-6.51	0.000
Natural resource rents	0.241***	(0.000)	5.46	0.000
Constant	0.148	(0.911)	0.11	0.911
Observations	550	Number of countries		62

⁴ The FE model with the OLS standard errors which is not adjusted for heteroscedasticity, provided very similar results to those presented in Table 3 and they are presented in Appendix in Table 8.

F test	$F(61, 484) = 3.55$	Prob > F = 0.0000
χ^2 Hausman test	$\chi^2(4) = 43.81$	Prob > $\chi^2 = 0.0000$

*p<0.05; ** p<0.01; *** p<0.001

The above results show that the regression coefficient of labour force growth rate (lf) is (-27.259). This result indicates that a one per cent increase in the labour force growth rate results in a 27.259% reduction in the GDP per capita growth. The coefficient is statistically significant, precisely at the 5% level. Besides, the coefficient is quite significant, indicating that the policy implications on the labour market appear to be crucially helpful in boosting economic growth.

The government expenditure appears to have a positive effect on the GDP per capita growth. The coefficient is 0.084, indicating that for every 1% increase in government expenditure, the GDP per capita growth will increase by 0.084%. The coefficient is statistically significant at the 10% level. However, the coefficient is quite small, indicating that while government expenditure affects economic growth, expanding government expenditure does not help thrive the economy.

Inflation appears to have a negative relationship with GDP per capita growth. The coefficient (-0.237) demonstrates that the GDP per capita growth will decrease 0.237% for every 1% increase in inflation. This means that governments should reduce inflation at a certain level that could result in high economic growth. The coefficient for inflation is statistically significant at the 1% level.

The natural resource rents have a positive relationship with the economic growth at the level of 1%. The coefficient is 0.241, which is a 1% increase in the natural resource rents leads to a 0.241% increase in GDP per capita growth.

6. Discussion

The descriptive statistics and model estimation show that general government final consumption expenditure and economic growth positively correlate with the significance level at 90%. This finding is consistent with studies of Abounoori and Nademi (2010), Hou and Chen (2013) and Guseh (1997). Public spending in developing countries is essential for economic activities as these countries have economies with many defects and cannot operate effectively on their own. Specifically, the characteristics of public spending in developing countries are mainly infrastructure investment spending, while these countries are still in a state

of weak infrastructure systems, so the source of government spending is an essential source of economic growth. In addition, government intervention could reduce social inequality while providing an insurance function for private wealth and encouraging private investment.

The study also shows that total natural resource rents and economic growth have a positive relationship and is consistent with the conclusion of Aljarallah (2021) and Ben Salha *et al.* (2018). In this case, the 62 developing countries appeared not to encounter Dutch Disease. Besides, the directional relationship between GDP growth and total natural resources rents seems consistent with the study of Lyatuu *et al.* (2021). They indicated that an increase in resource rents leads to a substantial increase in government income in the short term, which can transpose into government spending. Thus, natural resources could help governments finance the environmental and other development-oriented programs needed to improve GDP growth.

The study found that inflation (infla) has a negative impact on GDP growth rates. Findings by De Gregorio (1992), Burdekin *et al.* (1994), and Iqbal and Nawaz (2009) also concluded the same trend. Indeed, Fischer (1993) argued that inflation distorts resource distribution due to detrimental changes in relative pricing. Changes in the pricing of different items cause comparable prices, distorted consumer decisions, and the market's inability to allocate resources efficiently when inflation is high. Furthermore, inflation diminishes investment, which is the economy's source activity. In the long run, uncertainty about the volatility of inflation is the primary cause of investment reduction.

Notably, the study unexpectedly showed a negative relationship between labour force size growth and GDP growth which is reverse to our prediction but consistent with the findings of Fan (2008). One of the two primary production inputs is labour, and labour accumulation is a source of economic expansion. This reverse outcome could be explained by labour market inefficiency or low labour productivity in emerging countries.

7. Conclusion

Research on key drivers to economic growth among developing countries has been of great interest to policymakers, governments, researchers, and investors in the recent past. These factors are vital in highlighting activities occurring in developing nations and aid in devising policies to foster sustainable growth and development in the economy.

This paper sought to establish factors affecting economic activities in 62 developing countries from 2010 to 2018. Labour force growth and inflation rates harmed economic growth. Although the labour force growth rate was contrary to the prediction, it highlighted inefficiency in the labour market, which implies that the policies in the labour market need to be evaluated. Moreover, governments should devise monetary and fiscal policies that ensure relatively low inflation rates as high inflation rates are detrimental to economic growth. On the other hand, natural resource rent and public expenditures were good boosters of economic growth. Therefore, investments to maximize economic benefits for the endowed countries were critical for their economic development. However, policies to ensure that environmental health was maintained and government expenditure did not result from misappropriation of funds towards these activities are paramount.

However, due to time constraints and data availability, we omitted other essential indices of economic growth, such as education levels and technological advancements. We seek to explore these factors further and build on the labour inefficiency as detected in section 5.

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Appendix

Table 1. List of countries included in the research

No	Code	Country
1	AFG	Afghanistan
2	DZA	Algeria
3	AGO	Angola
4	BGD	Bangladesh
5	BEN	Benin
6	BTN	Bhutan
7	BOL	Bolivia
8	BFA	Burkina Faso
9	BDI	Burundi
10	CPV	Cabo Verde
11	KHM	Cambodia
12	CMR	Cameroon
13	CAF	Central African Republic
14	TCD	Chad
15	COD	Congo, Dem. Rep.
16	COG	Congo, Rep.
17	CIV	Côte d'Ivoire
18	EGY	Egypt, Arab Rep.
19	SLV	El Salvador
20	SWZ	Eswatini
21	ETH	Ethiopia
22	GMB	Gambia, The
23	GHA	Ghana
24	GIN	Guinea
25	GNB	Guinea-Bissau
26	HTI	Haiti
27	HND	Honduras
28	IND	India
29	KEN	Kenya
30	KGZ	Kyrgyz Republic
31	LSO	Lesotho

No	Code	Country
32	MDG	Madagascar
33	MWI	Malawi
34	MLI	Mali
35	MRT	Mauritania
36	MDA	Moldova
37	MAR	Morocco
38	MOZ	Mozambique
39	MMR	Myanmar
40	NPL	Nepal
41	NIC	Nicaragua
42	NER	Niger
43	NGA	Nigeria
44	PAK	Pakistan
45	PHL	Philippines
46	RWA	Rwanda
47	STP	São Tomé and Príncipe
48	SEN	Senegal
49	SLE	Sierra Leone
50	SLB	Solomon Islands
51	SSD	South Sudan
52	LKA	Sri Lanka
53	TJK	Tajikistan
54	TZA	Tanzania
55	TGO	Togo
56	TUN	Tunisia
57	UGA	Uganda
58	UKR	Ukraine
59	VUT	Vanuatu
60	VNM	Vietnam
61	ZMB	Zambia
62	ZWE	Zimbabwe

Table 2. Multicollinearity test results

	gdpgrowth	resource	infla	exp	lf
gdpgrowth	1				
resource	-0.1322	1			
infla	-0.2515	0.1466	1		
exp	-0.0814	0.1094	0.0171	1	
lf	-0.1574	0.1982	0.0223	-0.1729	1

Source: Own calculations

Table 3. Hausman test results

	(b)	(B)	(b-B)	sqrt(diag(V_b
	fixed	random	Difference	Std. err.
lf	-27.2595	-36.8918	9.632357	5.006245
exp	0.083715	-0.02554	0.109252	0.033578
infla	-0.23659	-0.21751	-0.01908	0.016596
resource	0.241223	0.038437	0.202786	0.032867

b = Consistent under H0 and Ha; obtained from xtreg.

B = Inconsistent under Ha, efficient

under H0; obtained from xtreg.

Test of H0: Difference in coefficients not systematic

$\chi^2(4) = (b-B)'[(V_b - V_B)^{-1}](b-B)$

43.81

Prob > chi2 = 0.0000

Source: Own calculations

Table 4. Autocorrelation test results

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

$F(1, 61) = 1.019$

Prob > F = 0.3166

Source: Own calculations

Table 5. Heteroskedasticity test

Modified Wald test for groupwise heteroskedasticity in fixed effect regression model

H0: $\sigma(i)^2 = \sigma^2$ for all i

chi2 (62) = 73498.00

Prob>chi2 = 0.0000

Source: Own calculations

Table 6. Ramsey Reset Test results for omitted variables

Ho: Model is Specified - Ha: Model is Misspecified

* Ramsey Specification ResetF Test

- Ramsey RESETF1 Test: $Y = X Yh2$ = 68.363 P-Value

- Ramsey RESETF2 Test: $Y = X Yh2 Yh3$ = 45.100 P-Value

- Ramsey RESETF3 Test: $Y = X Yh2 Yh3 Yh4$ = 34.818 P-Value

Source: Own calculations

Table 7. FE, RE model estimation and Hausman test results

VARIABLES	(1) fe	(2) re
lf	- 27.259** (0.039)	- 36.892*** (0.002)
exp	0.084* (0.055)	-0.026 (0.357)
infla	- 0.237*** (0.000)	-0.218*** (0.000)
resource	0.241*** (0.000)	0.038 (0.194)
Constant	0.148 (0.911)	4.777*** (0.000)
Observations	550	550
Number of country1	62	62
R-squared	0.136	
χ^2 Hausman test	43.81	0.0000
pval in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Source: Own calculations

Table 8. FE and FE with the robust option estimations

VARIABLES	(1) fe	(2) robust
	-	-
lf	27.259** (0.039)	27.259*** (0.01)
exp	0.084* (0.055)	0.084** (0.019)
	-	-
infla	0.237*** (0.000)	-0.237** (0.016)
resource	0.241*** (0.000)	0.241*** (0.001)
Constant	0.148 (0.911)	0.148 (0.901)
Observations	550	550
Number of country	62	62
R-squared	0.136	0.136

Robust pval in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Own calculations