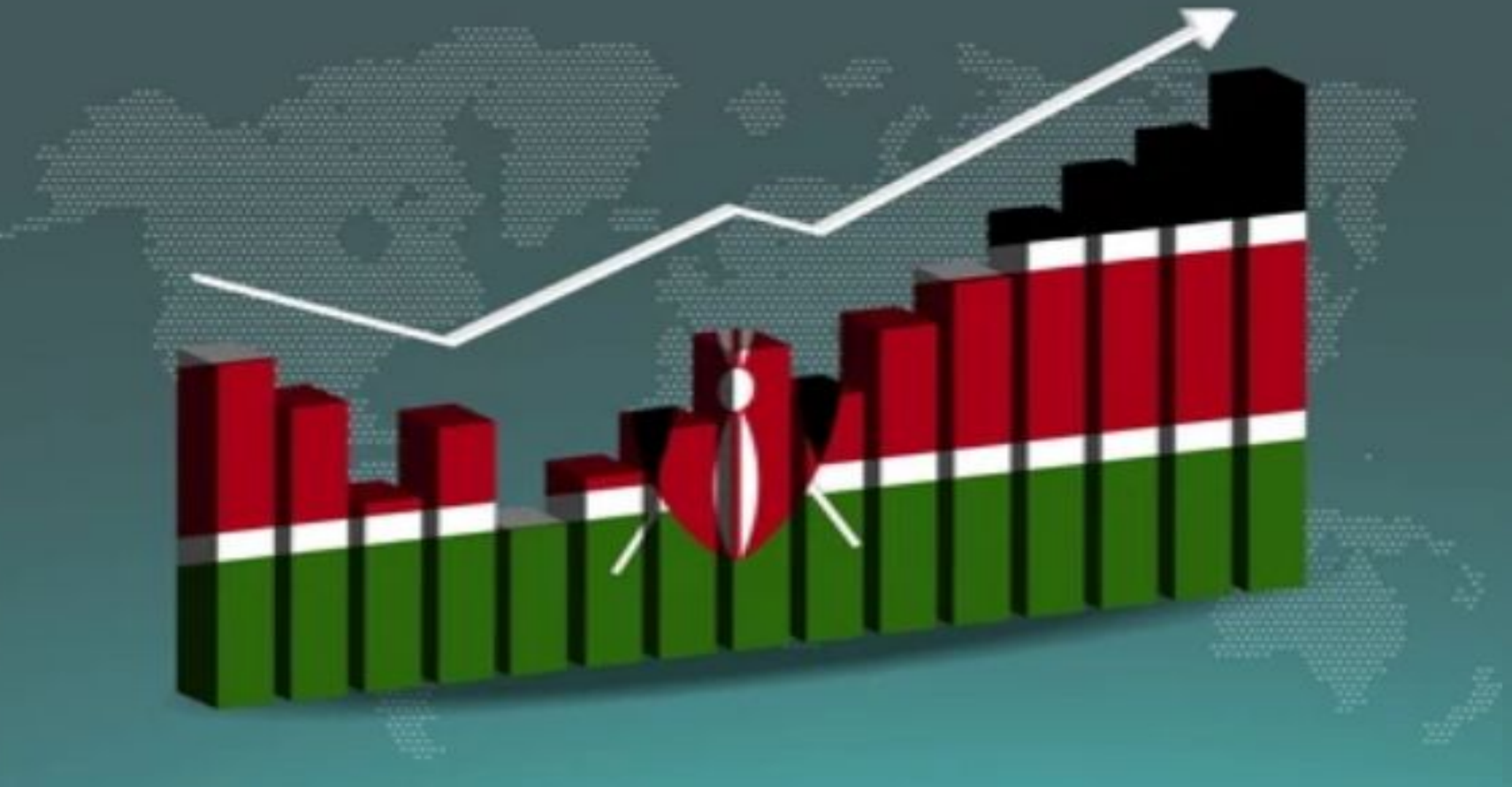
What Are The Effects Of Different Types Of The Government Expenditures And Investment On The Kenya’s Economic Growth?



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Why Is This Topic Interesting?

- **Kenya** is one of the countries that has the emerging economy in Africa, which is evidenced by **5% GDP growth by 2023**.
- From the **private and public sectors**, different types of government expenditures and investments have been going on in Kenya that can potentially contribute to **its economic growth.**
- For example, Kenyan government has allocated **$132 million USD** on the development of ICT sector according to Kenya's *national budget allocations for FY 2022/2023.* Also, the average FDI inflows in Kenya increased by 35% between 2019 and 2021.
- Therefore, with different types of government expenditures and investments in Kenya going on for its economic growth, I would like to **assess the effects of different types of government expenditures and investments** in Kenya on **its economic growth**.

Literature Review

The effect of foreign direct investment on the economic growth of Sub-Saharan African countries: An empirical approach (2022)

- The study aims to assess the impact of foreign direct investment on the economic growth of Sub-Saharan African countries. The study examined panel data from 22 nations in Sub-Saharan Africa from 1988 to 2019.

- The finding of study suggests that the po**sitive and statistically significant relationship** between increase of foreign direct investment in Sub-saharan economies and economic growth.The **1% increase** of foreign direct investment means the **increase o**f economic growth of sub-Saharan African countries **by 0.138%.**

Population dynamics and economic growth in Kenya (2021)

- The study used a Kenyan population dynamic, economic growth and social expenditure time series dataset for the period of 2000–2018 to evaluate the effect of changes in population size and structure on Kenya's economic growth, taking into account the contributions of social expenditure including healthcare spending.

- The finding of study reveals the **negative** and **statistically significant** relationship between the social expenditure and the economic growth.

Information and communication technology penetration level as an impetus for economic growth and development in Africa (2020)

- The study aims to examine the effect of the performance of ICT on economic growth and development in Africa through assessing the relationship between ICT penetration indicators (mobile telephone, fixed-line telephone and Internet access subscriptions) and economic growth indicator (GDP - real gross domestic product)

- The finding of the study suggests that **ICT penetration** has the **positive impact** on **economic growth and development in African countries**.

Contributions to Existing Literatures

Contribution 1

There are not have been much of empirical researches with constructing the statistical model on how different areas and types of investments in Kenya have impacted its economic growth. Therefore, I would like to do it by **constructing a statistical model to explore the relationship between the economic growth and the various types of investments and government expenditures**

Contribution 2

Also, I plan to include variables of investments and that **have not been addressed much** for economic growth in Kenya in existing literatures such as the **investment on telecommunication service**

Raw Data

Year	GDP_per_capita	Foreign_Direct_Investment	Government_Health_Expenditure	Telecommunication_Investment
2001	408.3606087	53.02622939	246.1165109	2947.69
2002	401.0923718	276.1844706	261.1256586	3468.06
2003	441.3914117	817.3824264	289.9747899	7913.09
2004	462.6182158	460.6393145	297.7209045	4438.55
2005	522.7768371	212.116854	332.5303492	6781.49
2006	699.3997381	506.7472518	369.9866897	7928.85
2007	840.1916319	7290.44146	479.282657	6269.03
2008	915.9989157	955.8568023	547.1893352	7447.16
2009	1049.121794	1162.57609	561.5862121	5145.31
2010	1093.639628	1780.646068	618.7769338	7121.64
2011	1099.315465	14504.74757	699.133242	5821.7
2012	1289.780795	13801.73662	889.0787415	8003.59
2013	1376.829206	11188.25	1024.308351	3939.02
2014	1489.919724	8209.375984	1236.100016	4381.21
2015	1496.653568	6197.24465	1315.408755	5163.32
2016	1562.076611	4695.333107	1473.916813	3811.08
2017	1675.98843	13460.85345	1121.396935	3772.52
2018	1845.783413	7677.615067	1371.427194	5675.94
2019	1970.080063	4699.402668	1472.809615	3718.7
2020	1936.250752	4263.051894	1687.002987	4308.77

Data/Variables/Model Description

Data

- The period of data is from 2001 to 2020

Variables

- Dependent variable-GDP per capita (in USD)
- Independent variable
  - Foreign direct investment net inflow (per million USD)
  - Annual Investment in Telecommunication Service (per million USD)
  - Health Expenditure - Government Scheme (per million USD)

Model

- *Significance level* (α)= *0.05*
- Y (GDP per capita) = β0 (Intercept) + β1*x1 (Foreign direct investment)+β2*x2 (Government health expenditure) + β3*x3(Investment in telecommunication services)

Hypothesis

Hypothesis 1

Null Hypothesis (H0): The statistical model equation is not significant

Alternative Hypothesis (H1): The statistical model equation is significant

Hypothesis 2

Null Hypothesis (H0): The corresponding population value of each partial regression coefficients is equal to 0. ($\beta i=0$)

Alternative Hypothesis (H1): The corresponding population value of each partial regression coefficients is not equal to 0. ($\beta i\neq 0$)

*(i=1,2,3 in this model)

Computational Result

```
Call:
lm(formula = GDP_per_capita ~ Foreign_Direct_Investment + Government_Health_Expenditure +
    Telecommunication_Investment, data = rm2)

Residuals:
    Min      1Q  Median      3Q     Max
-207.48  -74.45  -29.59   81.06  233.68

Coefficients:
                              Estimate Std. Error t value Pr(>|t|)
(Intercept)                  1.217e+02  1.411e+02   0.863    0.401
Foreign_Direct_Investment    1.219e-02  7.145e-03   1.706    0.107
Government_Health_Expenditure 1.028e+00  7.886e-02  13.032 6.17e-10 ***
Telecommunication_Investment  1.990e-02  2.002e-02   0.994    0.335
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 134.8 on 16 degrees of freedom
  (1 observation deleted due to missingness)
Multiple R-squared:  0.9458,    Adjusted R-squared:  0.9357
F-statistic: 93.16 on 3 and 16 DF,  p-value: 2.408e-10
```

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.97254746
R Square	0.945848563
Adjusted R Square	0.935695168
Standard Error	134.7842019
Observations	20

ANOVA

	df	SS	MS	F	Significance F
Regression	3	5077028	1692343	93.15589597	2.4083E-10
Residual	16	290668.5	18166.78		
Total	19	5367697			

	Coefficients	tandard Err	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	121.7065099	141.0507	0.862857	0.400965267	-177.30751	420.7205	-177.3075112	420.720531
Foreign_Direct_Investment	0.012189339	0.007145	1.705883	0.107362801	-0.0029584	0.027337	-0.002958389	0.027337067
Government_Health_Expenditure	1.027710786	0.078863	13.03162	6.17399E-10	0.86052896	1.194893	0.86052896	1.194892612
Telecommunication_Investment	0.019904462	0.020024	0.994046	0.334996768	-0.0225438	0.062353	-0.022543833	0.062352758

Checking the Multicollinearity (VIF)

```
> library(car)
> mod2<-vif(mod1)
> mod2
   Foreign_Direct_Investment  Telecommunication_Investment Government_Health_Expenditure
                    1.325903                      1.163475                      1.510718
```

No major multicollinearity issue detected as **all of independent variables**' VIF values **are less than 10** .

Result Interpretation 1 - Correlation

Regression Statistics	
Multiple R	0.97254746
R Square	0.945848563
Adjusted R Square	0.935695168
Standard Error	134.7842019
Observations	20

Multiple R-squared value signifies the magnitude of the correlation between independent variables and dependent variable in the model. According to the model result, it implies that **three independent variables in the model** has **a high (0.9725) correlation** with **the dependent variable**

Result Interpretation 2 - Model Variability

```
Call:
lm(formula = GDP_per_capita ~ Foreign_Direct_Investment + Government_Health_Expenditure +
    Telecommunication_Investment, data = rm2)

Residuals:
    Min      1Q  Median      3Q     Max
-207.48  -74.45  -29.59   81.06  233.68

Coefficients:
                             Estimate Std. Error t value Pr(>|t|)
(Intercept)                 1.217e+02  1.411e+02   0.863    0.401
Foreign_Direct_Investment   1.219e-02  7.145e-03   1.706    0.107
Government_Health_Expenditure 1.028e+00  7.886e-02  13.032 6.17e-10 ***
Telecommunication_Investment  1.990e-02  2.002e-02   0.994    0.335
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 134.8 on 16 degrees of freedom
  (1 observation deleted due to missingness)
Multiple R-squared:  0.9458,    Adjusted R-squared:  0.9357
F-statistic: 93.16 on 3 and 16 DF,  p-value: 2.408e-10
```

Adjusted R-squared value signifies how much changes in independent variables explain the dependent variable. Therefore, we can interpret the result as the **changes in three independent variables explain** approximately **93.6%** of the **dependent variable**

Result Interpretation 3 - ANOVA test

```
Call:
lm(formula = GDP_per_capita ~ Foreign_Direct_Investment + Government_Health_Expenditure +
    Telecommunication_Investment, data = rm2)

Residuals:
    Min      1Q  Median      3Q     Max
-207.48  -74.45  -29.59   81.06  233.68

Coefficients:
                              Estimate Std. Error t value Pr(>|t|)
(Intercept)                  1.217e+02  1.411e+02   0.863    0.401
Foreign_Direct_Investment    1.219e-02  7.145e-03   1.706    0.107
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Telecommunication_Investment  1.990e-02  2.002e-02   0.994    0.335
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 134.8 on 16 degrees of freedom
  (1 observation deleted due to missingness)
Multiple R-squared:  0.9458,    Adjusted R-squared:  0.9357
F-statistic: 93.16 on 3 and 16 DF,  p-value: 2.408e-10
```

By looking at the F-statistics and its p-value, we can check whether we can reject the null hypothesis from Hypothesis 1 (from slide 8) or not (The statistical model equation is significant or not). According to the p-value, it’s less than 0.05. Therefore, we have **sufficient evidence** to **reject the null hypothesis** that **the statistical model equation is not significant**

Result Interpretation 4 - Independent Variables

```
Call:
lm(formula = GDP_per_capita ~ Foreign_Direct_Investment + Government_Health_Expenditure +
    Telecommunication_Investment, data = rm2)

Residuals:
    Min      1Q  Median      3Q     Max
-207.48  -74.45  -29.59   81.06  233.68

Coefficients:
                             Estimate Std. Error t value Pr(>|t|)
(Intercept)                 1.217e+02  1.411e+02   0.863    0.401
Foreign_Direct_Investment    1.219e-02  7.145e-03   1.706    0.107
Government_Health_Expenditure 1.028e+00  7.886e-02  13.032 6.17e-10 ***
Telecommunication_Investment  1.990e-02  2.002e-02   0.994    0.335
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 134.8 on 16 degrees of freedom
  (1 observation deleted due to missingness)
Multiple R-squared:  0.9458,    Adjusted R-squared:  0.9357
F-statistic: 93.16 on 3 and 16 DF,  p-value: 2.408e-10
```

Among all of independent variables, only government health expenditure can reject the null hypothesis from Hypothesis 2 (from slide 8) with p-value less than 0.05. Therefore, we have **sufficient evidence** to conclude that **the the population value** of government health expenditure variable **is not 0.**

The interpretation of the coefficient for government health expenditure variable:

For given levels of the foreign direct investment and investment in telecommunication services, **another increase of $1 (million)** of government health expenditure **increases** the GDP per capita by **1.028$**.

Conclusion

- Statistical model used in the research is **significant**.
- **Government health expenditure can** be the **significant predictor** for the economic growth in Kenya.
- However, **the Inflow of foreign direct investment and the investment in telecommunication services cannot** be the **significant predictors** for the economic growth in Kenya.

Limitations of the Research

- Small sample size (n=20)
- Lack of variabilities of independent variables in the model (Only three independent variables)
- Lack of specification on individual variables
  - For example, inflow of foreign direct investment can be separated into the inflow of the foreign direct investment to infrastructure or agriculture

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