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Government Capital Expenditure and the Manufacturing Sector's Output Performance in Kenya

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Abstract:
The manufacturing sector is named as a key sector that promotes development through contribution to Gross Domestic Product, employment generation, value addition, diversification, industrialization and technological innovations. The government of Kenya has spent a lot of resources to boost the growth of the manufacturing sector. The need for growth in this sector picked momentum in the early 60s. Policies like the Import substitution in 1963-1970, Structural Adjustment Programs in the 80s, the Vision 2030 in 2008, the Kenya Industrial Transformation Program in 2015, and the Big Four Agenda in 2018 have been implemented to spur growth in the sector and to turn Kenya into an industrial middle-income economy. Much emphasis has since been placed on spending by increased government expenditure towards the manufacturing sector to improve the overall performance. Despite all, the conduct of the manufacturing sector, as shown by the sector's contribution to the Gross Domestic Product, only increased substantially in the first three decades after independence, after which it stagnated to below 9 percent to date. The purpose of the study was to find out the effect of government capital expenditure in the manufacturing sector on the sector's performance. The Autoregressive Distributed Lag Error Correction model was used to achieve the objective of the study. The study found out that public resources were allocated to the manufacturing sector. Further, the study found out that government capital expenditure significantly contribute to growth of the manufacturing sector. Recurrent expenditure was also statistically significant in explaining changes in the manufacturing sector performance

Keywords: *Government expenditure and the performance of the manufacturing sector in Kenya*

1. Introduction

1.1. Background of the Study

The manufacturing sector is a pioneering industry in any thriving economy. The sector provides a means of enhancing productivity in nexus to export growth and import substitution, highlighting an opportunity to earn foreign currency and creating employment opportunities. (Haraguchi, N., Cheng, C. F. C., & Smeets, E., 2017). Manufacturing is crucial in the growth of the economy through the contribution to GDP, the production of goods, the development of new products and the value addition of existing products (Adebayo, 2011). Apart from increasing the global share of employment and contribution to global GDP, it has also been highlighted as an engine of growth and a path of diversification for many developing nations (Felipe, J., Mehta, A., & Rhee, C, 2015).

The manufacturing sector has transformed multiple nations' leading macroeconomic and microeconomic benefits (Adeyemi & Akode, 2022). Developed countries have also focused on fostering robust industrial technology to promote industrialization. However, this narrative seems to exclude many African countries despite their rich natural resources endowment. Industrialization path of many African countries is dawdling behind, leading to stagnation, poor economic performance and slow technological advancement (Africa Development Bank, 2020). According to African Development Bank report (2023), the African industrial sector output and the total imported goods perpetually increased compared to the total amount of exported goods. This disproportion has not only piloted deindustrialization in Africa but has also robbed Africa of its wealth. Figure 1 below shows Africa's regional description of the manufacturing sector's contribution to GDP.

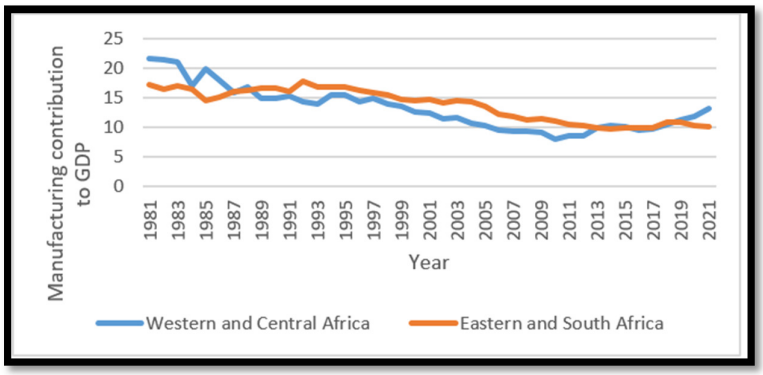

Figure 1: Africa Regions' Industrial Sector's Contribution to Africa's GDP (1980-2021)
Source: World Development Indicators, 2023

Figure 1 above shows that there has been a decline in the manufacturing sector's contribution to Africa's GDP in the Western and Central regions. A similar trend has been observed in the Southern and Eastern regions. This ebbing trend has been instigated by external shocks, rise in interest rates, market inefficiency trade barriers and infrastructural barriers (IMF, 2021, World Bank 2022).

1.1.1. Overview of Kenya's Manufacturing Sector

The Kenya Manufacturing sector is one of the essential sectors that has been vital in creating employment opportunities, enhancing export competitiveness, and encouraging economic prosperity (Kipruto, 2020). Loto (2012) highlighted this sector as a pool of benefits for dynamic economic development which can also play a catalytic role in the contemporary economy. Since independence, Kenya has undertaken numerous initiatives to enhance the development of its industrial sector. This effort picked momentum in the early 70s with the introduction of policies such as Import substitution 1970, structural adjustment programs in 1982, Vision 2030 in 2008, the Industrial Transformation Program in 2015, and the Big Four Agenda 2018, among others. However, despite the effort resulting in the country having a relatively large industrial sector, it has not been dynamic enough to function as a catalyst of growth. (Kenya Medium Term Plan, 2022).

The figure below shows a trend of performance by three major sectors in Kenya. In 2021, the Manufacturing, Agriculture and Service sectors contributed 7.24%, 21.7% and 54.41% to the Gross Domestic Product, respectively (World Development Indicators, 2024). The dawdling performance of the manufacturing sector is a clear indication that Kenya's economy has failed to adjust to the structural path evident in just industrialized and already industrialized economies. Normally, countries shift from an agriculture-dominated economy to industrialization (Kenya Association of Manufacturers, 2023).

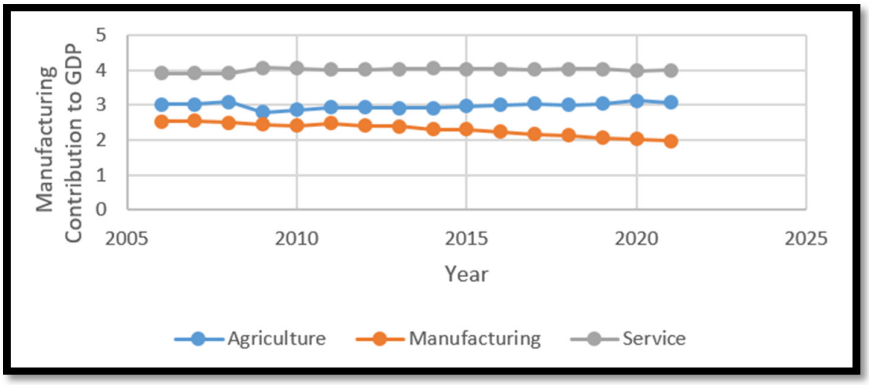

Figure 2: Kenya's Agriculture, Service and Manufacturing Sectors' Contribution to GDP
Source: World Development Indicators, 2023

1.1.2. Trend and Composition of Government Expenditure in the Manufacturing Sector

The Keynesian and Neoclassical economists highlighted expenditure as a tool that the government uses to embark on the activities of the economy, taking the role of administration and oversight in the presence of market disarray (Usman, 2011). Government expenditures are those costs accrued for government upkeep and those spent for the well-being of the public and the overall economy. They are sourced from taxation, public borrowing, grants and foreign aid (Oladiran & Emmanuel, 2015). Government expenditure can be divided into development expenditure and recurrent expenditure. Development expenditure refers to funds spent on projects with the aim of promoting economic and social progress. It is earmarked for projects that contribute to the long-run prosperity of the economy (International Monetary Funds, 2020). Recurrent expenditure refers to the ongoing cost that the government incurs to maintain regular operations, functions and

services. These expenses are majorly incurred repeatedly. They usually include wages, salaries, pensions and other costs that are not associated with long-term investments (IMF, 2021). Like many developing countries in Africa, Kenya has struggled to build a robust manufacturing sector. Much emphasis has since been put on spending and budgetary allocation by the government of Kenya (Republic of Kenya, 2023). Figure 3 below shows a trend of government expenditures by the government in Kenya's manufacturing sector from 1984 to 2020.

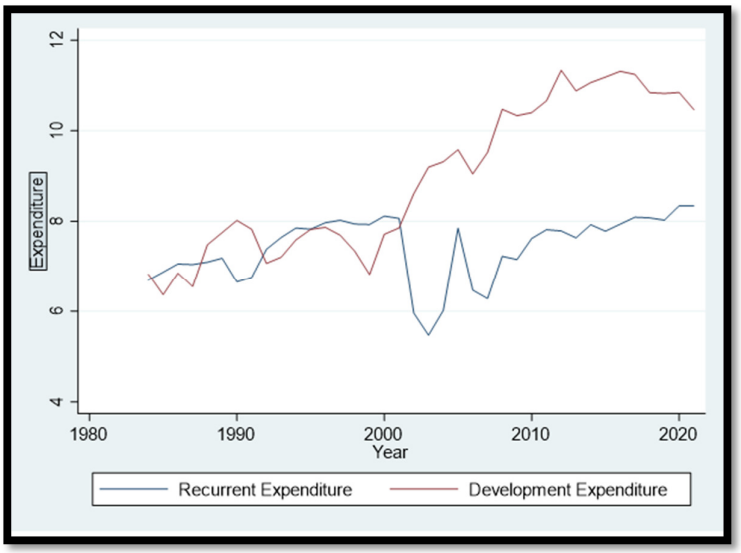

Figure 3: Government Expenditure in Manufacturing Sector 1984-2020
Source: Kenya National Bureau of Statistics Various Issues

Over the years, the government of Kenya has witnessed a significant increase in expenditure within the manufacturing sector. Development expenditure increased gradually between 1984-2001 and some years after 2010. This increase can be attributed to the creation of special economic zones, the formation of Kenya's Industrial Research and Development Institute and the establishment of an industrial cluster. Decreases were experienced in the years 1991, 2002, 2007 and 2013 when the country was suffering from political instability, low-value addition, poor transport network and the effects of general elections (Republic of Kenya, 2010). Due to its fixed nature, recurrent expenditure presented a non-varying trend compared to development expenditure. Increases were, however, noted from 1985 to 2011. They are attributable to reforms made by the government to revive the public sector. The decreases in the years 2002 and 2007 were due to declining economic activity as well as low supply input for industries (Republic of Kenya, 2022).

1.1.3. Sectorial Contribution to GDP and Government Spending in the Manufacturing Sector

Figure 4 below shows the trend of expenditure by the government of Kenya and the manufacturing sector's contribution to GDP from 1984 to 2020. There is a greater variation in development spending than recurrent spending. This results from stakeholders realizing the importance of developmental spending in the sector towards the economy (Bigsten, A Kimuyu, P., & Söderbom, M., 2010). The objective was to enhance the performance of the sector in order to boost the overall economic growth.

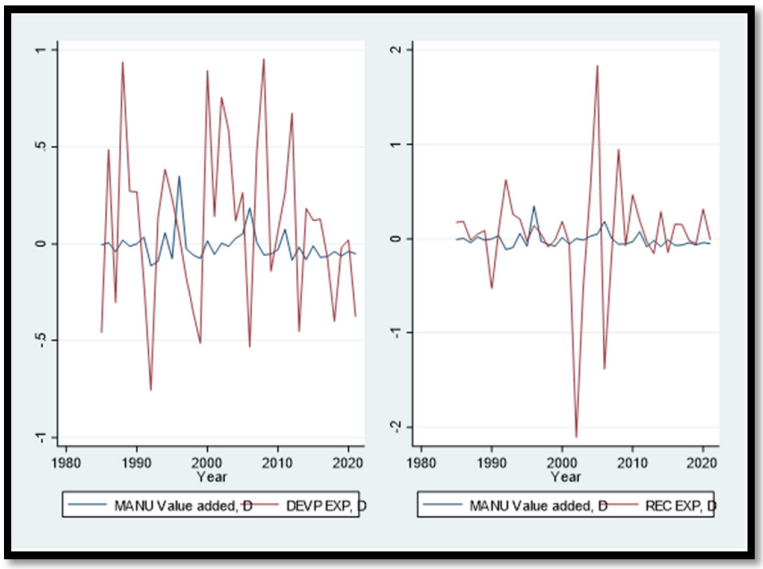

Figure 4: Government Expenditure in the Manufacturing Sector and the Manufacturing Sector's Contribution to GDP
Source: Author's Calculation Based on Data from WDI and KNBS

1.2. Statement of Problem

Literature such as Idowu (2021), Nwanne (2015) and Odhiambo (1991) highlighted a positive link between government development expenditure and sectorial performance. Notably, the government of Kenya has continued to prioritize spending in the sector (Kimuyu et al., 2010). This has been done with the aim of transforming the country into an industrialized middle-income economy (Republic of Kenya, 2010). Although the manufacturing sector's performance only improved fairly in the first years after the independence, it generally decreased (Chege, J., Ngui, D., & Kimuyu, P., 2016). The government has also undertaken an initiative to restructure spending by weeding our unproductive expenditure and increasing productive expenditure (Maingi, 2010). It is against this backdrop that the study seeks to find out the effect of government development expenditure in the manufacturing sector on manufacturing sector performance.

2. Literature Review

2.1. Keynesian Theory

The Keynesian Theory is one of the noted theories that describe the relationship between economic growth and public expenditure. It was formed in 1936 by John Maynard Keynes. Keynes highlighted government spending as a key factor that promotes economic growth. An increase in spending leads to increased investment, employment and profitability through a multiplier effect on aggregate demand. Keynes argued that reducing government spending would reduce aggregate demand, slowing the economy's rate of growth.

2.1.1. Devarajan Model: Public Expenditure and Economic Growth Nexus

Devarajan et al. 1996 conducted a study to find out the components of spending that boost economic development using data from 46 developed countries. The study derived a condition where a shift in allocation from unproductive to productive expenditure enhances economic growth. He highlighted that a shift in productive expenditure may be futile if there is an excessive amount of them. However, the study did not address how the government determined the extent of spending.

2.2. Empirical Literature Review

Maingi (2020) conducted a study to measure the association between the component of government spending and the growth of Kenya's economy. The study found out that the government spending on education, service and infrastructural development had a long-term significant effect on the growth of economy. Nwanne (2015) carried out a study on the effect of capital expenditure on the manufacturing sector in Nigeria. The study found that the efficient allocation of resources in the manufacturing sector is detrimental. The Nigerian industrial sector's long- and short-term outputs were dependent on capital expenditure by the government. Tenai (2020) carried out a study to investigate the impact government spending has on service and agriculture. The study found out that spending on agriculture and service is key towards moving the country to achieving vision 2030. The study, however, failed to uncover how spending per sector influenced the sector's growth and the overall economy. Adeyemi and Akode (2020) carried out a study to find out how government spending affected manufacturing output in West African countries. The study found that all other variables except capital expenditure had a positive significant effect on the manufacturing sector. Idowu (2021) also found out that increased government allocation in Nigeria increased sectorial performance.

2.3. Summary of Literature

The manufacturing sector has been highlighted as an engine of economic growth (Steel, 2010). It is the spine of socio-economic success. Given that the manufacturing sector is a component of overall economic development, theories like Keynesian and Devarajan et al. can be used to investigate the performance of the manufacturing sector in the economy. The reviewed literature above is a clear indication of the continued research in the manufacturing sector.

3. Methodology

The study sought to find out how government capital expenditure in the manufacturing sector affects the manufacturing sector's performance in Kenya. The study, thus, adopted a modified Devarajan et al. (1996) model. This model helped to capture the productive and unproductive spending by expressing their difference and finding out how a change in one will affect the long-run trajectory of the manufacturing sector. Borrowing from the literature and theories reviewed, variables such as real rate of interest, exchange rates, inflation, and GDP are key in determining the effect of government expenditure on the manufacturing sector. Therefore, the study included the variables in the model as s control variables.

$$Y^{Manu} = f(DET, GDP, EXC, RIR, INF) \quad (3.1)$$

$$Y^{Manu} = \beta_0 + \beta_1 DET + \beta_2 REXP + \beta_3 GDP + \beta_4 EXC + \beta_5 RIR + \beta_6 INF + \varepsilon_1 \quad (3.2)$$

The ARDL empirical equations below were utilized to meet the objectives of the study.

$$MANU_t = \beta_0 + \sum_{i-0}^{p} \beta_1 \Delta MANU_{t-i} + \sum_{i-0}^{p} \beta_2 \Delta REXP_{t-i} + \sum_{i-0}^{p} \beta_3 \Delta DET_{t-i} + + \sum_{i-0}^{p} \beta_4 \Delta RIR_{t-i} + \sum_{i-0}^{p} \beta_5 \Delta INF_{t-i} + \sum_{i-0}^{p} \beta_6 \Delta EXCH_{t-i} + \sum_{i-0}^{p} \beta_7 \Delta GDP_{t-i} + \delta_1 MANU_{t-i} + \delta_2 REXP_{t-i} + \delta_3 DET_{t-i} + \delta_4 RIR_{t-i} + \delta_5 INF_{t-i} + \delta_6 EXCH_{t-i} + \delta_7 GDP_{t-i} + \varepsilon_{1t} \quad (3.3)$$

The equation was used to ascertain the no-level relationship in the time series ARDL framework. The parameters$\beta_1 \ldots \beta_7$ were short-run elasticities. $\delta_1 \ldots \delta_6$ were the long-run multipliers used to get the Error Correction Model. Once the long-run relationship was ascertained, the following Error Correction Models were estimated

$$MANU_t = \beta_0 + \sum_{i-0}^{p} \beta_1 \Delta MANU_{t-i} + \sum_{i-0}^{p} \beta_2 \Delta REXP_{t-i} + \sum_{i-0}^{p} \beta_3 \Delta DET_{t-i} + + \sum_{i-0}^{p} \beta_4 \Delta RIR_{t-i} + \sum_{i-0}^{p} \beta_5 \Delta INF_{t-i} + \sum_{i-0}^{p} \beta_6 \Delta EXCH_{t-i} + \sum_{i-0}^{p} \beta_7 \Delta GDP_{t-i} + \delta_1 ECM_{t-1} + \varepsilon_{1t} \quad (3.4)$$

Y^{Manu} – Manufacturing sector contribution to GDP, DET- Development Expenditure in the manufacturing sector, GDP– Gross Domestic Product, EXC –Exchange Rate, RIR - Real Interest Rate, INF- Inflation rate, ε_1 , are the disturbance terms. REXP- Government Recurrent Expenditure in the manufacturing sector.

3.1.1. Definition and Source of Variables

Variable	Definition	Source
Manufacturing sector contribution to GDP (Y^{Manu})	It is the overall value of products produced in the manufacturing sector. Also, the manufacturing value added as the percentage of GDP	World Development Indicators
Development expenditure (DET)	Its funds that the government allocates to projects in order to promote economic and social progress	Kenya National Treasury Report
Recurrent Expenditure (REXP)	It is all payments other than capital expenditure, including those on goods and services spent by the government.	Kenya Natural Treasury Report
Inflation (INF)	It is the rate of increases in prices of a basket of commodities, leading to a decline in the purchasing power of local currency.	Central Bank of Kenya
Exchange Rate (EXC)	It is the value of Kenyan Shilling per US dollar	Central Bank of Kenya
Gross Domestic Product (GDP)	It is the Total value of all goods and services produced in a country. It captures the change in the value of the economy for a period of time.	World Bank
Real rates of Interest (RIR)	This is the rate of interest after adjustment to inflation	World Development Indicators

Table 1: Definition and Source of Variables

4. Data Analysis and Conclusion

4.1. Analysis and Findings

The government spent an average of 22314.45 million Kenya shillings in the manufacturing sector in Kenya from 1984 to 2019. The descriptive statistics showed that DET had a minimum of 596.33 million shillings and a maximum of 86235.75 million Kenya shillings. This was a clear indication of increased development expenditure in the manufacturing sector. Y^{Manu} had a minimum value of 7.3346 and a maximum value of 12.6545 during the entire period. The skewness of 0.1742, kurtosis of 2.642 and a joint probability chi-square of 0.8738 showed that the series was normally distributed. Variables with high standard deviation indicated that the data values clustered away from the mean. DET and INF presented a probability chi-square value of less than 0.05%, indicating that they were not normally distributed. DET and INF were positively skewed. RIR and GDP had a kurtosis greater than 0.05 and, therefore, were normally distributed.

4.2. Unit Root Test

4.2.1. Augmented Dickey-Fuller Test Unit Root Test

Variable	ADF Test Statistic	5% Critical Value	10% Critical Value	Order	Remark
DET	-3.998	-2.975	-2.620	I(1)	Stationary
Y^{Manu}	-3.713	-2.975	-2.620	I(1)	Stationary
RIR	-3.475	-2.975	-2.620	I(0)	Stationary
EXC	-3.482	-2.975	-2.620	I(1)	Stationary
INF	-3.655	-2.975	-2.619	I(0)	Stationary
REX	-5.864	-2.709	-2.623	I(1)	Stationary
GDP	-3.852	-2.983	-2.623	I(0)	stationary

Table 2: Augmented Dickey-Fuller Test
Source: Author's Calculations

The result of the Augmented Dickey-Fuller test shows that DET, ECH, REXP and the manufacturing sector's value added were stationary at first difference. INF and RIR were stationary at level. The results of the Phillips Perron test shown in the appendices also confirm the test results.

4.2.2. Cointegration Test

Given the different order of integration of the variables, the Autoregressive Distributed Lag Bounds Cointegration test was used as it allows for different order of integration. From the Results of the Bound test below, the f-statistic 7.394 is greater than the 5% upper bound of 4.01. We therefore reject the null hypothesis and conclude that there exist a long run relationship between the variables in the model.

F-Statistic	7.394			
Significance Level	1%	5%	2.5%	10%
I_0	2.45	2.86	3.25	3.74
I(1)	3.52	4.01	4.49	5.06

Table 3: ARDL Bound Test
Source: Author's Compilation

4.2.3. Diagnostic and Stability Tests

The Breusch Godfrey LM test was used to test for serial correlation in the error term. From the result of the test, the p-value of 0.6534 was greater than 0.05. We, therefore, do not reject the null hypothesis of No serial correlation. The d-statistic from the Durbin-Watson test 2.1 indicated the absence of autocorrelation. The white Test for Homoscedasticity gave a p-value of 0.6532, which is greater than 0.05%, indicating that the error term had a constant variance. The cumulative sum test statistic 0.46281 was lower than the 5% critical value 0.9479, indicating that the model was stable.

4.3. Auto Regressive Distributed Lag Model for the Manufacturing Sector's Performance in Kenya

Dependent Variable: MAN			
Short-Run Model			
Variable	**Coefficient**	**Probability**	**T-statistic**
MANU	0.8666	0.698	0.45
DET	0.3852	0.0423**	1.19
REX	0.8839	0.044**	4.58
RIR	-0.00232	0.0651*	-0.49
INF	-0.00186	0.0624*	-0.52
EXC	0.51263	0.039**	2.63
GDP	-0.0454	0.045**	-2.52
CONS	-0.18928	0.0640*	-0.49
Long-Run Model			
Speed of Adjustment	-0.13107	0.0464**	0.78
DET	0.70672	0.0466**	0.71-
REX	0.04642	0.0689*	-0.46
RIR	-0.06223	0.4641**	0.60
INF	-0.02119	0.0649**	0.43
EXC	-0.63471	0.5749*	-0.58
GDP	-0.56571	0.047**	-0.77
R-squared = 0.9634 Breusch Godfrey = 0.7582		Adjusted R-Squared= 0.7908 DW = 2.05434	

Table 4: ARDL Results
Source: Author's Compilation
****, ** and * Represent Significant at 1%, 5% and 10%, Respectively*

From the table above, the long-run results of the ARDL model showed that DET, REXP, RIR, and INF had a positive relationship with manufacturing sector performance. The results showed that the variables were significant in the long run. In the short run, the magnitude of the recurrent expenditure was greater than that of the development expenditure. The opposite is true in the long run. This implied that development expenditure had a significant effect on the manufacturing sector more in the long-run than in the short-run. The model explains 96.34% of the total variations of the dependent variable.

5. Conclusion and Recommendation

The results of this study clearly indicate that government capital and recurrent spending contributed to the manufacturing sector's performance by increasing the value added. Public expenditure was rightfully allocated to the manufacturing sector with the commitment to improve sectorial contribution, providing sustainable growth and infrastructure development. However, the government should be very keen to avoid the chance that funds allocated are mismanaged or used inappropriately. Political leaders mandated to oversee capital-intensive projects who engaged in corruption and resource misappropriation should be brought to book. The government of Kenya should, therefore, take the complete role of managing projects, monitoring, evaluating and enhancing policies on inflation, exchange rates and interest rates. In addition, the government should ensure that the institutions have the capacity to implement development projects to ensure project implementation and completion.

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Appendices

Descriptive Statistics

Variable	Mean	Median	Std-Dev	Min	Max	Skewness	Kurtosis
Y^{Manu}	10.28159	10.15012	1.189301	7.904616	12.79044	0.17536	2.70273
DET	21351.77	4265.045	27368.98	579.66	83705.6	1.1155	2.7816
RIR	7.724464	7.72054	7.03659	-10.096	21.09633	-0.44812	3.4059
INF	11.5177	9.56832	8.862258	1.55428	45.9788	2.05711	7.88067
EXC	63.3224	71.2135	28.4593	14.4138	103.41	-0.49252	2.0316
GDP	3.849564	4.2027	2.18324	-0.79949	8.05847	-0.34967	2.41216

Phillips Perron Fuller Test Unit Root Test

Variable	PP Test Statistic	5% Critical Value	Critical Value	Order	Remark
DET	-7.472	-2.975	-2.619	I(1)	Stationary
Y^{Manu}	-5.950	-2.975	-2.619	I(1)	Stationary
RIR	-4.426	-2.975	-2.618	I(0)	Stationary
EXC	-5.461	-2.975	-2.619	I(1)	Stationary
INF	-3.155	-2.975	-2.618	I(1)	Stationary
REX	-6.223	-2.975	-2.619	I(I)	Stationary

Ramsey RESET Test of Fitted Values

Ho model has no omitted variable
F (3, 8) = 0.60
Prob > F = 0.6345

Cumulative Sum Test for Stability

Test Statistic	**1% Critical Value**	**5% Critical Value**	**10% Critical Value**
	1.2452	0.9279	0.650