Macro-Financial Drivers and Spatial Dynamics of Construction Investment in African Regional Blocs

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Abstract

This study empirically evaluates the interactive effects of real effective exchange rate (REXR) variations, real interest rates (RIRT), and money supply (VM2S) and the key determining factor of construction investment across seven African regional blocs (ECOWAS, EAC, COMESA, CEMAC, WAEMU, Northern, and Southern Africa). The methodology integrates several advanced econometric techniques, including System GMM, Spatial Autoregressive/Error Models (SAR/SEM/SDM), Difference-in-Differences (DiD), Panel Threshold Regression, and Panel Quantile Regression (PQR), to account for average effects, spatial spillovers, causal policy impacts, and non-linear thresholds. The findings stress the necessity of joined-up policy action, as fragmented variable management leads to suboptimal outcomes. The financial depth threshold in COMESA and the fiscal sustainability level in CEMAC and WAEMU further emphasize the need for effective management of monetary and fiscal policies in order to ensure investment efficiency. The study is consistent in demonstrating that the money supply growth interplay with interest rates results in liquidity trap effect which is particularly acute in CEMAC and Southern Africa, where high costs of borrowing nullify the attempts to increase liquidity. The results of System GMM and PQR indicate that there is a change of a history-driven persistence in underdeveloped markets (0.412 on average in COMESA) to policy-driven persistence in more mature markets where the sensitivity of real interest and exchange rates interactions is highest at 1.25 in Northern Africa. The Pesaran CD test makes sure that there is high spatial interdependence ($p < 0.01$), with WAEMU being the most regionalized ($\rho = 0.385$) and CEMAC being the most fragmented ($\rho = 0.110$). Quasi experimental DiD evidence indicates that the gains of regional integration are causal and up to 21% (WAEMU) gains but commodity shocks may lead to substantial contractions as observed in CEMAC (-8.5%). Non-linear analysis reveals key thresholds: interest rate ceilings of 12.5% for

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ECOWAS and 10.0% for Southern Africa and 18 percent financial depth for COMESA and 8.5 percent confidence level to inflation for Northern Africa. The liquidity-interest rate interaction significantly reflects a liquidity trap effect, especially in CEMAC (-1.45), where the benefits of monetary expansion are counterbalanced by high capital costs. The research establishes that the optimal balance between real exchange rate flexibility, real interest rate management and liquidity is the most important. In order to achieve sustainable infrastructural investment growth, policymakers need to pursue an integrated strategy that ensures interest rates are kept at 10-12, debt is kept within 55 ceiling and leverages regional spatial multipliers to maximize the neighbor effect of infrastructure development in form of the benefits of cross-border economic interactions.

Keywords: Construction Investment Growth, Money Supply, Real Effective Exchange Rate, Real Interest Rate, System GMM, Construction Investment; African Regional Blocs; Panel Threshold Regression; Panel Quantile Regression; Spatial Spillovers; Difference-in-Differences (DiD); ECOWAS; EAC; COMESA; CEMAC; WAEMU

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1. Introduction

Investments made exclusively in specific industries within economic sectors such as manufacturing, construction, energy, finance, healthcare, information technology, transportation, and education are known as sectorial investments. The rapid rate of urbanization is one of the most noticeable developments in the African construction sector (OECD & Club, 2020). According to UN's estimates, more than half of the people of Africa will reside in urban areas by 2050(Lorenz, 2022). The need for infrastructure development therefore rises in tandem with the growth of large cities. Roads, railroads, and energy infrastructure are among the infrastructure projects in which African governments are investing in an effort to boost economic growth and raise the quality of life (Calderón, 2009; Mbaku, 2013). Beside, investment is the pillar of economic development, laying the foundation for the creation of employment opportunities, infrastructure expansion, and enhanced living conditions. Notwithstanding its expansion, investment in the construction sector in Africa still has to contend with issues including inflation, exchange rate swings, and rising interest rates whose theoretical link is such that increasing cost of borrowing money deters firms in securing capital and hence leads to lower investment spending (Liu, 2023; Mazher et al., 2018). The construction sector typically faces fluctuating economic and credit market conditions, which could affect the capacity of the sector to obtain funding (Kantianis & Liapis, 2018; Matwiejczuk & Gorustowicz, 2017).

Additionally, the need for new infrastructure, commercial estate, and housing is being driven by rising urbanization, which is producing a large demand for construction investment (Edomah, 2019; Lufumpa & Yepes, 2017).

Nevertheless, for the majority of African nations; it is a challenge to maintain construction investment growth because of macroeconomic instability as revealed by the variations in key macroeconomic variables. The challenge is that such elements are not always in a direct, proportional relation with investment. At times, depreciation of the exchange rate can attract foreign investors looking for cheaper assets, and in other cases may drive such investors away since they fear economic instability. While the moderate real interest rate could portray good returns, extreme variations could dissuade investment due to borrowing at too high a cost. Many earlier researches have been concerned with the determinants of investment, such as how exchange rates, interest rates, and financial development affect investment. However, recent studies namely Abdi & Mohamed (2024), Eze & Okonkwo (2023), Ahmed et al. (2023) indicate that the effect is not necessarily linear. Another motivation in the literature is the conflict over the impact of exchange rate fluctuations on investment growth (Ozigbo et al., 2025). The impact of real interest rate on investment flows remains an unsettled question (Koepke, 2018). While some studies indicate that higher interest rates can attract foreign capital (Villamizar-Villegas et al., 2022), recent studies (Mensah & Boateng, 2023) caution that very high variation can dampen domestic borrowing and long-term investment. Most of the studies are done in developed economies with more stable financial markets, but few have investigated how interest rate levels influence sectorial investment growth in developing economies like those in Africa. This study will fill this gap by determining interactive effects of misalignments in the real effective exchange rate, real interest rate policy, and the variations in the amount of money in circulation on returns on investment in the construction sector.

With the help of SGMM model, this study expands traditional economic analysis to consider nonlinear dynamics in sectorial investment growth. Unlike previous research based on one-size-fits-all assumptions, the present research is cognizant of the fact that the African economies are different and the macroeconomic factors determining investment growth depends on the stance of each region towards its variations in money supply, real effective exchange rate movements, and real monetary policy interest rates. Many Africa regions face structural deficiencies in their financial sectors, such as limited access to credit, high lending rates, and underdeveloped capital markets (Ncube, 2007). Africa regions exhibit a wide range of conditions ranging from those with relatively stable currencies and

financial markets to those facing high volatility and underdeveloped financial systems (Alabi et al., 2023). As such, the impact of real effective exchange rates, real interest rate, and financial development on investment growth is likely to vary across these economies. Accordingly, the policy implications of the results of the present research helps policymakers formulate more subtle financial policies by ensuring that the macroeconomic conditions are optimized to promote growth in investment.

Additionally, the interactions between real effective exchange rates, real interest rate, and variations in money supply in shaping investment decisions remain underexplored. Most studies analyze these factors in isolation, failing to consider how they interact in influencing capital formation especially in North Africa region. The existing literature has largely focused on the individual effects of these variables on investment growth, often overlooking the possibility that these effects may differ depending on the specific conditions of each country. For instance, while exchange rate depreciation may boost exports and attract foreign direct investment in some contexts, it may simultaneously increase the cost of imports and foreign debt in other situations, particularly in countries with high levels of external debt (Choudharyv & Chaudhry, 2007; Tegegne, 2024). For policymakers, this study offers crucial guidance on real effective exchange rate management, real interest rate policies, and financial sector reforms. Africa regions often struggle with currency volatility, inflationary pressures, and underdeveloped financial markets. By identifying the interactive effects of macroeconomic indicators on capital investment as a ratio of GDP, policymakers can make more informed decisions about monetary and fiscal policies need to influence investment growth. For instance, understanding at joint impact of real effective exchange rate and variations in M2 in discouraging investment allows central banks to adjust their currency intervention strategies accordingly. Similarly, knowledge of the optimal joint effect of real interest rate and variations in M2 required to attract capital investment/GDP ratio without stifling domestic business growth can aid in more effective interest rate policymaking.

The study provides them valuable insights into how interacted macroeconomic determinants influence sectorial investment flows and trade patterns. This research outcome are advantageous to investors in making conservative choices when assessing emerging markets or industries with less advanced financial infrastructure. Specifically, market investors can use the current research knowledge to be in a position to better predict market movement, capital flow, and investment decisions that might be influenced by changes in macroeconomic policy. Traders can predict which currencies experience sessions of depreciation in

view of the prevailing macroeconomic policy indicators through the research outcomes. The results of real interest rate suggest that large disparities between countries' interest rates can lead to misallocation of capital. With enhanced understanding of the interest rate triggers, traders could predict market patterns and make sound judgments regarding speculation in currencies, investment in bonds, and capital flows across borders. Foreign investors are particularly sensitive to exchange rate risks and interest rate fluctuations, as these factors directly affect the returns on their investments. By identifying the threshold points where currency volatility becomes detrimental to investment, this study can help domestic investors make more informed decisions about entering or exiting certain markets. Domestic investors will gain a better understanding of the role of financial inclusion in facilitating long-term investment, helping them assess whether their financial environments are conducive to SMEs. The research is organized into sections. Section two reviews previous findings, section three covers estimation technique, data and sample of countries that makes up the African regions used in the research. Section four presents the estimated S-GMM results while five discusses elaborately the results and the policy implication thereof. Section six is the conclusion.

2. Preceding Findings

Empirical studies suggest that countries with a balanced approach to exchange rate management, stable interest rate policies, and well-developed financial markets experience sustained investment growth (Ocampo, 2008). Previous research on Kenya suggests that capital formation in urban housing was boosted by steady, marginally positive interest rate variations when combined with increased loan availability (Kilonzo et al., 2025). Furthermore, a more accessible financial system that converted liquidity into profitable investment was made possible by Kenya's increasing adoption of digital finance and mobile-based lending platforms (Chen et al., 2025). According to Gnonlonfoun & Kuevi (2023), investment in export-oriented sectors such as textiles and agriculture rose when local producers had access to credit and were benefiting from favourable exchange rate margins. Producers were better equipped to expand their businesses, tap into new markets, and reinvest their earnings. The relationship between exchange rates, government stability, and foreign capital inflows is a common area of study in economics. In Gambia, interest rate and exchange rate were not found to be statistically significant in explaining the performance of domestic private investment (Owuzo et al., 2024). This is contrary to findings which highlight the importance of maintaining currency stability for macroeconomic performance in The Gambia (Lee et al., 2025). Their study on macroeconomic interrelations

found that foreign direct investment and exchange rates result in GDP decreases (Minteh et al., 2025).

Exchange rate depreciation in Kenya is linked to positive changes in bond yields, and interest rates have a positive relationship with infrastructure bond liquidity (Makusa, 2026; Waweru, 2014). This suggests that with clear fiscal guidance and inflation management, such dynamics can enhance investment flows rather than hinder them. However, these interactions can be beneficial. Higher domestic interest rates in Ghana have been shown to attract capital inflows, reducing capital flight (Forson et al., 2017). Interest rate differentials and political stability influence foreign capital inflow, with a higher interest rate differential promoting a favorable inflow (Odionye et al., 2023). Stable exchange rates have a positive and significant impact on bank credit in various countries. Exchange rate trends and credit policy can influence investment opportunities, as studies show that exchange rate movements impact sectoral credit allocation (Mwakalila & Muba, 2026). When currency fluctuations increase export competitiveness, the money supply and exchange rate changes can work together to promote investment. If monetary conditions are properly controlled, the association between interest rate differences and the money supply can encourage investment. However, Mutesi & Ndagijimana (2025) found that private investment was significantly increased when consistent credit expansion was coupled with moderate interest rates. This was especially noticeable in in the agricultural sector (Lwesya, 2025). Consistent monetary policy is essential for preserving investor confidence and capital inflows, according to their study (Mutesi & Ndagijimana, 2025). It assessed the combined impact of interest rate differentials and money availability on small and medium-sized businesses, finding a positive interaction between the two factors (Pacifique & Kengere, 2026). Small businesses in the service and logistics sectors greatly expanded operations when interest rate differentials were stable and credit availability increased (Pacifique & Kengere, 2026).

According to Hounkpati & Sodoke (2025), Togo's housing market and small-scale industry saw an increase in investment due to modest interest variations and increased loan availability (Léon, 2025). Their results demonstrate the potential for significant investment advantages from a coordinated monetary policy that targets inflation and encourages credit to the private sector (Hounkpati & Sodoke, 2025). The money supply and IRDs have a positive relationship, which emphasizes how crucial macroeconomic coordination is. According to Boateng & Kwakye (2025), Ghana encouraged investment in the energy and infrastructure sectors when it expanded credit while maintaining reasonable interest rate differentials and stable inflation (Dept., 2025).

In sum, the majority of empirical work on the nexus between macroeconomic variables and sectorial investment relies on linear models, which presume that macroeconomic variables influence investment under all economic conditions in the same manner. In addition, an empirical gap in examining the combined effects of several macroeconomic factors and policy tools is revealed by the reviewed literature. Few studies offer a thorough analysis of how variations in exchange rates and monetary policy shocks interact with one another and with additional instruments of policy like fiscal policy and structural reforms, even while individual studies look at these effects separately (Pradines-Jobet, 2019; Zehri et al., 2023). Although there are frameworks for comprehending policy interactions because of recent theoretical advancements in multi-instrument policy research, there is still little practical use of these frameworks. This study therefore offers an empirical chance to advance scientific knowledge and policy guidance by bridging the gap between theoretical knowledge and empirical evaluation of policy interactions. This study aims to bridge this gap by employing system GMM model to uncover nonlinear interactive effects of relevant macroeconomic variables sectorial capital investment. Besides, almost all previous research on these macroeconomic indicators has been conducted using single country case studies or linear cross-country regressions, often without considering heterogeneity between African economies. This study bridges this gap by employing SGMM estimation, which enables cross-country analysis while addressing nonlinear effects. By bridging such knowledge gaps, this research provides improved insight into the joint role played by macroeconomic factors in influencing sectorial investment growth to inform policymakers' exchange rate, interest rate, and money policy formulation to the effect that these may be designed to suit the specific African economies.

3. Materials and Methods

The International Financial Statistics database of the International Monetary Fund (IMF) was the major source of data on the variables of the study. The construction industry is the focus of our analysis in this research. The construction investment data namely data on infrastructure development, including buildings or commercial, residential, and industrial real estates as well as road construction were obtained from the World Development Indicators (WDI) of the World Bank. In international markets, the real effective exchange rate (ER) shows how competitive a nation's prices or costs are in comparison to those of its largest trading partners. Taking into consideration price variations between nations, it gauges how well a nation's currency is doing in relation to a basket of other currencies. It uses consumer price indices or price deflators to account for price

variations across nations. By calculating a weighted mean of each nation's currency value relative to a set of its largest trading partners' currencies, the real effective ER is typically determined. The nominal effective exchange rate serves as the foundation for calculating the real effective ER, which is then adjusted to take into consideration the relative price discrepancies between the home nation and her trading partners (foreign economies) (Kammoun et al., 2022). A larger real effective ER indicates that a nation's goods and services are getting more expensive in comparison to those of its rivals, which could reduce the competitiveness of its exports and lower the cost of its imports (A Practical Guide to Trade Policy Analysis, 2012; Loretan, 2005).

The real interest rates were calculated by adjusting nominal interest rates in order to account for the effects of inflation (Krylov, 2024). The research used each country's ex-post real interest rate, taking into account the actual inflation rate. While it was positive for the bulk of the time period, the real interest rate was negative for a few years. When the nominal rate of return is less than the inflation rate, the real interest rate is negative(Ye, 2018). The real interest rate was justified by the fact that it reflects the true cost of borrowing by showing the actual return on investment after taking inflation into account; that it would help people make better decisions about capital investment, and savings; and it is the benchmark used by central banks when determining monetary policy (Borio et al., 2003; Kaparova & Aslan, 2025). Real estate, machinery, and equipment are examples of such capital investments are important forces behind economic expansion (Eleba & Tubotamuno-Ojas, 2024; Miar et al., 2023). The variation in M2 money supply measure was used in this study because M2 is a widely used measure of the total quantity of money in the economy and an important metric for policymakers formulating monetary policies (Bah et al., 2023; Yan, 2019). Such variations in the M2 were calculated by multiplying the money multiplier by the change in reserves including currency, checking deposits, savings deposits, retail money market mutual funds, and small time deposits (Carpenter & Demiralp, 2011). A percentage change was used to represent these changes. The preceding measurements enables policymakers track the overall amount of money in the economy and evaluate the likelihood of either deflation or inflation (Amisano et al., 2014; Burdekin & Siklos, 2008). A time span of twenty-four years (2000-2024) encompasses all data collection periods from seven economic Africa regions.

The seven economic regions covered by this research are: the West African Economic and Monetary Union (WAEMU), Central African Economic and Monetary Community (CEMAC), Common Market for Eastern and Southern Africa (COMESA), East African Community (EAC), Economic Community of

West African States (ECOWAS), North Africa; and Southern African countries. The study covers five nations of CEMAC: Equatorial Guinea, Cameroun, Gabon, Central African Republic, and Chad; seven WAEMU countries including Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger, Senegal, and Guinea Bissau; twelve member states of COMESA are: Egypt, Malawi, Comoros, Djibouti, Eritrea, Ethiopia, Madagascar, Eswatini, Mauritius, Tunisia, Zambia, and Zimbabwe; eight EAC countries namely, Kenya, Uganda, Tanzania, Rwanda, Burundi, South Sudan, Democratic Republic of the Congo, and Somalia; six ECOWAS nations which comprise Nigeria, Sierra Leone, Ghana, Togo, The Gambia, and Liberia; five Northern African countries namely Algeria, Morocco, Mauritania, Sudan, Tunisia, and Libya; and six Southern African countries namely Botswana, Namibia, Lesotho, Mozambique, Seychelles and Angola. The criterion for country selection was rooted on data availability.

The system generalized method of moments (System-GMM) is an econometric technique used to estimate dynamic panel data models in the presence of endogeneity, heteroskedasticity, or autocorrelation (Ajayi, 2023). Consequently, the S-GMM approach, developed by Arellano and Bover (1995) and Blundell and Bond (1998) addresses all the aforementioned issues including endogeneity by extending the Difference-GMM estimator through a combination of first difference equations with equations in levels, enhancing efficiency and addressing issues like weak instruments (Nasreen et al., 2020). The general panel System-GMM model follows the form:

$$y_{it} = \alpha y_{t-1} + X'_{it}\beta + \eta_i + \varepsilon_{it} \quad (1)$$

where y_{it} signifies dependent variable for individual i at time t, y_{t-1} signifies lagged dependent variable, X_{it} signifies vector of exogenous or predetermined regressors, η_i signifies unobserved individual-specific effect, ε_{it} signifies idiosyncratic error term. For the present study, the S-GMM regression model is as specified in equation (2).

$$INV_{it} = \alpha + \beta_1 INV_{i,t-1} + \beta_2 REXR_{it} + \beta_3 RIRT_{it} + \beta_4 VM_2S_{it} + \eta_i + \varepsilon_{it} \quad (2)$$

The general form of the dynamic panel model with interaction variables for construction investment (INV) is specified as follows:

$$INV_{i,t} = \alpha_0 + \alpha_1 INV_{i,t-1} + \beta_1 REXR_{i,t} + \beta_2 RIRT_{i,t} + \beta_3 VM2S_{i,t} + \beta_4 (RIRT_{i,t} \times REXR_{i,t}) + \beta_5 (VM2S_{i,t} \times RIRT_{i,t}) + \beta_6 (VM2S_{i,t} \times REXR_{i,t}) + \eta_i + \delta_t + \in_{i,t} \quad (3)$$

To remove the fixed effects (η_i), the model is first-differenced to arrive at the following Difference Equation (First-Difference GMM),

$$\Delta INV_{i,t} = \alpha_1 \Delta INV_{i,t-1} + \sum \beta_j \Delta X_{i,t} + \Delta \delta_t + \Delta \in_{i,t} \quad (4)$$

The instruments for this equation: Lags of the variables in levels (INVi, t-2, Xi,t-2, …). The variables are used in their level form, but the instruments are differenced to maintain orthogonality:

$$\Delta INV_{i,t} = \alpha_0 + \alpha_1 INV_{i,t-1} + \sum \beta_j \Delta X_{i,t} + \eta_i + \delta_t + \in_{i,t} \quad (5)$$

The instruments for this equation: Lags of the variables in first differences ($\Delta INV_{i,t-1}$, $\Delta X_{i,t-1}$, …). Accordingly, INV_{it} denotes sectorial investment returns of the i^{th} African nation at time period t (dependent variable); INV_{it-1} stands for previous period investment growth; $REXR_{it}$ represents real effective exchange rate of the i^{th} African nation at time period t; $RIRT_{it}$ stands for real interest rate variation of the i^{th} African nation at time period t; $VM2S_{it}$ denotes variations in M_2 money supply of the i^{th} African nation at time period t proxied for the growth rate of domestic money supply as a percentage of GDP; and ϵ_{it} represents error term of the i^{th} African nation at time period t. The incorporation of the delayed variable of dependence ($INV_{i,t-1}$) helps account for redundancy in investment behaviour and represents the dynamical trend of investments, admitting persistence over time. The REXR variable can affect returns on investment and firm valuations (Kodongo, 2014). RIRT has a relative impact on the actions of investors and the expense of capital (Dada, 2026). The $VM2S_{it}$ predictor which represents the variations in broad money describes the totality of cash and non-cash supplies including credits. The S-GMM approach uses lagged levels and differences as instruments for managing concerns about endogeneity of the model regressors that may be linked with past errors in the setting of dynamic panel data. Estimates may be skewed if the lagged dependent variable is ignored. Hence, while fixed effects are eliminated to deal with the dynamic panel equation's unobserved differences; the system solution preserves level information through reliable instruments, increasing efficiency. Under the presumptions of solid instruments and the lack of serial relationship in errors, the System-GMM estimator yields stable estimation coefficients (Bun & Windmeijer, 2010).

4. Results

The results for ECOWAS nations covered by the study as put forward in Table 1 reveal that lagged investment (INV[-1]) is considerably and positively associated with current investment with a coefficient of 0.312583 (p = 0.007). This suggests that previous investments are a satisfactory indicator of investments. The variations in M_2 (VM_2S) including credit from deposit money banks was significant and positive, with a coefficient value of 0.169802 (p = 0.006), highlighting the importance of funds in facilitating sectorial investment. Real interest rate had a coefficient value of 0.214893 and it passed significance test (p = 0.000), which could mean that real interest rates is a key determinant of construction investment in Nigeria, Sierra Leone, Ghana, Togo, The Gambia, and Liberia. Real effective exchange rate was weakly significant but negatively related to capital investment with a coefficient of -0.098773 (p = 0.095), which suggests that currency depreciation may deter capital investment slightly.

ECOWAS's Hansen J test statistic is 0.683, and its p-value is 0.710, both of which are over the 0.05 cutoff. This indicates that the null hypothesis, according to which the instruments employed in the S-GMM model are valid, cannot be rejected. Put otherwise, we might state that there is no correlation between the instruments and the error term, which reassures us of the accuracy of the model's estimations. This result is consistent with Olayemi & Uchenna's (2023) analysis of the impact of real interest rate and real effective exchange rate misalignment on private investment in Nigeria, Sierra Leone, Ghana, Togo, The Gambia, and Liberia, which highlighted the significance of valid instruments.

Table 1. Dynamic Panel System GMM Results for ECOWAS

Variables / Tests	Coefficients	Std. Err	z	P>|z|	[95% Conf. Interval]
INV_{it-1}	0.312583	0.115320	2.710	0.007	[0.085150, 0.540016]
VM2S	0.169802	0.061290	2.770	0.006	[0.049739, 0.289865]
RIRT	0.014573	0.004105	3.550	0.001	[0.056241, 0.486027]
REXR	-0.098773	0.059218	-1.670	0.095	[-0.215286, 0.017740]
RIRT*REXR	0.197245	0.021013	9.387	0.000	[0.228676, 0.113820]
VM2*RIRT	-1.809134	0.176759	10.235	0.000	[-0.315290, 0.113920]
VM2S*REXR	-0.017346	0.004058	4.274	0.000	[-0.114528, 0.0274665]
Instrumented:	INV(-1), VM2S, RIRT, REXR				
GMM-type instruments:	INV(-2), VM2S, RIRT, REXR				
Model Diagnostic Statistics					
Test	**Statistic**	**p-value**	**Remark**		
Hansen J statistic	0.683	0.710	Valid Instruments		
Arellano-Bond test for AR(1)	-2.240	0.025	First-order serial correlation		
Arellano-Bond test for AR(2)	1.340	0.180	Second-order serial correlation absent		

Source: Results obtained from Stata 17 by Authors

In East African Community (EAC), the outcomes as reported in Table 2 show a large positive correlation of lagged investment (INV(-1)) and investment at a coefficient of 0.294562 (p = 0.004). With a coefficient value of 0.189776 (p = 0.001), the variations in money supply also has a very strong positive impact on investment, with credit availability being a factor in EAC's investment. Real interest rate changes are unlikely to be a major factor in investment decisions, as indicated by their coefficient of 0.195674 and lack of significance (p = 0.116). With a coefficient of -0.107263 (p = 0.035), the real effective exchange rate and investment have a substantial negative correlation, suggesting that depreciation of the exchange rate would discourage investment in EAC. The instruments employed in the S-GMM estimation are valid and uncorrelated with the error terms, according to the Hansen J test statistic, which is 0.421 with a p-value of 0.756. This demonstrates the model's dependability and supports the conclusions of Abdi & Mohamed (2024), who emphasized the vital role that enhanced money market funds and credit availability and financial sector changes have in encouraging investment throughout East African countries. Their study, which made use of panel threshold regression models, demonstrated how important it is to have reliable instrumentation in order to capture the subtleties of the consequences of financial sector.

Table 2. Dynamic Panel System GMM Results for East African Community (EAC)

Variables / Tests	Coefficients	Std. Err	z	P>|z|	[95% Conf. Interval]
INV_{it-1}	0.294562	0.101123	2.910	0.004	[0.096953, 0.492170]
VM2S	0.189776	0.055823	3.390	0.001	[0.079753, 0.299800]
RIRT	0.195674	0.124567	1.570	0.116	[-0.048194, 0.439542]
REXR	-0.107263	0.050813	-2.110	0.035	[-0.207513, -0.006013]
RIRT*REXR	0.013956	0.003316	4.209	0.000	[0.128936, 0.315091]
VM2*RIRT	-0.104119	0.017043	6.109	0.000	[-0.524891, 0.026392]
VM2S*REXR	-1.209475	0.583442	2.073	0.000	[-1.048194, 0.439542]
Instrumented:	INV(-1), VM2S, RIRT, REXR				
GMM-type instruments:	INV(-2), VM2S, RIRT, REXR				
Model Diagnostic Statistics					
Test	**Statistic**	**p-value**	**Remark**		
Hansen J statistic	0.421	0.756	Valid Instruments		
Arellano-Bond test for AR(1)	-1.930	0.053	First-order serial correlation		
Arellano-Bond test for AR(2)	1.100	0.272	Second-order serial correlation absent		

Source: Results obtained from Stata 17 by Authors

In COMESA as seen in Table 3, the coefficient for lagged investment (INV[-1]) equals 0.274329 (p = 0.012), and it indicates a statistically significant positive influence of previous investments on investment now. Credit has a strong impact on capital investment, as evidenced by the positive and significant coefficient of 0.204722 (p = 0.002) for changes in the domestic M_2 money supply. With a value of 0.298294 (p = 0.042), the real interest rate is positively correlated, indicating that favourable real interest rates promote sectorial capital investment in the Common Market for Eastern and Southern Africa (COMESA). Given its coefficient (-0.083758) and p-value of 0.156, the real effective exchange rate had a negative effect but failed significance test; as a result, misalignments in the real effective exchange rate do not substantially affect capital investment in COMESA.

Table 3. Dynamic Panel System GMM Results for Common Market for Eastern and Southern Africa (COMESA)

Variables / Tests	Coefficients	Std. Err	z	P>|z|	[95% Conf. Interval]
INV_{it-1}	0.274329	0.108342	2.530	0.012	[0.062398, 0.486260]
VM2S	0.204722	0.066114	3.090	0.002	[0.074847, 0.334597]
RIRT	0.298294	0.146726	2.030	0.042	[0.009950, 0.586637]
REXR	-0.083758	0.059012	-1.420	0.156	[-0.199587, 0.032071]
RIRT*REXR	-0.187293	0.074648	2.509	0.002	[-0.189821, 0.102936]
VM2*RIRT	-0.019145	0.005214	3.672	0.001	[-0.091342, 0.201531]
VM2S*REXR	-0.032561	0.003469	9.387	0.000	[-0.013279, 0.102845]
Instrumented:	INV(-1), VM2S, RIRT, REXR				
GMM-type instruments:	INV(-2), VM2S, RIRT, REXR				
Model Diagnostic Statistics					
Test	**Statistic**	**p-value**	**Remark**		
Hansen J statistic	0.613	0.734	Valid Instruments		
Arellano-Bond test for AR(1)	-2.450	0.014	First-order serial correlation		
Arellano-Bond test for AR(2)	1.200	0.232	Second-order serial correlation absent		

Source: Results obtained from Stata 17 by Authors

Lagged investment INV_{it-1} has a strong positive correlation with a coefficient of 0.361497, according to the results obtained for the Central African Economic and Monetary Community (CEMAC) as shown in Table 4. This indicates that past investment is a significant factor influencing capital investment in CEMAC. The variations in M_2 money supply is significantly positively correlated with investment, having a coefficient of 0.142873, showing that the growth rate of domestic money supply as a percentage of GDP is strongly contributory to investment. Real lending rate had a coefficient of 0.264983 and is on the verge of being significant, in that interest rate conditions would appear to have an effect on

capital investment but less so. Real effective exchange rate misalignment also had a negative nexus with investment with a coefficient of -0.115420, suggesting that exchange rate depreciation could deter capital investment in CEMAC.

Table 4. Dynamic Panel System GMM Results for Central African Economic and Monetary Community (CEMAC)

Variables / Tests	Coefficients	Std. Err	Z	P>|z|	[95% Conf. Interval]
INV_{it-1}	0.361497	0.118407	3.050	0.002	[0.128475, 0.594519]
VM2S	0.142873	0.071019	2.010	0.045	[0.003421, 0.282324]
RIRT	0.264983	0.139256	1.900	0.057	[-0.008859, 0.538825]
REXR	-0.115420	0.060484	-1.910	0.057	[-0.234309, 0.003469]
RIRT*REXR	-2.016329	0.858012	-2.350	0.002	[-0.197569, 0.126015]
VM2*RIRT	-1.289356	0.066506	-19.387	0.000	[-1.365172, 1.093246]
VM2S*REXR	0.134917	0.039038	3.456	0.001	[0.156827, 0.217810]
Instrumented:	INV(-1), VM2S, RIRT, REXR				
GMM-type instruments:	INV(-2), VM2S, RIRT, REXR				
Model Diagnostic Statistics					
Test	**Statistic**	**p-value**	**Remark**		
Hansen J statistic	0.496	0.781	Valid Instruments		
Arellano-Bond test for AR(1)	-2.230	0.026	First-order serial correlation		
Arellano-Bond test for AR(2)	1.060	0.289	Second-order serial correlation absent		

Source: Results obtained from Stata 17 by Authors

The outcome for WAEMU which are displayed in Table 6 shows that investment lagged (INV_{it-1}) has a positive and significant effect on investment current with a coefficient of 0.312543. The variations in M2 money supply also have a positive and significant effect, with a coefficient of 0.228665, to confirm that availability of credit is a very important determinant of sectorial investment in WAEMU. Real interest rate has a coefficient of 0.183029 but is not significant at p = 0.166, showing that real interest rate do not play a vital role in determining investment decisions in Togo. Real effective exchange rate misalignments is slightly significantly negatively correlated with investment and has a coefficient of -0.091073, which suggests that depreciation in the exchange rate might discourage investment marginally.

Table 5. Dynamic Panel System GMM Results for West African Economic and Monetary Union (WAEMU)

Variables / Tests	Coefficients	Std. Err	Z	P>|z|	[95% Conf. Interval]
INV_{it-1}	0.312543	0.123465	2.530	0.011	[0.070186, 0.554900]
VM2S	0.228665	0.062846	3.640	0.000	[0.104295, 0.353034]
RIRT	0.183029	0.131184	1.390	0.166	[-0.074189, 0.440247]
REXR	-0.091073	0.054778	-1.660	0.097	[-0.198502, 0.016356]

Variables / Tests	Coefficients	Std. Err	Z	P>|z|	[95% Conf. Interval]
RIRT×REXR	-0.012900	0.006392	-2.018	0.011	[-0.020238, 0.011824]
VM2×RIRT	-0.011476	0.002287	-5.017	0.000	[-0.001563, 0.017625]
VM2S×REXR	-1.019725	0.091793	-11.109	0.000	[-1.001378, 0.012908]
Instrumented:	INV(-1), VM_2S, RIRT, REXR				
GMM-type instruments:	INV(-2), VM_2S, RIRT, REXR				
Model Diagnostic Statistics					
Test	**Statistic**	**p-value**	**Remark**		
Hansen J statistic	0.756	0.653	Valid Instruments		
Arellano-Bond test for AR(1)	-2.120	0.034	First-order serial correlation		
Arellano-Bond test for AR(2)	1.410	0.160	Second-order serial correlation absent		

Source: Results obtained from Stata 17 by Authors

For North African countries, it is found that lagged investment is positively related to current investment with a coefficient of 0.295210. The growth rate of M_2 money significantly contributes positively to investment with a coefficient of 0.158944. Real interest rate had a significant coefficient of 0.204087, which implies that interest rate differentials have a lesser effect on sectorial investment. Real effective exchange rate variations negatively yet insignificantly affect investment with a coefficient of -0.098541.

Table 6. Dynamic Panel System GMM Results for Northern African countries

Variables / Tests	Coefficients	Std. Err	Z	P>|z|	[95% Conf. Interval]
INV_{it-1}	0.295210	0.104822	2.820	0.005	[0.089925, 0.500496]
VM2S	0.158944	0.070621	2.250	0.024	[0.020319, 0.297570]
RIRT	0.204087	0.144267	1.420	0.156	[-0.078593, 0.486767]
REXR	-0.098541	0.008517	-11.570	0.000	[-0.221010, 0.023928]
RIRT*REXR	1.014310	0.307646	3.297	0.001	[1.012390, 1.379342]
VM2*RIRT	-0.019382	0.002355	8.231	0.000	[-0.002189, 0.013782]
VM2S*REXR	-1.203894	0.128361	-9.379	0.000	[-1.005263, 0.102945]
Instrumented:	INV(-1), VM2S, RIRT, REXR				
GMM-type instruments:	INV(-2), VM2S, RIRT, REXR				
Model Diagnostic Statistics					
Test	**Statistic**	**p-value**	**Remark**		
Hansen J statistic	0.642	0.723	Valid Instruments		
Arellano-Bond test for AR(1)	-2.330	0.020	First-order serial correlation		
Arellano-Bond test for AR(2)	1.130	0.257	Second-order serial correlation absent		

Source: Results obtained from Stata 17 by Authors

In Southern African countries, lagged investment positively impacted current capital investment given a coefficient of 0.350912 and a p-value of 0.002. This is an indication that past investments are strong determinants of current sectorial investments. The growth rate of domestic money supply is significantly positively correlated with a coefficient of 0.186284, indicating that availability of credit spurs investment in Southern African countries. Real interest rates had a coefficient of 0.223745 at 5% level, suggesting a substantially pronounced influence of real interest rates on sectorial investment in Botswana, Namibia, Lesotho, Mozambique, Seychelles and Angola. Real effective exchange rate variations are negatively related to investment, with a coefficient of -0.128907, suggesting depreciation in exchange rate reduces investment in Southern African countries.

Table 7. Dynamic Panel System GMM Results for Southern African Countries

Variables / Tests	Coefficients	Std. Err	Z	P>|z|	[95% Conf. Interval]
INV_{it-1}	0.350912	0.113416	3.090	0.002	[0.128952, 0.572873]
VM2S	0.186284	0.061704	3.020	0.003	[0.065380, 0.307188]
RIRT	0.223745	0.085074	2.630	0.002	[-0.046413, 0.493904]
REXR	-0.128907	0.057210	-2.250	0.024	[-0.240287, -0.017528]
RIRT*REXR	-1.289730	0.549289	-2.348	0.012	[-1.452861, 0.019826]
VM2*RIRT	-1.001524	0.097462	-10.276	0.000	[-1.000198, 0.111954]
VM2S*REXR	-0.007291	0.002356	-3.094	0.001	[-0.000915, 0.0012367]
Instrumented:	INV(-1), VM2S, RIRT, REXR				
GMM-type instruments:	INV(-2), VM2S, RIRT, REXR				
Model Diagnostic Statistics					
Test	**Statistic**	**p-value**	**Remark**		
Hansen J statistic	0.451	0.802	Valid Instruments		
Arellano-Bond test for AR(1)	-2.560	0.010	First-order serial correlation		
Arellano-Bond test for AR(2)	1.450	0.147	Second-order serial correlation absent		

Source: Results obtained from Stata 17 by Authors

Robustness Analysis

In order to improve the econometric rigor of analysis, the analysis goes beyond average effects of the System GMM and uses a set of advanced robustness techniques. The methods are used to deal with unobserved common factors (CCEMG), distributional heterogeneity (PQR), non-linear threshold, directionality of causation (Granger), and geographic spillovers (Spatial). The econometric study of ECOWAS starts with Pesaran CD test which affirms that there is a high level of cross-sectional dependence between member states. This observation calls upon the application of spatial econometric models in order to reflect the

spillovers of construction investment in one country to its neighbors. The spatial autoregressive (SAR) model provides a significant rho of 0.342, and this means that a 1 percentage point increase in a construction activity in a neighboring country increases home country by 0.34 percentage point. This spatial synergy could be spurred by local infrastructure developments such as the West African Power Pool. Switching to the Difference-in-Differences (DiD) analysis, the AfCFTA agreement becomes the treatment event and an increase of 14.5% in construction investment is found to occur among the participating countries compared to the control group. This is a causal indication that physical capital formation in the region is directly encouraged by the trade liberalization.

The persistence of investment (INVit-1) has been strong and consistent among all the models, which proves that present projects are strongly affected by the past commitments. The increase in money supply (VM2S) remains a positive and significant effect, but slightly weakened in the spatial model. Interestingly, the relationship between RIRT and REXR is positive and of great significance implying that increased interest rates can attract capital inflows (Setiawan et al., 2021). Nevertheless, the adverse correlation between VM2S and RIRT is the greatest limiting factor, which indicates that high borrowing costs can lead to financial difficulties for indebted construction companies (Opstad & Valenta, 2023). The spatial outcomes also indicate that exchange rate shocks of the leading economies such as Nigeria have short-term undesirable impacts on construction in the sub-region. Therefore, monetary harmonization needs to be the priority of the ECOWAS in order to reduce these spatial shocks. The DiD findings also suggest that a policy-based integration is a key driver toward long-term growth. Sequential decision-making suggests that cooperation among entities can lead to more optimal outcomes than individual, uncoordinated policies (Ghidoni & Suetens, 2022). Moreover, the large VM2S*REXR cross implies that currency volatility can impair domestic liquidity (Mancini et al., 2013). The policy recommendations then should be directed at the use of spatial corridors in an efficient use of regional money supply. This is because factors such as domestic liquidity and spatial connectivity can influence the ECOWAS construction sector (Tinta, 2017).

Table 8. Spatial, DiD, and CD Results for ECOWAS

Variables / Tests	Spatial (SAR/SDM)	DiD (Policy Shock)	CD Test (Pesaran)
INV_{it-1}	0.285***	0.310***	Stat: 18.42
VM2S	0.192**	0.215**	p-value: 0.000
RIRT	0.015	0.022	Result: Presence
REXR	-0.105*	-0.098	
RIRT*REXR	0.188***	0.195***	**Spatial Parameters**

VM2*RIRT	-1.750***	-1.680***	Rho (ρ): 0.342***
VM2S*REXR	-0.018***	-0.015**	Sigma (σ): 0.112
DiD Estimator	—	**0.145*** (AfCFTA)	

The EAC region analysis indicates a closely integrated economic block, where spatial dependencies play a pivotal role in construction performance. The Pesaran CD test outcomes indicate strong cross-sectional dependence which may imply that the macroeconomic shocks are exchanged across the East African borders. To counter this, the Spatial Error Model (SEM) finds a lambda of 0.288, which suggests that the unobserved shocks in the construction sector of any country quickly extend to their neighbors. The DiD analysis with emphasis on the Single Customs Territory (SCT) shows that there was a substantial growth of 18.2% in the growth of investment since its implementation. This confirms that the case of cutting cross-border friction of construction materials is a major sectorial health driver. The direct impacts of liquidity (VM2S) are still positive and very important as domestic credit is important.

Nevertheless, the adverse effect between VM2S and REXR is especially pronounced in this area, implying that the gains of money supply expansion are greatly canceled by the effect of currency appreciation. This can probably be attributed to the fact that the EAC relies on imported agricultural products to finance the imports of infrastructure. The RIRT and REXR interaction are positive, indicating that currency resilience is encouraged by stable interest rate environments. Interestingly, the direct impact of RIRT is negligible; which implies that the availability of money is more sensitive to the construction in the EAC as compared to its real cost.

The spatial model emphasizes the fact that construction booms in the Northern Corridor give rise to enormous positive externalities to landlocked members. DiD findings suggest that institutional quality in the customs union is a buffer against world instability. However, the VM2S*RIRT interaction demonstrates that even high interest rates remain a strong drag on the liquidity effectiveness. Policymakers are then advised to target the regional Inland Container Depots in order to strengthen the spatial spillovers. The adverse impacts of the exchange rate will have to be, by default, contained by coordination of regional currencies. The results indicate that the EAC is moving towards construction-based recovery, in case spatial connections are enhanced. The research finds that in the case of the EAC, infrastructure is not only a national asset but a regional public good.

Table 9. Spatial, DiD, and CD Results for East African Community (EAC)

Variables / Tests	Spatial (SEM)	DiD (Customs Union)	CD Test (Pesaran)
INV_{it-1}	0.275***	0.288***	Stat: 12.15
VM2S	0.170***	0.182***	p-value: 0.000
RIRT	0.154	0.165	Result: Presence
REXR	-0.112**	-0.108**	
RIRT*REXR	0.012***	0.014***	**Spatial Parameters**
VM2*RIRT	-0.115***	-0.102***	Lambda (λ): 0.288**
VM2S*REXR	-1.180***	-1.205***	Sigma (σ): 0.095
DiD Estimator	—	**0.182*** (Single Customs)	

The COMESA has a large geographical variety, which requires a complex Spatial Durbin Model (SDM) to address both direct and indirect impacts. The Table 10 provides Spatial, DiD, and CD Results. The Pesaran CD test reaffirms that though geographic distance separating the members exists, regional trade connections establish a high degree of cross-sectional dependence. The SDM results indicate that there is investment spatial lag (WINV) of 0.154, so that a growth in construction by a neighbor causes a 15% growth in the domestic area. This underscores the significance of the COMESA Free Trade Area to the ease of movement of construction services.

The DiD analysis of the launch of the COMESA FTA reveals an 11% causal effect on investment, albeit with a somewhat less significant effect than in more integrated unions such as WAEMU. The persistence variable (INV_{it-1}) is still highly predictive, which denotes long-term character of the infrastructure master plans of COMESA. Both, money supply (VM2S) and real interest rates (RIRT) have positive direct effects, yet there is an interaction (VM2S*RIRT) displays a faint negative friction. The RIRT is an especially important factor here since the negative interaction of RIRT*REXR is implying that at high interest rates, foreign construction companies are put off by currency volatility. Direct exchange rate effects are not very important, but the spatial model indicates that the impact of exchange rate shocks in the leading economies such as Egypt on the entire block is felt. Sequential rationality implies that individual national policy is not as important of a driver as market size effect in the case of COMESA.

According to the VM2S*REXR interaction, liquidity must be converted into physical assets, which in turn means that currency stability is necessary. The policymakers must thus seek to maximize the spatial lags observed within the regions in terms of investment hubs. The DiD findings indicate that trade

protocols are required and not enough to stimulate a construction boom: they need to be combined with financial deepening. The positive and significant coefficient of VM2S supports this. The research indicates that the construction industry at COMESA would be the most benefited with harmonized investment codes. The analysis highlights that spatial connectivity is the gateway to the construction potential of the 21 member states.

Table 10. Spatial, DiD, and CD Results for COMESA

Variables / Tests	Spatial (SDM)	DiD (FTA Adoption)	CD Test (Pesaran)
INV_{it-1}	0.262**	0.275**	Stat: 25.10
VM2S	0.210***	0.198***	p-value: 0.000
RIRT	0.285**	0.292**	Result: Presence
REXR	-0.075	-0.082	
RIRT*REXR	-0.190***	-0.185***	**Spatial Parameters**
VM2*RIRT	-0.022***	-0.018***	W*INV: 0.154**
VM2S*REXR	-0.035***	-0.031***	*W*VM2S: 0.112*
DiD Estimator	—	**0.110** (FTA Launch)	

Table 11 presents the Spatial, DiD, and CD Results for CEMAC. CEMAC analysis is based on the peculiarities of an oil-related area having a fixed exchange rate. Pesaran CD test shows cross-sectional interdependence, which is mostly, determined by mutual dependence on the CFA franc and world oil prices. The Spatial Autoregressive (SAR) model indicates a slight Rho of 0.11, which implies that spatial spillovers are not strong in CEMAC as compared to West Africa because the region is not well connected physically. The DiD analysis takes the global volatility occurrence of 2014, in the form of a commodity price crash, which shows a 8.5% shrinkage in construction investment. This indicates external shocks as the main determinants of construction cycles of CEMAC. The level of investment persistence is high implying that when oil-funded projects are initiated, they are likely to be completed regardless of price fluctuation. The influence of liquidity (VM2S) is very positive, but its interaction with interest rates (VM2S*RIRT) is very negative, which indicates that tight monetary policy is catastrophic to this field.

Surprisingly, there is positive interaction between VM2S and REXR, which indicates that money supply growth in a given exchange rate regime can be beneficial in smooth out the impact of overvalued currency. The interaction between the RIRT and the REXR is, however, the most important negative interaction, cautioning that large rates in currency stress are poisonous. Sequentially this suggests that the construction industry in CEMAC would be more of a follower rather than a leader in the domestic development in the world

of energy trends. The direct negative impact of REXR underscores the uncompetitiveness of domestic construction companies in times of the strong CFA Franc. It is upon policy makers to ensure that they focus on economic diversification in order to ensure that construction is no longer linked to the oil price DiD effect. Spatial outcomes demand better regional roads to enhance the low spillover parameter. Moreover, the high liquidity interactions imply that the central banks ought to keep the rates low in order to keep the projects afloat. Indirectly, the construction performance of CEMAC is already a ransom to the global oil and fixed exchange rate inflexibility.

Table 11. Spatial, DiD, and CD Results for CEMAC

Variables / Tests	Spatial (SAR)	DiD (Currency Peg)	CD Test (Pesaran)
INV_{it-1}	0.355***	0.362***	Stat: 9.85
VM2S	0.138**	0.145**	p-value: 0.002
RIRT	0.250*	0.266*	Result: Presence
REXR	-0.120*	-0.112*	
RIRT*REXR	-2.050***	-1.980***	**Spatial Parameters**
VM2*RIRT	-1.250***	-1.305***	Rho (ρ): 0.110*
VM2S*REXR	0.142***	0.132***	Sigma (σ): 0.142
DiD Estimator	—	**-0.085** (2014 Shock)	

Table 12 presents Spatial, DiD, and CD Results for WAEMU. The study shows that the WAEMU is the most integrated regionally, and this is indicated by the good spatial outcomes. The Pesaran CD test supports the fact that there is very high cross-sectional dependence, which implies that the single currency (CFA Franc) and common central bank (BCEAO) align the macroeconomic shocks. SAR model provides a substantial Rho of 0.385 which is the highest of all sub-regions and this demonstrates that almost instantaneously, construction booms in a single country within the WAEMU spur neighbors. The DiD analysis, which analyzes the application of regional convergence criteria, demonstrates significant improvement in construction investment by 21%. This demonstrates the fact that fiscal and monetary discipline is what forms the stable environment in which long-term physical capital can grow.

The direct impacts of VM2S are positive and have a great significance since the local banking system offers stable liquidity. But the adverse interaction of VM2S*REXR is drastic, thus depicting that the pegged exchange rate may be a bottleneck at the time when Euro gains strength. There is a negative yet insignificant association between VM2S and RIRT, which demonstrates that the interest rate management of the BCEAO is more or less efficient. The immediate impact of RIRT is of meager prominence, with access to capital being the primary

concern of construction firms in the region of WAEMU, which means that spatial outcomes imply Ivory Coast as a regional construction engine with massive positive spillovers to Burkina Faso and Mali. Sequential rationality implies that the stability of the union is its biggest asset in developing infrastructure. The negative RIRT*REXR interaction cautions against letting interest rates get too high in case of currency appreciation. Through DiD findings, it is by extension that the single market of WAEMU is a model of the other continents. The results emphasize the fact that in WAEMU, the presence of macroeconomic stability is directly proportional to physical growth. The prosperity of the region is established upon the background of money and space harmony.

Table 12. Spatial, DiD, and CD Results for WAEMU

Variables / Tests	Spatial (SAR/SDM)	DiD (Convergence)	CD Test (Pesaran)
INV_{it-1}	0.305***	0.315***	Stat: 15.62
VM2S	0.215***	0.230***	p-value: 0.000
RIRT	0.170	0.185	Result: Presence
REXR	-0.095*	-0.088	
RIRT*REXR	-0.015**	-0.012**	**Spatial Parameters**
VM2*RIRT	-0.012***	-0.010***	Rho (ρ): 0.385***
VM2S*REXR	-1.025***	-1.015***	Sigma (σ): 0.082
DiD Estimator	—	**0.210*** (Single Market)	

Table 13 provides the Spatial, DiD, and CD Results of Northern Africa. The macroeconomic environment of the Northern Africa is more varied but the Pesaran CD test still demonstrates the existence of considerable cross-sectional dependence. The SEM gives a Lambda of 0.21, indicating that market shocks that are not observed (such as tourism variations or Mediterranean trade changes) are spread regionally. A DiD analysis, which concentrates on the recent mega-scale Green Hydrogen and renewable energy investment programs, reveals that there was a sharp 15.5% increment in sectorial investment. This implies that a new causal agent to construction in the area is the shift towards green infrastructure. The persistence is high, but with a slight decrease compared to CEMAC, which means a more dynamic project environment. The positive impact of liquidity is strong and the impact of RIRT is directly insignificant hence the significance of financing availability.

The relationship between RIRT and REXR is particularly good and meaningful (1.012), which indicates that the foreign investment required stabilizing the currency and financing the construction is attracted by high interest rates. The adverse interaction of VM2S*REXR is a significant challenge though, since the currency appreciation will render Northern African construction material less competitive. The results of space reveal that the anchors of the regions are Egypt

and Morocco, although the spatial spillovers are at present restricted by the political barriers. Sequential logic gives the idea that Northern Africa is shifting to high-tech infrastructure instead of traditional building projects. The objective of policymakers should thus be to have a Mediterranean Energy Hub to exploit identified DiD effects. The very high liquidity interactions indicate that central banks ought to watch the actual cost of credit keenly. The immediate drawback of REXR is of great importance, which proves that it is the exchange rate that is in question in the construction sector here. The results indicate that the way forward of Northern Africa is in more Mediterranean integration. Lastly, the paper concludes that in this area, construction is becoming more and more interconnected with the global energy transition.

Table 13. Spatial, DiD, and CD Results for Northern Africa

Variables/Tests	Spatial (SEM)	DiD (Reform Event)	CD Test (Pesaran)
INV_{it-1}	0.288***	0.302***	Stat: 11.45
VM2S	0.155**	0.162**	p-value: 0.000
RIRT	0.198	0.208	Result: Presence
REXR	-0.102***	-0.095***	
RIRT*REXR	1.012***	1.018***	**Spatial Parameters**
VM2*RIRT	-0.018***	-0.015***	Lambda (λ): 0.210**
VM2S*REXR	-1.185***	-1.210***	Sigma (σ): 0.115
DiD Estimator	—	**0.155*** (Green Hydrogen)	

Table 14 present the Spatial, DiD, and CD Results for Southern Africa. The huge gravity effect of the South African economy that permeates the spatial outcomes characterizes the Southern Africa. The Pesaran CD test explains high dependency, which is very much integrated Southern African Customs Union (SACU). The SDM reveals a high spatial lag of investment (WINV) to be 0.315, which means that the construction booms of South Africa promote the growth across the sub-continent. The DiD analysis which assesses new policy changes in regional management of energy crises (e.g. deregulation of private power generation) indicates that there is a 12.8% causal increase in investment. This confirms that deregulation in the utility-related construction is one of the main drivers of growth nowadays. The persistence (INV-1) is high (0.342), and it indicates that there is a consistent pipeline of large scale infrastructure projects in Southern Africa.

Both money supply (VM2S) and real interest rates (RIRT) are positive and significant, unlike in any of the regions analyzed. The VM2SRIRT interaction, however, is extremely negative in that the advanced financial markets within the

region rapidly transfer high interest rates on the developers. The RIRT*REXR interaction is also negative and provides a warning that exchange rate volatility and high rates are a big obstacle to entry. Spatial outcomes show that the exchange rate shocks to the South African Rand (W*REXR) have a great negative effect on the entire region. Sequential logic indicates that countries in Southern Africa are progressing toward the model of infrastructure that is dominated by the private sector. The policy should then be aimed at stabilizing the Rand and promoting cross-border participation by the individuals. DiD results indicate that the energy gap is the most useful existing policy lever to construction. Moreover, the positive direct impacts of RIRT indicate that the Southern African projects are strong enough to face moderate rate increases. The South African economy spatial health determines the success of the region construction. The discussion highlights that Southern Africa has led in the use of policy reform to propel physical development.

Table 14. Spatial, DiD, and CD Results for Southern Africa

Variables / Tests	Spatial (SDM)	DiD (SACU Reform)	CD Test (Pesaran)
INV_{it-1}	0.342***	0.355***	Stat: 19.88
VM2S	0.180***	0.192***	p-value: 0.000
RIRT	0.215***	0.228***	Result: Presence
REXR	-0.118**	-0.125**	
RIRT*REXR	-1.250**	-1.280**	**Spatial Parameters**
VM2*RIRT	-0.985***	-1.015***	W*INV: 0.315***
VM2S*REXR	-0.008***	-0.005***	W*REXR: -0.092*
DiD Estimator	—	**0.128*** (Energy Crisis Policy)	

Table 15 present Panel non-linearities and distributional heterogeneity results for all geographical regions. In order to offer a strict econometric analysis, we go beyond average effects to consider non-linearities and distributional heterogeneity. The results of the Panel Threshold Regression (determining thresholds) and PQR (identifying the effects at various levels of investment growth) in all the seven regions are given in the following tables and analyses. Table 15 is used to determine the level at which a certain variable reaches the threshold of the particular variable that changes the regimes of the impact on construction investment. The effect of variables at the 25th (Low), 50th (Median), and 75th (High) quantiles of investment growth are also indicated in Table.

The panel non-linearities and distributional heterogeneity findings of ECOWAS reflect an industry with high liquidity dependence and a severe limit on interest

rate. The PQR indicates the highest effect of money supply is at 75th quantile implying that the most effective financial deepening is in high-growth construction markets. This liquidity effect is uniform throughout the distribution but increases with the volume of the construction project pipeline. However, the threshold regression determines the critical threshold of real interest rates to be 12.5%. Beneath this level, interest rates are positively correlated with investment and probably at the time of sound economic growth. The correlation beyond 12.5 becomes insignificant or negative, because the cost of capital becomes prohibitive to the developers. VM2S*RIRT interaction is always negative, which confirms the fact that high borrowing costs neutralize the effect of higher liquidity. It is evident in the RIRT*REXR interaction that the high rates can only be effective in attracting capital when the exchange rate is seen to be stable. The VM2S*REXR term shows that the appreciation of the currency marginally reduces the translation of domestic money into physical infrastructure. The persistence of investments is greatest in the lower quantiles, meaning that the markets that are struggling rely more on the historical momentum. This path dependency implies that it takes substantial initial policy action to get out of low-investment cycles. Causal evidence suggests that monetary expansion is a condition to growth, and only in the identified interest rate regime. The policy should therefore be geared towards maintaining the rates at less than 12.5 percent to make money supply an effective tool. ECOWAS countries would have to harmonize fiscal policy in the long term, so that there is no spike in interest rates. The analysis demonstrates that in the case of ECOWAS, liquidity is essentially dominant, though affordable in case of borrowing. The construction strength of the region is in fact a fine tune between the liquidity of the region and national rate management.

The EAC analysis shows a territory where the results of construction are determined by external price stability and regional integration. PQR indicates that exchange rate shocks are the most harmful at the 25th quantile, implying that small construction markets are the weakest to currency volatility. The negative effect of appreciation diminishes as we head towards the 75th quantile, probably due to the fact that larger companies have superior hedging in place. The threshold regression comes up with a 5.4 percent appreciation limit as the one where domestic competitiveness is drastically undermined. After this point, the construction industry experiences an additional decline in investment as the local cost of production increases as compared to imports. The correlation of VM2S with REXR is very important and negative, which implies that when there is a spike in currency, then money cannot reach the sector effectively in the country. In the meantime, the VM2S*RIRT interaction is another weak point in that it is not as serious as in ECOWAS. The interaction of RIRT*REXR is positive, which

means that the interest rate policy can be successfully often employed to protect the currency stability. Persistence (INV-1) is a strong predictor and it is true of all quantiles, supporting the long term aspect of East African infrastructure master plans. Causal tests show that regional trade agreements have established a considerable floor on these persistence effects. The results of the threshold however give a warning that failure to observe red lines on exchange rates would invoke capital flight. The emphasis should therefore be on the policy of having a competitive exchange rate in order to safeguard the domestic contractors. This is especially crucial to landlocked members with an increased logistical cost. The successive results imply that liquidity is not sufficient to propel the EAC without price competitiveness. In its turn, the success of the region is related to the protection of smaller markets against external volatility. In conclusion, the EAC needs to focus on the external sector stability in order to continue with its construction pace.

The geography of the COMESA is highly diverse and large in scale, which necessitates attention to financial depth as a precondition to building. The threshold regression shows that money supply can only make a significant construction driver when it attains 18 per cent of GDP. At a level below this 18 percent mark, the financial sector is shallow enough not to bring the long-term funding on major physical assets. PQR affirms that the level of investment persistence is most at the 10th and 25th quantile, indicating that underdeveloped markets are languishing in their historic ways. The current macroeconomic variables such as VM2S gain more dominance over the past trends as the markets mature to the 75th quantile. The interaction between VM2S and RIRT demonstrates that the most detrimental is the interaction between high interest rates in those shallow markets below the threshold. Also, the correlation between the RIRT*REXR is negative; implying that the combination of high rates and currency fluctuations discourages foreign direct investment. The VM2S*REXR exchange shows that the purchasing power of domestic liquidity of imported machinery may be destroyed by currency depreciation. This is of main concern to the numerous import-dependent countries under the COMESA bloc (Gondwe, 2021). Causality: There is a causality relationship between exchange rate stability and a leading indicator of construction starts in the region. Therefore, the policy should aim at enhancing the financial sector so as to get countries out of the 18% liquidity level. With such a depth in place, the susceptibility to historical persistence drops, and more dynamic growth is possible. The findings indicate that the greatest challenge that faces COMESA is its diversity since one size does not fit all. Nevertheless, shared emphasis on financial inclusion might reconcile

these contrasting results. The way that the COMESA will go is to grow out of historical dependency and to active monetary management.

Spatial outcomes demand an improved connectivity so that these national initiatives can generate regional benefits.

The WAEMU's regional macroeconomic surveillance framework and convergence criteria, centered around fiscal goals, aim to ensure fiscal discipline and growth (Fund, 2016; Napo & NAPO, 2022). According to threshold regression, the sector performs well with a fiscal deficit not exceeding 3% of GDP, which is among union convergence requirements (Kebalo & Zouri, 2022). In this sound fiscal regime, the growth of money supply is an instrument in stimulating gross fixed capital formation and economic growth (Gnahe & Fei-ming, 2020). This implies that larger markets in the union, such as Cote d'Ivoire and Senegal, are active in credit flows (Koffi, 2016). Causal tests demonstrate that the regional stock exchange (BRVM) has a causal relationship with economic growth and long-term financing (Zonon, 2021). The policy should now be directed at minimizing the adverse impacts of exchange rate peg on local competitiveness.

Northern Africa: The construction industry in Northern Africa is marked by the fact that it is integrated into the global value chains and price stability is sensitive. To conclude, North Africa needs an advanced monetary policy that will address the inflation, but will keep the exchange rate safe.

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but increases with the volume of the construction project pipeline. However, the threshold regression determines the critical threshold of real interest rates to be 12.5%. Beneath this level, interest rates are positively correlated with investment and probably at the time of sound economic growth. The correlation beyond 12.5 becomes insignificant or negative, because the cost of capital becomes prohibitive to the developers. VM2S*RIRT interaction is always negative, which confirms the fact that high borrowing costs neutralize the effect of higher liquidity. It is evident in the RIRT*REXR interaction that the high rates can only be effective in attracting capital when the exchange rate is seen to be stable. The VM2S*REXR term shows that the appreciation of the currency marginally reduces the translation of domestic money into physical infrastructure. The persistence of investments is greatest in the lower quantiles, meaning that the markets that are struggling rely more on the historical momentum. This path dependency implies that it takes substantial initial policy action to get out of low-investment cycles. Causal evidence suggests that monetary expansion is a condition to growth, and only in the identified interest rate regime. The policy should therefore be geared towards maintaining the rates at less than 12.5 percent to make money supply an effective tool. ECOWAS countries would have to harmonize fiscal policy in the long term, so that there is no spike in interest rates. The analysis demonstrates that in the case of ECOWAS, liquidity is essentially dominant, though affordable in case of borrowing. The construction strength of the region is in fact a fine tune between the liquidity of the region and national rate management.

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plans. Causal tests show that regional trade agreements have established a considerable floor on these persistence effects. The results of the threshold however give a warning that failure to observe red lines on exchange rates would invoke capital flight. The emphasis should therefore be on the policy of having a competitive exchange rate in order to safeguard the domestic contractors. This is especially crucial to landlocked members with an increased logistical cost. The successive results imply that liquidity is not sufficient to propel the EAC without price competitiveness. In its turn, the success of the region is related to the protection of smaller markets against external volatility. In conclusion, the EAC needs to focus on the external sector stability in order to continue with its construction pace.

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In the case of CEMAC region, the construction industry is a product of fiscal wellbeing and commodity-based stability. A threshold regression of 55% debt to GDP ratio is used to determine where construction investment starts to be crowded out by debt servicing. Infrastructure investment by the government and private investment below 55 follow the trend of liquidity growth. At this point in debt, the beneficial effect of VM2S disappears as funds are redirected to international commitments. The PQR reveals that the negative correlation between VM2S and RIRT is harsh and uniform in the whole distribution. This implies that the cost of capital is a structural factor irrespective of the magnitude of construction market. The VM2S*REXR relationship is a special positive one in this case, which indicates that the money supply is a buffer to external shocks in a fixed exchange rate regime. Nevertheless, the RIRT*REXR interaction is the most important negative, which implies that high rates in times of currency stress are harmful. Persistence at investment levels is very high, ranging over quantiles, and this is a characteristic of long-term, oil-financed government projects. Such projects are not as much affected by short-term market fluctuations but very sensitive to the debt limit identified. The causal evidences put forward associate the stability of oil prices directly to the capacity of the region to retain its liquidity. Fiscal discipline should however be put at the forefront of policy advising in order to maintain a debt ratio of less than 55%. Moreover, the region needs to devise means of lowering the cost of borrowing to open the VM2S*RIRT bottleneck. This is of main concern to the numerous import-dependent countries under the COMESA bloc (Gondwe, 2021). Spatial outcomes demand an improved connectivity so that these national initiatives can generate regional benefits. To sum up, the construction industry of CEMAC is a result of fiscal space and financial stability. The reasoning goes on that with no debt control, the liquidity growth will be a dead weight on the construction industry.

The WAEMU findings demonstrate a very integrated and disciplined area where fiscal goals serve as the main gatekeeper to growth. According to threshold regression, the sector performs well with a fiscal deficit not exceeding 3% of GDP, which is among union convergence requirements. In this sound fiscal regime, the growth of money supply is a very good instrument in stimulating construction. The WAEMU's regional macroeconomic surveillance framework and convergence criteria, centered on fiscal goals, aim to ensure fiscal discipline and growth (Fund, 2016; Napo & NAPO, 2022). According to threshold regression, the sector performs well with a fiscal deficit not exceeding 3% of GDP, which is among union convergence requirements (Kebalo & Zouri, 2022). In this sound fiscal regime, the growth of money supply is an instrument in stimulating gross fixed capital formation and economic growth (Gnahe & Fei-

ming, 2020). This implies that larger markets in the union, such as Cote d'Ivoire and Senegal, are active in credit flows (Koffi, 2016). The efficiency of VM2S declines dramatically with a deficit of over 3 and market confidence declines. The PQR testifies the fact that the liquidity effect is strong and even stronger as we proceed between the 25th to 75th quantile. This implies that the most efficient markets in the union as far as converting credit to buildings is concerned are the largest markets of the union. The relationship between VM2S and RIRT is negative, small, which suggests that the common central bank (BCEAO) controls the interest rates professionally. The VM2S*REXR interaction, however, is highly negative and exhibits that a robust CFA Franc constrains the home effect of credit multiplier. The RIRT*REXR learning is not positive either, implying that interest rate increases in the period of Euro strength are two-fold constraining. The infrastructure development in the region has been steady and this is reflected in the high persistence across the board. Causal tests demonstrate that the regional stock exchange (BRVM) has introduced a major causal change in long-term financing. The consecutive conclusions suggest that the 3% deficit rule is not only a fiscal goal, but a construction requirement. This discipline makes sure that the liquidity of WAEMU is productive. The policy should now be directed at minimizing the adverse impacts of exchange rate peg on local competitiveness. Finally, the highest monetary and fiscal coordination of the regional scope is the WAEMU construction industry. The success of the region lies in the fact that it is able to stick to discipline as well as encourages spatial spillovers.

Northern Africa: The construction industry in Northern Africa is marked by the fact that it is integrated into the global value chains and price stability is sensitive. The threshold regression indicates an 8.5 percent inflation rate as the risk zone of the sector. At a percentage below 8.5, the real interest rate and liquidity collaborate to make well-performing growth. Anything above 8.5 percent, the future prices will be uncertain and this will lead to a drastic narrowing of long-term construction commitments. QR demonstrates that in the 90th quantile of the largest markets (such as Egypt and Morocco); exchange rate stability (REXR) has the greatest effect. The value of the RIRT REXR interaction is very positive at 1.014 and it indicates that the high interest rates are applied effectively to lure foreign capital to the industry. Nevertheless, the VM2S*REXR interaction is a huge negative (-1.185), cautioning that devaluations are a big negative to the power to import construction technology. The persistence is moderate indicating that the North African markets are more responsive to modern shocks as compared to Sub-Saharan counterparts. Causal analysis indicates that the Mediterranean trade flows are a leading indicator of domestic construction boom. Policy should then focus on ensuring that inflation is kept at below the 8.5% level

to ensure the confidence of the developers. The region ought also to leverage its high interest rate ability to cushion the currency without crippling local credit. The sequential logic suggests that North African construction is a transgression between African labour and world capital. As a result, any destabilization of prices annihilates this fine balance. A regional energy hub is the next causal element to the 75th quantile, as the study suggests. To conclude, North Africa needs an advanced monetary policy that will address the inflation, but will keep the exchange rate safe.

The construction industry in Southern Africa is an interest rate sensitive and financially mature story. Through threshold regression, it is discovered that construction investment is extremely positive up to the point when the real interest rates reach 10 percent. Beyond 10% the industry will be in stagnation since the deep financial markets of the region will price out all but the most lucrative projects. As indicated by the PQR, the interest rate effect (RIRT) is strongest at the median (50th quantile) and influences the major portion of the mid-range developers. Those markets with high growth at the 75th quantile are more robust yet remain sensitive to the 10% mark. VM2S and RIRT have an almost -1.0 interaction with each other, indicating that an increase in interest rates essentially kills positive effect of any increase in liquidity. The RIRT*REXR correlation is negative indicating the risk of the Rand-effect in the subcontinent. The greatest persistence is in Africa at 0.35, which is an indication of a very stable and long-term infrastructure pipelines region. Causal evidence indicates that Granger-cause outcomes are the direction of South African construction in the rest of the bloc. This is in line with the findings of Zonon (2021). Thus, the 10% interest rate in South Africa is a regional ceiling to all the neighbors. The concern of the policy should be maintaining the rates lower than this double-digit value so as to sustain regional momentum. The VM2S*REXR interaction indicates that the deep liquidity of the region requires currency stability in order to maximize the benefits thereof. The results suggest that Southern Africa is a rate based construction market. The success of infrastructure in the region, by implication, is related to the capacity of the central bank to keep rates at a low level. In this respect, the way forward of Southern Africa must be to balance between the demands of the advanced financial sector and the demands of the physical development.

Table 15. Panel Non-Linearities and Distributional Heterogeneity Results for all Geographical Regions

Panel Threshold Regression Results for all Geographical Regions					
Region	**Threshold Variable**	**Threshold Value**	**Regime 1 (Below)**	**Regime 2 (Above)**	**P-Value**
ECOWAS	Real Interest Rate (RIRT)	12.5%	0.185***	-0.042	0.002
EAC	Exchange Rate (REXR)	5.4% (Appr.)	-0.092**	-0.215***	0.015
COMESA	Money Supply (VM2S)	18.0% of GDP	0.045	0.235***	0.001
CEMAC	Debt-to-GDP Ratio (DEBT)	55%	0.120**	-0.098*	0.034
WAEMU	Fiscal Deficit (FSID)	3.0% of GDP	0.215***	0.054	0.000
Northern Africa	Inflation Rate	8.5%	0.165***	-0.110**	0.011
Southern Africa	Real Interest Rate (RIRT)	10.0%	0.225***	-0.015	0.005

Table 16. Panel Quantile Regression (PQR) Results for all Geographical Regions				
Region	**Variable**	**25th Quantile**	**50th Quantile**	**75th Quantile**
ECOWAS	VM2S	0.142**	0.215***	0.285***
EAC	REXR	-0.154***	-0.112**	-0.085*
COMESA	$INV_{(it-1)}$	0.412***	0.350***	0.262**
CEMAC	VM2S*RIRT	-1.450***	-1.289***	-1.050***
WAEMU	VM2S	0.185***	0.228***	0.245***
Northern Africa	RIRT*REXR	0.850***	1.014***	1.250***
Southern Africa	RIRT	0.155**	0.223***	0.288***

5. Discussion

This part of the study explains the findings of the system GMM estimation and the policy implications of the same. In every GMM estimation, it is apparent that the Arellano-Bond tests, the AR (1) test showed z-values that prove there was first-order serial correlation in the differenced residuals, as it should be in dynamic panels. However, the z-values of the AR (2) tests indicate that there is no second-order serial correlation which reinstates the suitability of the instrument lag structure. The Hansen J test also provides statistics, which shows the instruments used in the S-GMM model estimation are valid. Essentially, all the instrumental variables that one plans to use to estimate are actually not correlated with the error term. Results and the findings of the research were discussed regionally.

ECOWAS

The results of the ECOWAS show that there is positive interaction between misalignment in real effective exchange rate and real interest rate changes that are capital investment enhancing. The large coefficient indicates that there is a substantial impact on the existing growth of investment. This implies that as long as there was a significant misalignment of the actual effective exchange rate in the ECOWAS countries under investigation, the sectorial investment increment would be more vulnerable to the escalating real interest rates. It sends the message that under the right circumstances, high domestic real interest rates plus the depreciation of the real effective exchange rates of Ghana, Togo, Nigeria, Sierra Leone, and Liberia may result in foreign investment. This is consistent with the statement by Chikezie and Omodara (2022), who indicated that this type of dynamics creates trade opportunities and entices foreign portfolio investment when well managed. Such inflows may temporarily boost capital supply and stimulate investment in such sectors as finance and services, although such inflows do not necessarily result in long-term investment.

The misalignments in the real effective exchange rate vis-a-v-s trading partners and the amount of money supplied by the central banks of Nigeria, Sierra Leone, Ghana, Togo, The Gambia and Liberia interact negatively. Although the GMM findings affirm positive contribution of financial development, the positive impact of higher credit was diluted in the cases when the local currencies of countries mentioned above depreciated at high rates. This is indicative of the empirical observation by Ibrahim and Ejezie (2024) that expansionary monetary policy against a depreciating currency is more likely to contribute to the inflation, which reduces the real worth of credit and puts lenders at risk. Consequently, banks can reduce lending, which will limit investment across the board.

Our result shows that the combination of real interest rate and a loose monetary policy will spur large credit restraints. This aligns with studies by Obianuju and Falana (2023), which established that high rates of interest differentials might elevate inflation expectations and loan default concerns in case they are not accompanied by appropriate monetary tightening. This has led to banks coming up with tighter lending policies, which limits access to investment capital, especially by startups and small businesses. We found that the variation in the level of money in circulation, loans and credits and the real effective exchange rate mutually reinforced each other negatively. In reality, credit expansion through the increasing money market funds and domestic loans have not yet substantially and pervasively allowed firms, and in particular small firms, to increase their operations and reinvest. This is supported by the fact that, depreciation of the

local currencies has failed to increase the export profitability due to non-competitiveness of ECOWAS export. All these combined cannot support an expansion of investment.

EAC

Under certain macroeconomic conditions, a positive relationship between changes in the real effective exchange rate and real interest rates was observed in EAC. These were especially evident in tourist and services sector where investment was more enticing with quick returns and foreign demand. Other positive results that were found to exist in the current study are that there is evidence that the changes in the M2 money supply have a positive relation to the changes in the real effective exchange rate. There is a concern that exists due to the adverse relationship which exists between the actual interest rate and the money in circulation. The findings of (Hakizimana & Musoni, 2024) support such concern when it was disclosed that during high credit growth periods, the escalating interest rate differentials led to misalignments in funding costs.

Common Market for Eastern and Southern Africa (COMESA)

According to Egypt's S-GMM statistics, the country's real interest rate, domestic money supply, and past investment trends all have a significant role in the country's present sectorial investment growth. In particular, although there was a negative indication of misalignments in the actual effective exchange rate compared to trading partners in COMESA nations, the impact was negligible. The negative interaction between real interest rates and exchange rate volatility is one of the primary obstacles to investment in COMESA. Even if real interest rates alone promoted capital inflows, their beneficial effects may be lessened when combined with an unstable and misaligned effective exchange rate. This interaction of real interest rates and exchange rate volatility erodes investor confidence and increases macroeconomic uncertainty. Foreign investors often hold back due to concerns about real effective exchange rate depreciation, resulting in capital flight and weakened foreign capital inflows (Fahirah, 2025; Godspower. et al., 2025).

The research provides evidence that when real effective exchange rate instability and changes in the money supply interact negatively, especially when credit is expanding and the value of the currency is falling, the result can be inflationary and counterproductive. Incidents in COMESA's recent past caused prices to rise while real investment returns decreased. These highlight the potential negative effects of expansionary monetary policy when exchange rate volatility reduces the actual value of lending as earlier advocated by Aboyitungiye & Mathu (2023) and

Buyun (2024). Additionally, distortions in borrowing circumstances arise when the real interest rate and M2 money supply interact negatively. This identical outcome is consistent with Belozorova (2025) and Schäfer & Semmler (2024) that high real interest rates exacerbated inflationary pressures and raised investor cost expectations during times of expanded money supply. This inhibited investment and discouraged domestic borrowing, particularly in credit-intensive industries like construction and manufacturing. Even readily available credit may be viewed as too hazardous to employ in such a turbulent environment. Furthermore, when credit supply and real interest rates are properly controlled, their interactions can support one another.

Central African Economic and Monetary Community (CEMAC)

In CEMAC, the negative interaction between real effective exchange rate fluctuations and real interest rate can be explained by the fact that while low real lending rate on their own support capital investment, their positive impact tends to wane when paired with fluctuations in the cedi. The outcome is consistent with the previous study by Amankwah & Baidoo (2023), which found that this interaction lowers investor confidence and raises macroeconomic uncertainty, particularly among international and portfolio investors. Likewise, the interplay between the money supply and the negative exchange rate poses challenges. While the real effective Cedi exchange rate misalignments with CEMAC trading partners were marginally significant, and the growth rate of the amount of money in circulation has a favourable impact on investment, the interaction effect on capital investment was negative. The main point is that when loan expansion coincides with significant devaluation of the cedi, the outcomes can be detrimental. This is in tune with the research results of Adu-Gyamfi & Ofori (2022), who found that the advantages of easy lending were countered by inflationary pressures and a decline in the Cedi's purchasing power during such times. Additionally, it should be noted that while the money supply and real interest rate both encourage capital investment on their own, their interplay can unfortunately have unforeseen repercussions. According to the explanation in line with the findings of Akomea et al. (2023), commercial banks adopted a more cautious approach, especially during periods of inflation, as a result of high real interest rates and aggressive credit growth. As a result, local companies faced more stringent credit requirements, which inhibited lending and slowed down investment activity. Our finding of a positive interaction between real effective exchange rate and money supply variations including deposit money banks' credits corroborates the findings of Fremmpong et al. (2023) where it was observed that as the cedi weakened, exports of domestic products became more competitive. When this trend was matched with greater access to credit, local firms were able to scale operations and invest in

growth. In these cases, the dual effect of improved export margins and accessible financing created a strong investment stimulus.

West African Economic and Monetary Union (WAEMU)

In WAEMU, we identified an inverse interaction between changes in the real interest rate and changes in the real exchange rate. By explanation, the benefits of real interest rate influence are frequently outweighed by the CFA franc's volatility, despite the fact that they may yield larger returns. This supports the findings of (Umoru & Hussaini, 2022), who observed that long-term capital investments were deterred by the combination of rising real interest rates and real effective exchange rate instability. It is challenging for both domestic and foreign investors to plan and allocate funds to projects when the currency rate is uncertain. A declining currency reduces the real worth of available funds just when monetary growth is not accompanied by productivity improvements, according to the negative relationship between real effective exchange rate misalignments and money supply expansion. Accordibgly, increased money supply, during times of CFA depreciation, often led to inflation spikes. In turn, this undermined the effectiveness of expanded credit, especially in trade and consumer-facing sectors that rely heavily on imported goods.

Similarly, the adverse interactive effect between real interest rate and the amount of money in circulation portrays volatile macroeconomic conditions aligns with the results of Sanga & Aziakpono (2024) who argued that the uncertainty presented by real interest rate variation makes banks to tighten credit policies. As a result of this, investments from the private sector were stalled even if the financial system had liquidity since access to money was limited. The fact that not every interaction results in negative consequences should not be overlooked. Some of these interactions could yield advantageous impact to WAEMU in comparatively steady circumstances. For example, Fanelli & Straub (2021) found that short-term capital inflow was facilitated by a small depreciation of the CFA franc combined with somewhat increased interest rates.

Northern Africa

The S-GMM results for North Africa demonstrate that the negative interaction between the money supply and the real exchange rate is visible when there is a change in the money supply together with credit expansion and a weak currency. Even though changes in M_2 plus bank credits alone encourage capital investment, their efficacy is undermined during inflationary periods when the real effective exchange rates of Algeria, Morocco, Mauritania, Sudan, Tunisia, and Libya decline relative to their trading partners' currencies.

Also, the negative interaction between real interest rate variation together with the quantity of money in circulation plus banking sector credit/loans also undermines investment, particularly in smaller credit markets. This is comparable with the research of Milosavljevic, Torrance, Kievit, Darboe, McCann, & Team, (2024)., who found that commercial banks tightened lending access in response to growing interest rate gaps and an expanding money supply because they were concerned about loan defaults. According to their findings, actual investment flows are decreased when rising real interest rates interact with an unstable macroeconomic environment. Stable macroeconomic conditions are indicated by the evidence of positive interaction effects between North Africa's real interest rate and real exchange rate misalignment. Therefore, with successful central bank actions, the relationship between real effective exchange rate misalignment and real interest rate may provide positive outcomes.

Southern African Countries

The study found a negative interaction between real effective exchange rate movements and real interest rate variations. Theoretically, capital investment is drawn to countries with positive real interest rates; however, when the real effective local currency exchange rates of Botswana, Namibia, Lesotho, Mozambique, Seychelles, and Angola drop significantly, the advantages are frequently negated. This supports the findings of Wekesa (2023) in Kenya, which highlighted how uncertainty is created by the Kenyan Shilling's volatility, particularly in capital-intensive industries like infrastructure and manufacturing. Their findings demonstrated that even attractive domestic returns cannot outweigh the risks associated to unpredictable real effective exchange rate changes, which often delay project implementation and even precipitate capital flight.

Similarly, we discovered evidence of a negative interaction between the amount of money supplied and the misalignments in the actual effective exchange rates of Botswana, Namibia, Lesotho, Mozambique, Seychelles, and Angola with respect to the aforementioned countries' trading partners. This could be explained by the idea that credit expansion encourages investment, and that when it occurs at the same time as local currency depreciation, earnings are reduced. A declining value of the local currency in import-reliant economies can drive up prices, fuel inflation, and reduce actual investment returns (Liu, 2023; Ng, 2026). This was particularly true when credit expansion exceeded productive output, leading to inflationary pressures that stifled investor enthusiasm and drive. In Southern African nations, the negative interaction between the money supply and real interest rates also has the impact of discouraging investment. The findings support

those of Mwangi (2026) and Botchwey et al. (2022) who discovered that commercial banks raised lending rates to lower loan defaults when interest rate discrepancies extended in tandem with a rise in the money supply. This made it tougher for small and medium firms to acquire finance, diminishing the larger impact of greater cash on the real economy. According to their analysis, expansionary lending policies might not fully materialize if the interest rate is not stabilized.

Policy Implications

The systemic econometric findings of System GMM, Spatial Spillovers, panel thresholds and Quantile Regressions are used to derive the following policy implications in order to offer a strong framework on how construction investment can be sustained in Africa.

ECOWAS (West African States)

The policy makers of ECOWAS need to work towards keeping real interest rates at a level that does not exceed 12.5 to make sure that the domestic liquidity continues to be a good factor in encouraging construction growth. The central banks should make sure that expansion of money supply should be channeled towards credit facilities, which are to be used in long-term infrastructural projects. As a result of the high spatial spillovers that have been witnessed, the leaders in the region should align the infrastructure master plans in order to maximize the neighbor effect on a cross-border basis. The AfCFTA framework should be integrated with fiscal policies that have been documented to cause an increase in investment. In that regard, the government ought to think of adopting hedging mechanisms to cushion mid-tier developers against the negative interplay between currency appreciation and money supply.

Targeted seed investments are needed to initiate new cycles of projects to overcome the path dependency that is witnessed in developing countries with lower growth. Financial integration between the regions needs to be enhanced to lessen the cost of cross-border construction financing. Policies should also strike a balance between currency stability and liquidity to ensure that the liquidity and real exchange rate interaction bottleneck does not suffocation of capital intensive projects. Incentives to public- private partnerships (PPP) should be encouraged in high-growth quantile where the ability to absorb liquidity is at its optimum. Lastly, the ECOWAS needs to form a regional monitoring body to monitor interest rate volatility, and its direct effect on the construction pipeline.

EAC

The EAC should exercise caution with its exchange rate regime to avoid appreciation of the currency beyond the 5.4% mark that will lead to a steep fall in investment. External sector competitiveness should be a priority in regional monetary policy in a way that does not leave domestic contractors exposed to an increase in the prices of imported materials. As the construction shocks are also spatially correlated, the establishment of a regional insurance pool may allow the landlocked members to alleviate unobserved disruptions of the supply chain.

The governments need to take advantage of the Single Customs Territory in order to ensure smooth flow of construction inputs along the Northern Corridor. The policymakers ought to offer certain financial safeguards to the construction companies in the 25th growth quantile, which are the most susceptible to instability. The strategic use of interest rate policies should be employed to protect currency floors without the crowding out of the private developers. The region must also encourage local construction materials in order to minimize the adverse interplay between the liquidity and the real exchange rate. The design of future infrastructure projects should be regional outlook in a way that will increase the positive spatial spillover effects among member states. The alignment of codes of investments in the region will also contribute to the attraction of foreign companies in high-growth and high technology construction industries. Competitive exchange rate zone is the most critical policy in the long run in sustaining the momentum of the East African infrastructure.

COMESA

Financial sector deepening should be a high priority in COMESA countries as the study has found that money supply has to be at the critical 18% of GDP level. There should be a bottom line of structural changes in the banking sector of the policy and not mere expansion of monetary in nature. In the case of countries languishing in low-quantile growth, the government should inject direct capital to get things going in an effort to break the historical path dependency. The regional trade protocols are to be further integrated to increase the spatial lag effect of construction investment among geographically differentiated members. The negative interaction between the two effects of increase in interest rates and exchange rate changes should be alleviated by policymakers by putting currency-stable financing windows.

Since interest rates are a major factor in the mature markets (Bekaert et al., 2011), there should be an attempt to reduce base rates of lending to important development projects. COMESA needs to empower the Regional Investment Agency to streamline the construction standards and draw international

contractors. The liquidity and real exchange rate interaction will lead to a decrease in the purchasing power which will be reduced by the efforts to reduce the dependence on imports. High-growth countries should also be equipped with strategic investment centres to act as catalysts of development in the region. The strategy of COMESA needs to be adjusted to focusing not only on the management of historical tendencies but on the management of financial and spatial limits.

CEMAC

The CEMAC countries are bound to maintain a 55% debt-to-GDP limit to avoid crowding out of critical construction investment. This is close to the threshold of 70% debt-to-GDP limit earlier reported by Ndoricimpa (2020) to avoid crowding out of critical construction investment. To make sure that domestic liquidity is available to fund physical capital projects and not to pay off international debt, fiscal consolidation is needed. Governments ought to create sovereign wealth funds that are capable of counter-cyclical funding of their projects to decouple construction to the oil price shocks. The central banks in the region should strive to reduce the cost of capital in order to ease the harsh bottleneck in the interaction of money supply and real interest rate that is experienced in all quantile ranges. The region will need to invest a lot of capital in cross-border road networks due to the low levels of spatial spillovers, as the region needs to enhance regional construction synergies. In a fixed exchange rate system, the policy must be directed towards internal devaluation and lowering cost to enhance competitiveness of domestic firms (Kuokštis et al., 2025). Debt ceiling (55 percent) ought to be incorporated in the national fiscal regulations indicating that the country is stable to long-term infrastructure investors. To alleviate the effects of global commodity shocks, governments need to encourage the diversification of money supply beyond the oil reliant sectors. At the lower quantiles, projects that are driven by the local people ought to be maintained at a constant rate to maintain local continuity and jobs. The research found that construction industry in CEMAC relies on the ability to preserve fiscal space and vigorously lower the cost of debt. This is in agreement with the finding reported by Makala (2022) and Ondo (2017).

WAEMU (West African Monetary Union)

The WAEMU should further maintain the 3.0% fiscal deficit limit, which is an essential point of maintaining confidence among investors in construction. This in indeed support earlier policy advice of Dordevic (2024). The existence of spatial spillover effects should be harnessed by regional policymakers through initiating joint-border infrastructure projects as earlier noted by Kane & Sanghare (2018).

The BCEAO also ought to make certain that the transmission of its interest rates is efficient to ensure that the positive relationship between expansion of money supply and investment is maintained (DIA, 2025; Gnahe & Fei-ming, 2020). WAEMU should also encourage the use of Made in WAEMU construction materials to help in the reduction of reliance on Euro-linked costs to counteract potential negative real exchange rate interaction effects. This was noted advised by CISSE et al. (2025). In line with the submissions of Hervé & Modeste (2025); Hervé (2019), privatization should be taken advantage of to offer bond financing to long-term low-interest private developers through the regional stock exchange (BRVM). The solution to the median-growth squeeze in mid-tier countries should be fiscal discipline coupled with targeted infrastructure subsidies. This is agrees with Aiyar et al. (2013); Kato (2025). High growth countries such as Ivory Coast are supposed to be urged to act as a regional construction powerhouse to their smaller neighbors (Morisset, 2016). The policymakers are advised to observe the real interest and real exchange rates interaction to make sure that the growth should not be stifled by interest rate increases in the periods of Euro strength (MacDonald, 2000). The WAEMU convergence criteria need to be at par with national development plans to realize an optimum causal growth effect. This shares support to Amadou & Kebalo (2019). Finally, the region needs to safeguard its financial harmony because it is the major force behind construction persistence and general expansion.

Northern African Countries

The Northern African nations should focus on ensuring that inflation does not exceed the 8.5% level so that it ensures that large construction projects can continue operating in a stable environment. When inflation goes beyond this point the monetary policy will have to act with decisive action to bring back the price stability and make the developers confident in the long term. Central banks ought to use the positive real interest and real exchange rate interaction to attract foreign capital through keeping the real interest and real exchange rate at competitive but stable rates. In order to correct the adverse negative liquidity and real exchange rate interaction effect, the policymakers will need to encourage the production of high-tech construction inputs in the country. Green Hydrogen DiD effect can be exploited by the regional leaders by setting up special economic zones where renewable energy infrastructure projects can be developed. There is a need to work on minimizing political obstacles to enhance the already small spatial spillovers among the Mediterranean neighbors as earlier observed by Alaya (2020) In large quantile markets (90^{th} percentile) policies must aim at internationalization of the construction standards in order to bring in international institutional investors. The 25^{th} quantile markets need local-content protections so that they

have a chance to survive competitive pressures of the globalized firms. The interaction bottleneck that involves liquidity and real interest rate should be resolved by creating special regional infrastructure banks. Overall, the Northern Africa ought to establish itself as a construction hub in the Mediterranean region through unifying its energy and transport systems with Europe.

Southern African Countries

To prevent stagnation in the case of the real interest rate, the Southern African authorities have to make sure that real interest rates remain below the 10% marker. Considering the overriding spatial spillover effect of South Africa, the neighboring countries should align their economic cycles with that of the region. The single-digit interest rate environment should be the goal of monetary policy to mitigate the severe liquidity and real interest rate interaction neutralization effect. To continue with the 12.8% causal increase found in the DiD analysis, SACU and SADC need to focus on deregulation of the energy sector. The region has high construction persistence and thus policy should aim at ensuring that there is a steady pipeline of projects to maintain stability of the industries. Regional members should consider using cross-border construction projects with currency-hedging facilities to reduce the Rand-effect on construction costs. The advanced capital market instruments should be used to support high growth markets in the 75th quantile because they are highly sensitive to interest rates. The financial authorities have to solve the liquidity and real exchange rate interaction by ensuring that the liquidity is affordable even at the time of currency volatility. The middle-range developers in the 50th percentile need special credit relief to rise above the 10 percentile interest ceiling. Therefore, to be successful in the construction business, Southern Africa needs a common regional approach to the interest rate stability and liberalization of the energy sector.

Contributions to Knowledge

The study makes a very holistic and multidimensional contribution to the literature as it goes beyond average effects and gives an account of non-linear, spatial and distributional dynamics of construction investment in Africa.

ECOWAS (West African States)

This research contributes profoundly to the body of literature because it highlights a particular non-linear level of real interest rates, beyond which monetary stimulus would no longer be effective in promoting construction growth in West Africa. The study measures a 34.2% spatial spillover, the first to measure such an effect, showing that construction is a regional process and not a national phenomenon. The implication of PQR application is that liquidity impacts most in high-growth

markets and therefore defies the classical assumptions on average effects in the past studies. In addition, the relationship between the growth in money supply and real interest rates reveals a special liquidity trap encountered by companies when the price of borrowing becomes higher than the norms in the region. The Difference-in-Differences (DiD) analysis offers new empirical results, which AfCFTA is one of the major factors contributing to physical capital formation and thus causally increases investment. The gap that is critical to be filled in the understanding of the relationship between currency stability and money supply efficacy in ECOWAS bloc is also covered in this study. It provides central bank with a good idea of the boundaries of monetary expansion by providing a new empirical standard. Moreover, the study indicates that the less developed countries rely more on the past investment momentum, which demonstrates the high degree of path dependency in the countries. The paper combines both spatial and threshold theories, and provides a more detailed account of why the construction cycles in regions are more co-ordinated than was previously considered. Finally, it presents a new infrastructure planning model that is sensitive to location interest rates and regional processes in West Africa.

EAC

The study is innovative in that it finds a 5.4% exchange rate appreciation level beyond which the construction industry in East Africa will lose competitiveness. It underscores that the Single Customs Territory is causally relevant in infrastructure projects, which, with DiD modeling, gives immense uplift. The paper also employs the Spatial Error Model (SEM) to show that the transmission rate of shocks is 28.8% signifying the high interconnectedness of the EAC supply chain. It illuminates the weakness of smaller markets especially the ones that are in the 25th growth quantile of the markets and indicates that they are the ones who suffer the most in terms of currency volatility. What is more, the interplay between the growth in money supply and exchange rates shows the extent to which currency fluctuations may offset the advantages of domestic credit. The study examines the interaction between real interest rates and exchange rates and demonstrates how the interest rate policy acts as a shield to protect regional currencies. The contribution of this research to the body of literature is that it considers construction investment as a regional good, as opposed to a national asset only. It also highlights how the Northern Corridor is of paramount importance in propelling investment and infrastructure wellbeing of landlocked EAC members. The research questions conventional theories of investments by indicating that the supply of money is usually greater than its nominal price in the context of East Africa. Lastly, the analysis presents an optimized empirical

foundation of aligning monetary and trade policy to protect infrastructure momentum of the EAC.

COMESA

The research adds value in finding an 18 percent money-to-GDP ratio, which is essential in stimulating credit-based construction growth in COMESA. It quantifies the indirect wealth impacts on the region in the Spatial Durbin Model (SDM), revealing the relationship between various and geographically dispersed nations in regard to construction investment. Path dependency is also brought to the fore in the research, which shows that the countries in the 10th growth quantile are specifically caught up in historical patterns of investments. The study provides the reason why most markets are not able to attract foreign firms when volatility is high by examining how interest rates and exchange rates interact. It creates a new perception of the market size effect, demonstrating how the size of the market in general may be more significant than the national policies in particular. The study also adds to the theory of financial deepening as it shows how the market shift to policy-driven growth comes with the maturation of the history-driven growth. The DiD analysis is the first quasi-experimental result of the particular effect of the COMESA FTA on the construction in the region. The research addresses a gap by establishing a shallow market friction that constrains the effectiveness of monetary stimulus in low-liquidity countries. It also emphasizes the need of regional investment agencies to coordinate the construction codes to improve spatial spillovers. Finally, it provides a combination of infrastructure development management within a heterogeneous and diverse region such as COMESA.

CEMAC

One of the main contributions of this research is to determine that a 55 percent debt to GDP ratio is the limit above which construction investment in Central Africa is crowded out by the high rates of government debt. It is the 2014 commodity price crash that it attributes to the negative shift in the construction sector using DiD that demonstrates that the oil revenues are closely linked to the health of the sector. The research shows also that spatial spillovers in the area are not very high, with an 11% effect, and it indicates a severe lack of infrastructure, which is the inhibitor of synergy in the region. The study elucidates the two-fold nature of the fixed exchange rate, as a stability floor and as a competitive bottleneck to the local companies. It points to a devastating bottleneck due to the combination of money supply increase with real interest rates, with the cost of borrowing being a key impediment in all markets. The research is useful in explaining why it is high and the persistence of the public-sector projects in the

oil-dependent economies with the coefficient of 0.355. It also offers a new view of the money supply growth cushioning currency shocks in a pegged exchange rate regime. The study presents a new concept of internal devaluation as the means of enhancing construction competitiveness in CFA zone countries. The analysis of threshold theory, together with fiscal space analysis, will offer a new diagnostic instrument to CEMAC policymakers. The study acts as an empirical caution of the risks of fiscal volatility in the long-term on capital formation in Central Africa.

WAEMU (West African Monetary Union)

A significant contribution of this research is that it confirms that the 3.0% fiscal deficit limit is a critical limit that should be maintained to ensure that the construction investors do not lose confidence in WAEMU. The analysis shows that the WAEMU market is the most integrated construction market in Africa with a high spatial multiplier of 0.385. According to the DiD analysis, the regional convergence requirements give a 21-percentage point improvement to infrastructure investment results, which highlights the significance of coordination of the regional policy. The study finds the median-growth squeeze effect which is triggered by the combination of the Euro-peg and domestic credit, especially in the 50th quantile. The fact that the interaction of money supply growth and real interest rates is included also supports the effectiveness of monetary transmission of the BCEAO to all the member states. It also addresses a gap in the knowledge of the role of the regional stock exchanges, like BRVM, in offering long-term liquidity to construction. The analysis demonstrates that the stability of the region assists in the growth distribution to rise not only with the top-tier economies. It provides also a new perspective on monetary harmony as one of the driving forces of physical growth of regions. The study reinforces the notion of regional financial harmony as a key to the continuation of infrastructure momentum in the countries of the WAEMU. Finally, it offers a good benchmark to be emulated by other parts of Africa with the need to balance fiscal and monetary policies to achieve sustainable growth.

Northern African Countries

The research is valuable as it has found an 8.5 percent level of inflation that controls the confidence regime among developers in Northern Africa, which demonstrates the effects of inflation on construction investment. It is a new way of quantifying the interaction between actual interest rates and exchange rates and how the high growth countries are using the rates to attract international capital. The study indicates that the market is split with big markets being globalized on the basis of drivers, whereas the small markets are more localized. The research is relevant to the research of the effects of devaluations on the whole region since all

markets experience the hurt of such changes, notwithstanding their levels of growth. It reveals, with the help of the Spatial Error Model, Mediterranean trade flows as an important yet frequently ignored cause of domestic construction shocks. The study also addresses a gap in the knowledge of how the high-tech construction is sensitive to real exchange rate movements in the emerging markets. It offers a sophisticated empirical foundation of growth that is price-stability based in the advanced market setting of Northern Africa. The paper moves the theory of the energy-construction nexus further, demonstrating the impact of the African contribution to the global green transition on the dynamics of construction. Finally, it provides a strategic roadmap of the integration of Northern African construction industries with the wider Mediterranean economy.

Southern African Countries

One significant contribution of this research is that it has pinpointed a 10% real interest rate ceiling as the most important limit in the area of private construction investment in Southern Africa. It is the only measure that quantifies the gravity effect of South African economy indicating a high spatial lag of 0.315 throughout the sub-continent. It presents a DiD analysis of deregulation in the energy sector, the first of its kind, and finds that deregulation caused a 12.8% causal increase in infrastructure investment. It shows that the Southern Africa project pipeline is the most stable in Africa with persistence coefficient of 0.355. The study explains how the Rand-effect functions as a local risk factor and how it interacts with the growth in money supply and exchange rates. The research will address a gap by demonstrating that the high-growth markets in the region are more response to financial costs than it has been realized before. It leads to the comprehension of the behaviour of rate-driven markets in a highly financialized regional setting. The study presents findings that interest rates are the key means of transmitting liquidity on construction in the region. It provides a new diagnostic instrument to policy makers in Southern Africa to track the dependence between the monetary policy and the physical growth. Finally, the research gives an overall model of how to run infrastructure within the most established market of Southern Africa.

6. Conclusion

This study examined the joint effects of real effective exchange rate, real interest rate, and the amount of money in circulation on construction investment growth of seven economic regions of Africa, namely WAEMU, CEMAC, COMESA, EAC, ECOWAS, North Africa, and Southern African countries. Particularly, this research examines the construction investment determinants within seven African regional blocks through a multi-stage econometric model known as System GMM, Spatial Autoregressive/Error Models (SAR/SEM/SDM), Difference-in-

Differences (DiD), Panel Threshold Regression, and Panel Quantile Regression (PQR). The analysis balances the average effects with the spatial spillovers, causal policy effects as well as non-linear thresholds. The findings indicate that historical persistence predominates in low-growth markets, with high-growth markets being much more responsive to the existing policy interactions between real interest and exchange rates with a high sensitivity in Northern Africa. The response between the money supply and real interest rates always had a liquidity trap effect especially in CEMAC and Southern Africa whose high cost of capital has been an effective barrier to transmitting credit to the construction sector. The research establishes that the African construction industry experiences a shift in history-based persistence to policy-based dynamics. To maximize investment, it is necessary to keep interest rates below 10-12, have a 55 percent interest-debt-to-GDP ratio for the CEMAC and utilize regional spatial multipliers in order to increase the neighbor effect of infrastructure development. According to the results; macroeconomic determinants do not act in isolation but have interconnected effects on investment growth. Policymakers of the seven economic African regions therefore should adopt an integrated policy perspective while designing policy interventions. The analysis highlights the necessity for policymakers to strike a balance between exchange rate stability and flexibility. While excessively fluctuating real effective exchange rates might cause investor concern, excessively stiff currency rates can hurt export competitiveness. Exchange rate policies with a reasonable degree of flexibility are adopted by policymakers, promoting competition and lowering the risk of external shocks. The study also emphasizes how crucial it is to keep real interest rates at their ideal levels that are lower than the domestic inflation rate. Capital flight or speculative investment results from excessive real interest rate variations, which lowers the amount of money available for long-term, profitable investments. Therefore, interest rate policies should be designed to keep these differences at levels that encourage investment and lessen financial instability. Accordingly, African governments need to avoid early financial opening up, an intrinsically intruding step that would intrude into financial turbulence and market deviations. Motivations should instead aim towards gradual and progressive financial sector reforms with a focus on guaranteeing financial inclusiveness, the supply of credit, and the transparency of markets so as to promote sustained investment expansion. Perhaps, most importantly, the report highlights the need for coordination across macroeconomic policies. Policymakers should not treat real exchange rate misalignment, real interest rate policy, and money supply variations as separate entities but rather be attentive to the inter-linkages between them. Understanding the best way to mix policies and the possibility of policy complementarities depends heavily on the empirical applicability of policy interaction analysis. The

present research offers these interaction effects, hence, policymakers have to take into account the interactions between various policy tools rather than adopting policies independently in practice. A coordinated policy strategy is required to avoid unwanted adverse consequences that can arise from unilateral policy interventions in one area. Upcoming researches could expand the scope to explore how other macroeconomic variables such as inflation, fiscal policy, and political risk interact with real effective exchange rates, real interest rates, and the amount of money in circulation to influence returns on investment.

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