

Monetary Policy and Uganda's Private Investment

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Abstract: Monetary policy determines the overall performance of an economy, particularly in developing countries where private investment is among the determinants of growth. Money supply, inflation, and changes in lending rates always influenced how the private sector invested in Uganda. This study aimed to examine how monetary policy influences private investment in Uganda focusing on money supply, interest rates, and inflation as the key determinants. Data for the period 1990 to 2020 were used for the study, which were secondary time series data provided by the Bank of Uganda and World Development Indicators publications. The Autoregressive Distributed Lag (ARDL) model was used to apply its application to both the short-run and long-run effects of monetary policy on private investment. The results showed that in the short run, private investment responded positively to increased money supply and inflation and negatively to higher lending rates. Although monetary policy can stimulate private investment in the short run, its effectiveness wanes in the long run unless carefully managed. This means that expansive policies can stimulate investment in the short run, but such heavy reliance could undermine the sustainability of investment. The study identifies that if Uganda could maintain an effective monetary policy, it is vital to balance encouraging private investment and maintaining macroeconomic stability. Such findings can assist in designing policies fostering sustainable private sector-driven growth.

Keywords: *Monetary policy, Private investment, Uganda*

1. Background

In today's development world, sustained long-term economic growth demands private investment (Gwartney, Stroup, Sobel, & Macpherson, 2021). Private investment makes economies modernize by reorganizing informal sectors into productive and formal sectors as well as producing jobs and enhancing productivity. In places where private investment is weak, it slows down the achievement of a modern competitive economy. Across the globe, countries that have managed to extend private investment have turned their informal economies into high-output, formal sectors, and this has led to economic growth with sustainability. Etim and Daramola (2020) argue that countries that have not modernized are often countries whose private sector is largely informal, an issue prevalent in sub-Saharan Africa.

The same is true in Uganda. Despite adhering to a private sector-led growth strategy for the past three decades, private investment has been rising at a slowing rate over the past two decades (Mohamoud, 2017). This slowing growth has led to enlarging government revenue deficits, increased debt levels, and other economic problems (Obol, 2023). National Private Sector Development Strategy (2017/18–2021/22) aimed at increasing the competitiveness of the private sector and driving economic growth by improving policy coordination and enterprise development supporting programs as well as increasing performance measurement and management of the country's programs (Nabiryo, 2021). These interventions targeted three levels: the entire economy, specific industries, and specific companies (Probst, Westermann, Anadón, & Kontoleon, 2021). Uganda's private sector investment is, nonetheless, still low and largely informal (Wabiga, 2020). The private sector is dominated by micro, small, and medium enterprises (MSMEs), which account for nearly 90% of private sector production and employ over 2.5 million people (Hoekman, Sanfilippo, Santi, & Ticku, 2022). The fragmentation prevents the effective use of human and material resources, thereby rendering Uganda's long-term modernization aspirations more difficult to achieve (Mohamoud, 2017). Stagnation in private investment is a cause of serious alarm about Uganda's capacity to develop economically (Obol, 2023).

The weak performance in private investment has been attributed to hindrances like high interest rates by the Ministry of Finance, making access to finance costly. Macroeconomic interventions have thus focused on maintaining fiscal discipline and a benign interest rate environment that fosters growth through monetary policy (Abdirizak, 2017). Despite this, growth in private investment has not increased as expected (Nabiryo,

2021). Empirical findings reveal that money supply and interest rates in monetary policy have an important influence on private investment since they shape credit conditions in the business sector and market demand where firms operate their activities (Wabiga, 2020). Money supply in Uganda increased more than threefold in the last decade—from 7 trillion shillings to about 23 trillion shillings in 2020—while private investment as a share of GDP rose by less than one percent (Probst et al., 2021). Such divergence is concerning because monetary policy is not contributing to the country's private sector-driven development approach (Hoekman et al., 2022). Private investment in Uganda has been investigated primarily with regard to firm-level characteristics or financial institutions, with considerably less attention being given to the impact played by monetary policy itself (Nabiryo, 2021).

Research that examines monetary policy as a potential driver of low private investment growth in Uganda remains scant (Mohamoud, 2017). It uses the accelerator model of investment to study how monetary policy impacts private investment (Abdirizak, 2017). Theory holds that net investment in an economy is a function of the level of output (Wabiga, 2020). Since monetary policy impacts aggregate demand, and output is a function of the same, monetary policy has a direct impact on investment decisions (Probst et al., 2021). This relationship is crucial for such policies to be formulated which can have a positive impact on sustainable private sector development and Uganda's economic development objectives.

Problem Statement

In the period of a decade, Uganda's private investment has been in decline, with its average annual growth rate yet to hit 1%. The private sector remains dominated and informal and made up of micro, small, and medium enterprises (MSMEs), which, as much as they employ the majority of Ugandans, make a very limited economic contribution. This private investment stagnation is driving the increasing jobless growth and increasing the burden on taxes since the modest revenues from the MSMEs cannot fund government investment schemes. The Ministry of Finance has credited the low growth and informality in the private sector to constrained access to credit and an indolent monetary policy.

The government has, in turn, sought to implement cautious monetary policy measures. For example, the bank rate was reduced to an all-time low of 6.5% by the central bank and maintained yearly inflation largely within single digits over the past decade. Despite all these, the expansion of private investment has yet to take off. Bank of Uganda reports have established that aspects of monetary policy, such as money supply, have not been managed cautiously, rising more than threefold from 7 trillion shillings to around 23 trillion shillings between 2010 and 2020 while there was no corresponding increase in economic activity. Facts based on evidence indicate that conservative monetary policy is crucial in the encouragement of private investment through not only increasing the availability of credit but also influencing aggregate demand (Kaplan, Moll, & Violante, 2018). Private venture activity continues to worsen despite the limited existing studies on the impact of Uganda's monetary policy on private investment specifically. This study, therefore, aims to examine the impact of different aspects of Uganda's monetary policy on private sector investment in Uganda.

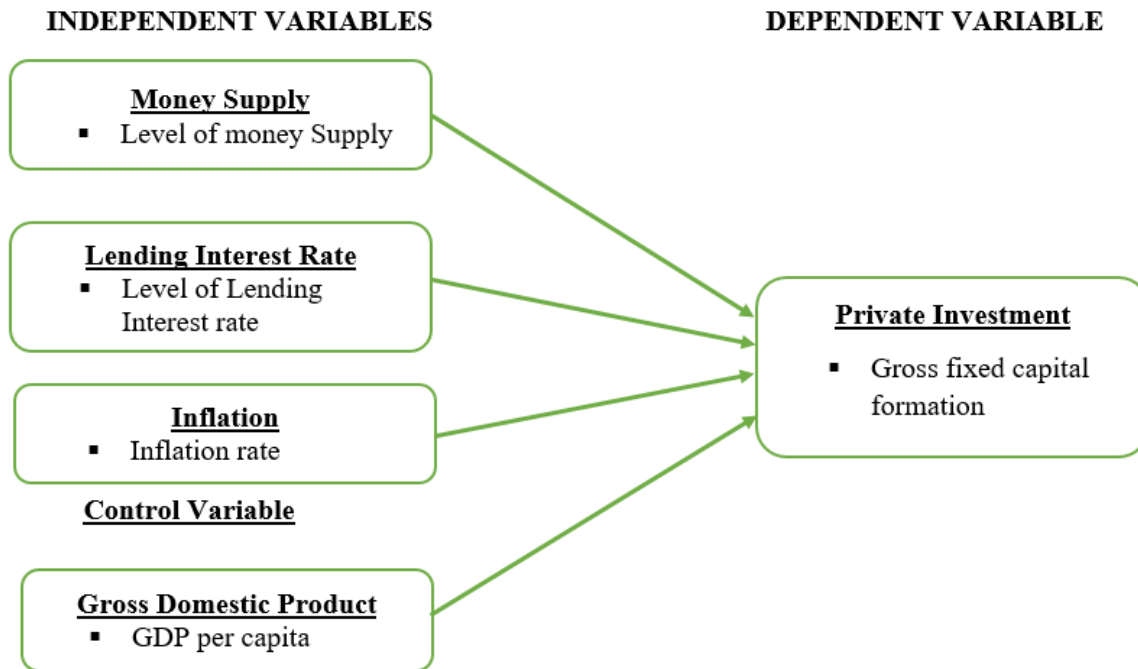
Research Hypotheses

Ho1: Money supply does not affect the level of Uganda's private investment

Ho2: Lending Interest rate does not affect the level of Uganda's private investment

Ho3: The Inflation rate does not affect the level of Uganda's private investment

Conceptual Framework



Source: (Dang, Pham, & Tran, 2020; Frimpong & Marbuah, 2010)

According to the conceptual framework, monetary policy indicators, that is, money supply, lending interest rates, and inflation, directly influence private investment. The purpose of this study is to determine whether increases or decreases in these indicators, as represented by money supply level, the prevailing lending interest rate, and the level of inflation, have a real effect on private investment, which is represented by Gross Fixed Capital Formation (GFCF) in the private sector.

The model, taken from Frimpong and Mabuah (2010), has the demand situation of the economy or Gross Domestic Product (GDP) as a control variable. Central bank monetary policy-imposed interest rate changes have an effect on the cost of capital and thus the level of private investment. This is referred to as the credit transmission channel of monetary policy (Afful & Kamasa, 2020). For instance, if a tighter money policy reduces the length of money that banks have for lending, and this money is not replaced by an alternative source, the supply of money contracts. This raises the relative cost of borrowing and reduces the quantity of loans available for investors relying on bank finance as the increase in the external finance premium discourages investment and borrowing.

2. Literature Review

The Outlook for Uganda's Private Investment

Private enterprise in Uganda consists of income-generating activities that are owned and controlled independently outside the government (Obol, 2023). It is largely dominated by Micro, Small, and Medium Enterprises with over a million distributed throughout the country (Hoekman, Sanfilippo, Santi, & Ticku, 2022). Together, the enterprises employ approximately 2.5 million people, which is nearly 90 percent of the total non-farm private sector employment (Obol, 2023).

They traverse all the principal sectors, i.e., trade, construction, manufacturing, and services such as hospitality, entertainment, finance, health, education, professional services, and ICT (Obol, 2023). They form the private sector spine of Uganda and are central to propelling national development dreams (Hoekman et al., 2022). Despite their importance, these businesses face significant handicaps, including low competitiveness and high operating costs, which limit their productivity and growth potential (Probst et al., 2021).

Theoretical Literature Review

Flexible Accelerator Theory of Investment

Accelerator theory of investment, in a flexible nature, advanced by Treadway (1971), Lucas (1967), and Goodwin (1951), posits that businesses alter their stock of capital over a period of time, attempting to close the gap that exists between their current capital and the desired amount they hope to maintain over time (Abdulkarim, 2023). Simply put, the larger this gap, the higher the rate of investment a business sets toward its desired capital level (Nadabo & Abdullahi, 2024).

The desired capital stock is responsive to the level of production by the firm, the price of capital goods, and the real expense of using capital, for example, depreciation and interest (Otchia, 2025). The theory also states that assuming a firm can reach the desired level of capital, adjustment costs mean only a fraction of the goal is possible within any given time (Abdulkarim, 2023).

This model provides the overall benchmark for investment: current investment is not only influenced by past investment but also by other determinants of basic demand factors (Nadabo & Abdullahi, 2024). In this article, monetary policy ranks as such a determinant based on its impact on investment decisions and the ability of a firm to bridge the difference between needed and accessible capital (Otchia, 2025).

Empirical Literature Review

Relationship Between Money Supply and Private Investment

Money supply, as one of the monetary policy instruments, is widely recognized to have a positive impact on private investment, yet Uganda still has a lot to learn from others. Dang et al. (2020), using Vietnam provincial data and system GMM, found that conduits such as broad money, domestic credit, and interest rates increase private investment. This suggests that in the context of Uganda, which suffers from credit shortage and illiquidity for firms, a rise in money supply would be in a position to stimulate private sector investment. Hussain and Zafar (2018) examined Pakistan and found that there existed a long-run relationship between economic growth and money supply, although short-run adaptation was slow, with bidirectional causality between inflation and money supply. To Uganda, this implies that increasing money supply may not be adequate unless other macroeconomic factors like inflation are also sufficiently checked, thereby indicating a shortcoming in indigenous studies that examine short- and long-term factors. Bora, Kirikkaleli, Zoaka, Bekun, and Ekwueme (2020) in Nigeria similarly observed that private investment is sustained in the long run by the existence of broad money, pointing out the importance of proper liquidity policy, but country-specific research for Uganda does not exist.

Worldwide, Ndikumana (2016) analyzed 37 Sub-Saharan African countries and concluded that expansionary monetary policies reduce private investment through bank lending and interest rate channels. This is an indicator of the significance of considering Uganda's banking and credit systems as key transmission channels of monetary policy. In Jordan, Alawneh et al. (2015) revealed that compulsory reserve requirements strongly affect private investment, illustrating the effect of policy tools on investment channels. Hailu and Debele (2015) of Ethiopia proved that negative short-run effects of money supply and government spending were followed by positive long-run patterns, suggesting that Uganda could also experience time-varying monetary policy effects. Agu (2015) of Nigeria proved that Uganda needs to lower structural bottlenecks—high lending rates, low government spending, political tensions, and low infrastructure—as investment barriers because Nigeria is also confronted with the same constraints.

Studies also suggest variations in the influence of monetary policy on investment by domestic conditions. Fu and Liu (2015) in China found that firms respond more to credit and money supply changes when there are tight monetary conditions, suggesting Uganda's response would also vary depending on firm flexibility and market conditions. Brima and Brima (2017) in Sierra Leone illustrated that domestic savings and money supply positively influence investment, while debt and inflation have a negative influence on investment, highlighting the need for coordinated macroeconomic policies. Ralarala and Ncanywa (2020) also reported a negative relationship between investment and lending rates in some Sub-Saharan African countries, illustrating the need to consider the cost of credit while analyzing the impact of policies. Enayati and Farahani (2016) also underscored that shocks to money being negative in nature in resource-based economies are likely to be stronger than positive shocks, implying that Uganda's resource-based economy may respond asymmetrically

to monetary shocks. All these studies confirm the importance of money supply but reveal no prior Uganda-specific research on the channels, magnitude, and context-sensitive effects of monetary policy on private investment, highlighting the need for locally relevant empirical research.

Relationship Between Lending Interest Rate and Private Investment

The effect of lending rates on borrowing on private investment is typically negatively associated as a rise in borrowing prices tends to restrict the ability of firms to invest and expand. Ralarala and Ncanywa (2020) utilized a panel ARDL specification in examining some Sub-Saharan African countries during the years 1980–2018 and confirmed a long-run negative effect of lending rates on investment. This would mean that in Uganda, with real lending rates still relatively higher, the same limitation might hold back private sector growth. Magableh and Ajlouni (2016) analyzed Jordan for 1976–2012 using an ARDL cointegration approach and reached the conclusion that private investment is negatively correlated with real interest rates and public investment. This would imply in Uganda that borrowing rates and government spending would significantly drive investment in Uganda. By contrast, Afful and Kamasa (2020) examined Ghana during 1986–2016 and used ARDL and quadratic estimations to find out the threshold interest rates beyond which investment is negatively affected. They found positive effects of interest rates up to threshold values of 23.59% and 24%, indicating a knowledge gap in Uganda where the precise lending rate threshold deterring investment is yet to be determined. Waluyo (2017) in Indonesia (1990–2011) showed that interest rates negatively affect private investment but that public investment positively affects it, as does private sector funding, establishing the need for balanced macro conditions. Ababio, Kumankoma, and Osei (2018), applying an Error Correction Model to 1970–2010, also identified interest rates, inflation, exchange rates, and foreign debt to have a negative effect on investment, implying the need for Uganda-specific empirical tests for these relationships. Generally, the literature is calling for the analysis of Uganda's lending rate environment, the determination of optimal thresholds, and the revelation of the way credit costs are working in conjunction with other macroeconomic variables.

The relationship between private sector credit, inflation, and private investment is critical. Most studies point towards a positive long-run effect of credit on investment. Abate (2016) examined Ethiopia through VAR and VECM models and established that private credit is conducive to long-run private investment, though short-term effects were insignificant. This would suggest that Ugandan firms would also respond to credit growth with a lag. Okorie (2013) for Nigeria, using an Error Correction Model, determined that an increase in private sector credit by 10% raised domestic private investment by 6%, highlighting the finance access catalytic effect—a relationship which remains under-exaggerated in Uganda. Kazeem et al. (2012), for Nigeria 1970–2010 using ARDL techniques, determined that private credit, along with interest rates, GDP, exchange rates, external debt, public investment, and reforms, jointly determine long-run private investment. Ghura and Goodwin (2010) compared 31 SSA, Asian, and Latin American countries and observed that private credit enhances investment in SSA and Asia but not in Latin America, and that government-controlled credit crowds out private investment in SSA and hence the relevance of exploring how public borrowing affects private credit in Uganda. Green and Villanueva (2006) also found that foreign exchange and credit access are robust private investment stimulators, implying that Uganda may benefit from greater exchange rate stability and financial intermediation.

Overall, the literature shows that private sector lending rates and private sector credit are determinants of private investment, but their effects differ significantly with context. Sub-Saharan African data (Ralarala & Ncanywa, 2020; Afful & Kamasa, 2020) show that high lending interest rates lower investment, but moderate rates can spur investment, a phenomenon yet to be empirically studied in Uganda. Studies in Jordan, Indonesia, and Ghana (Magableh & Ajlouni, 2016; Waluyo, 2017; Afful & Kamasa, 2020) indicate that investment is inhibited by inflation and financing cost, but fueled by public investment and GDP, highlighting the significance of good policy design in Uganda. For private sector credit (Abate, 2016; Okorie, 2013; Kazeem et al., 2012; Ghura & Goodwin, 2010; Green & Villanueva, 2006), there exists evidence that credit availability encourages investment, but in Uganda, knowledge gaps exist regarding threshold effects, short- versus long-run responsiveness, and public borrowing interactions. These knowledge gaps are vital to be plugged so that monetary and financial policies can be formulated that will help promote the development of private investment in Uganda.

Relationship Between Gross Domestic Product and Private Investment

There has been research linking domestic investment and GDP, focusing on the contribution of private investment towards economic growth, with most of the evidence validating a positive impact. Tang et al. (2008) examined the interactions between domestic investment, foreign direct investment, and Chinese economic growth from 1988-2003 and established two-way causality between domestic investment and growth, though foreign investment supplemented domestic investment further to enhance output. For Uganda, this would mean that private investment will become the largest contributor to GDP growth, although there is little research comparing the interaction between domestic and foreign investment in Uganda.

Yovo (2017) compared public and private investment in Togo from 1980 to 2013 and found that both types of investment complement each other in stimulating economic growth. This finding implies that in Uganda, public and private investment convergence can support growth performance. Javid (2019), examining Pakistan for 1972-2015 using Johansen cointegration and fully modified OLS methods, discovered that public and private investment enhances growth but with differing productivity across sectors. In Uganda, this implies that sectoral allocation is required to avail investments for efficient utilization in order to boost GDP. Tran and Hoang (2018), in a panel study of 47 Vietnamese provinces between the years 2012-2015, found that domestic investment combined with human capital development stimulated growth positively. Uganda could similarly benefit by merging financial investment with human capital development to harness the greatest dividend.

Some studies provide cautionary results. Nguyen and Trinh (2018) examined Vietnam over the period from 1990 to 2016 and found that public and private investment both have beneficial effects on short- and long-term growth, and it is necessary for Uganda to consider how public investment complements private sector activity, particularly in view of the dominance of micro, small, and medium enterprises. On the other hand, Bakari (2017) considered Gabon between 1980 and 2015 and found that domestic investment and exports had negative long-term effects on growth but positive short-run effects. Bakari (2020) found the same in Tunisia between 1965 and 2016, in which domestic investment negatively correlated with economic growth in the long term but had positive short-run impacts. For Uganda, the conclusion is that private investment alone will not result in long-term growth unless coordinated or in strategic sectors.

Together, the studies confirm that the effect of private investment on GDP is highly context-specific and subject to monetary policy, sectoral composition, credit access, as well as public investment policy. While studies like Tang et al. (2008), Yovo (2017), Javid (2019), and Nguyen & Trinh (2018) demonstrate the potential for growth to be driven by private investment, Bakari (2017, 2020) shows that without correct policy guidance, long-term benefits will not be imminent. In Uganda, little empirical work has been done on how money supply, lending rate, and private sector credit influence private investment relative to GDP. Studies in this regard are most important to understand how investment dynamics in micro, small, and medium enterprises can promote long-term economic growth sustainably through monetary policy.

3. Methodology

Research Design/Approach

This research study follows a longitudinal research design rooted in a quantitative research approach. According to Bloomfield and Fisher (2019), a quantitative research approach is one in which research variables are described by assembling numerical data that are analyzed using mathematically structured methods. This study proposes a quantitative design because private investment, the variable under investigation, can only be observed in quantitative terms

Model Specification

The research adopted an analytical framework based on the flexible accelerator theory. It adopted the investment equation of Frimpong & Marbuah (2010), where the money supply and lending rate are used as monetary policy tools as the predictor variables, and the private sector credit and gross domestic product per capita as proxies for the liquidity constraint and demand conditions in the economy, respectively. The application of such variables rendered the investment function Uganda-specific. The research then set the functional form of the model as in equation 1 below.

$$GFCF = f(MSP, LNTR, INFR, GDPPC) \dots\dots\dots (i)$$

Where GFCF = Gross Fixed Capital Formation, MSP = Money Supply, LNTR = Lending Interest Rate, INFR = Inflation Rate, and GDPPC = Gross Domestic Product per capita

The clear, estimable econometric model will be formulated as follows:

$$\ln GFCF_t = \alpha_0 + \alpha_1 \ln MSP_t + \alpha_2 \ln LNTR_t + \alpha_3 \ln INFR_t + \alpha_4 \ln GDPPC + \varepsilon_t \dots\dots\dots (ii)$$

Where α_0 is the intercept of the model, while $\alpha_1 - \alpha_4$ are the parameter coefficients to be estimated. Ln is a natural log indicator, ε indicates the error term of the model, whereas the subscript "t" is a current period indicator. The a priori expectations of the research are such that $\alpha_1 < 0$, $\alpha_2 < 0$, $\alpha_3 > 0$, and $\alpha_4 > 0$. The other variables remain as described above.

Measurement of Variables

Variables	Measurement	Definition	Data source
Gross Fixed Capital Formation (GFCF)	Total Investment by the private sector in Local Currency Units	Gross outlays by the private sector (including private nonprofit agencies) on additions to its fixed domestic assets.	WDI (2021)
Money Supply (MSP)	Amount of money in circulation in Ugandan shillings	The money outside banks, demand deposits of the central government excluded, and the time, savings, and foreign currency deposits of the central government excluding resident sectors. This definition of money supply is usually called M2	BOU (2021)
Lending Interest Rate (LNTR)	Average level of lending rate in the market	A rate that usually accommodates the short- and medium-term funding needs of the private sector. It is usually differentiated according to borrowers' credit quality and funding purposes.	BOU (2021)
Gross Domestic Product (GDP)	Gross Domestic Product per capita in Uganda shillings	GDP per capita is gross domestic product divided by the population in midyear. It is value added by all resident producers in the economy, plus taxes on products and minus subsidies on products not included in product value	WDI (2021)

Source: Author's compilation

Type of Data

Time series data was employed. Time series data refer to a type of quantitative and longitudinal information from different observable points of a single phenomenon in chronological order. The longitudinal design of the research necessitated this kind of data. The data were collected from secondary sources where it was already aggregated. Such secondary sources were the Bank of Uganda's (BOU) online databases and the World Development Indicators (WDI). The information accessed was for 1990–2020, the years that Uganda undertook a series of economic reforms with a target to restart private sector-led growth.

Data Analysis

The research analyzed data using the Stata Statistical package 14. The analysis will include data description, correlation analysis, diagnostic checks, and model estimation, among others.

Tests of Pre-Estimation Diagnostic

Before model estimation, the research will first carry out diagnostic tests to ensure that including the research variables together in the model would not result in econometric problems that would render the model results spurious.

The Test For Serial Correlation

This study performed a test of serial correlation, i.e., the relationship between the current values of a variable and its past values for a duration of time. Serial correlation can be problematic in time series analysis because

it distorts the efficiency of OLS estimates of standard errors in a manner that they would seem smaller than they are in reality (Roberto & Jódiney, 2019). In order to surpass this, the Breusch-Godfrey test via the Lagrange Multiplier was employed, with the null hypothesis of no autocorrelation.

The Test For Normality

Tests for normality were conducted in this research in order to ascertain whether the error terms of the econometric model under study were constant over observations and variables throughout the research period, that is, whether they were normally distributed with zero mean and constant variance. The predictive ability of the independent variables would not be reliable over the sample period if the error terms are not normally distributed (Gujarati, 2004). To test this, the Jarque-Bera test was employed, testing the null that the error terms were normally distributed.

The Test For Multicollinearity

This study screened whether multicollinearity, which is the situation where independent variables correlate highly among themselves, was present. Tabachnick and Fidell (2007) explain that correlations should be below 0.7, whereas Cooper and Schindler (2003) advise that correlations greater than 0.8 could mean a severe multicollinearity problem. To correct it, the study used pairwise correlation coefficients in combination with the Tolerance value as well as the Variance Inflation Factor (VIF). Tolerance value estimates the proportion of variation in an independent variable unexplained by the other independent variables included in the model.

Model Estimation Procedure

Unit Root Test

Before estimating the model, it was essential to test each research variable for stationarity. The research made use of the Augmented Dickey-Fuller (ADF) test which is known for its accuracy and reliability in determining unit roots. The test used an autoregressive process of order p . The Null hypothesis (H_0) was of such a nature that $\rho = 1$, i.e., the series is not stationary and has a unit root. If the null hypothesis could not be rejected, then there was a unit root implied. Alternatively, if the null was rejected, then the series was stationary and unit root-free. A time series was integrated of order zero, $I(0)$, if it was stationary in levels and regression estimates were not spurious.

Co-Integration Test

The research tested if there was a long-run relationship between the variables through Johansen's (1998) cointegration method in a vector autoregressive (VAR) framework. If two or more series were non-stationary, then it was necessary to test whether their linear combination was stationary, a situation described as cointegration. The existence of cointegration implied that the variables experienced a stable long-run relation in the sense that although they may diverge in the short run, they had a tendency to return to equilibrium in the long run. The study also ascertained the number of cointegrating vectors in the model according to Johansen's likelihood ratio test using both the trace and maximum eigenvalue tests. Having ascertained the number of cointegrating relations, the research estimated the Vector Error Correction Model (VECM) to account for both short- and long-run dynamics.

Vector Error-Correction Model (VECM)

VECM estimation was employed in this study because the variables were non-stationary at their levels but became stationary after differencing at the same order of integration. The VECM is most suited here, as it provides reliable estimates of both short-run and long-run relations. Acting as a restricted version of VAR, the VECM deals with cointegration by placing the long-run equilibrium relationship on the independent variables while allowing for short-run adjustments. According to Granger (1986), cointegrated series require an error correction representation to connect long-run equilibrium and short-run dynamics. In this study, the error correction mechanism (ECM) was a methodical adjustment process that prevented the dependent variable (Y) and the independent variables (X) from moving too far away from their long-run equilibrium. The ECM is represented by:

$$\Delta Y_t = A_0 + \Pi Y_{t-1} + \sum_{i=1}^{k-1} A_i^* \Delta Y_{t-i} + \emptyset X_t + \varepsilon_t \dots\dots\dots (iii)$$

Where Y_t and Y_{t-i} are both $(j \times 1)$ column vectors with j as the number of endogenous variables, Y_t includes observations at time t , and Y_{t-i} includes the i th lagged value of endogenous variables. A_0 denotes a $(j \times 1)$ vector

of intercept terms. ΔY_t is the first difference of Y_t . Π is the coefficient matrix containing information on the long-run relationship among Y_t . Matrix A_i^* contains information on short-run dynamics in the cointegrated system. X_t indicates an $(m \times 1)$ column vector of m exogenous variables. ε_t is a $(j \times 1)$ vector of disturbance terms.

Post Estimation Diagnostic Test

After model estimation, the research went on to carry out post-estimation diagnostics as confirmatory tests that the estimated model meets all econometric assumptions.

Model Stability Test

The research tested for the stability of the model as approximated by the Cumulative Sum of Squared Residuals test. The test was performed for recursive regression residuals against possible breaks in the model within a significant 5% range. The model was considered to be stable when the cumulative sum of the residuals indeed fell within these ranges.

Ethical Considerations

The obtained data was used for only academic reasons and not for any other purpose away of academics.

4. Presentation and Interpretation of Findings

Descriptive Evidence of The Research

Descriptive statistics were presented in tables to give the overall nature of the data description. It was utilized to make sure the data were good enough for estimation; otherwise, it would lead to incorrect conclusions. In particular, a table of mean, minimum, maximum, and standard deviation values was computed. Data was analyzed and processed with the STATA computer package version 14.

Summary Statistics of Study Variables

The summary statistics of the research variables are presented in Table 1 below, outlining the mean, maximum values, minimum values, and the standard deviations.

Table 1: Summary of study variables

Variables	Mean	Standard Deviation	Minimum	Maximum
GFCF	8,450,000,000,000	9,210,000,000,000	89,000,000,000	25,300,000,000,000
MSP	6,917.239	7,208.332	353.9663	24,285.2
LNTR	13.19	8.795	1	28
GDPPC	1,200,771	1,063,323	79,273.69	3,139,881

No. of Observations: 32. Source: Researcher's computation using secondary data

The first objective of the descriptive analysis was to test the goodness of fit of the observed data. The data offer gigantic standard deviations. This is consistent with evidence that the observed data stray from the means and therefore represent an unstable investment climate. As volatile as macroeconomic data are traditionally, this particular observation in this study could have been attributed to the short data set this study utilized as well. However, variables in studies were transformed into log form in the interest of partial mitigation of reported volatilities.

Pre-Estimation Diagnostic Tests

Pre-estimation diagnostics are statistical tests carried out before model estimation to ensure that the selected variables are fit to be included in the model to be estimated.

The Test For Multicollinearity

To test for multicollinearity, this study first established the correlations between the variables and then estimated the variance inflation factor (VIF) for each of the independent variables. The results are indicated as follows;

Table 2: Pairwise correlation analysis results

	LgGFCF	LgMSP	LgLNTR	LgINFR	LgGDPPC
LgGFCF	1.0000				
LgMSP	0.8133* (0.0211)	1.0000			
LgLNTR	-0.2236* (0.0000)	-0.2311* (0.0188)	1.0000		
LgINFR	-0.2488* (0.0163)	-0.2013 (0.2861)	0.2183 (0.2381)	1.0000	
LgGDPPC	0.7971* (0.0000)	0.8901* (0.0000)	-0.2384* (0.0000)	-0.2567 (0.1633)	1.0000

* Indicates significance at the 0.05 level. Source: Researcher's computation using secondary data

Gujarati and Porter (2009) note that a very high correlation coefficient among independent variables is $r = \pm 0.8$. Beyond this cut-off, the correlation matrix in Table 2 reveals that most of the variables have correlation coefficients below 0.8; however, there are strong and statistically significant correlations between "LgMSP" and "LgGFCF" ($r = 0.8133$), LgGDPPC and LgGFCF ($r = 0.7971$), and LgGDPPC and LgMSP ($r = 0.8901$). This was an indication that these variables might have multicollinearity. To rule out the possibility of multicollinearity, the study performed the variance inflation factor (VIF) for all independent variables in the empirical model. The results are as depicted below;

Table 3: VIF Results

Variable	VIF	1/VIF
LgMSP	8.66	0.115446
LgLNTR	3.69	0.270826
LgINFR	1.11	0.900815
LgGDPPC	1.06	0.942295
Mean VIF	3.63	

Source: Researcher's computation using secondary data

According to Suleiman (2019), the VIF values should be below 10, while tolerance levels should be above 0.2 for there to be no danger of variables causing multicollinearity in the model. Since it would be evident from the findings presented in Table 3 that the VIF for all the variables was found to be below 10 and all the tolerance values were above 0.2, the test concluded that there was no risk of multicollinearity and therefore moved on to model estimation.

Stationarity Tests on The Model Variables

The study also subjected the model variables to the test of stationarity under the application of the Augmented Dickey-Fuller (ADF) test which is traditionally applied in research for such a purpose. The ADF test examines whether or not there exists a unit root by examining the null hypothesis that a given time series possesses a unit root. If the ADF test statistic (t-statistic) is smaller than its critical value at the 5% significance level, then the null cannot be rejected. In this research, unit root tests were performed both at the variable level and at their first differences, as outlined in Table 4.

Table 4: ADF test results

ADF			
Variables	Z-Statistic at Levels	Z-Statistic at First Difference	Integration
LgGFCF	-2.293 (0.1743)	-4.203** (0.0007)	I(1)
LgMSP	-1.302 (0.6281)	-7.414** (0.0000)	I(1)
LgLNTR	-2.004 (0.2850)	-7.048** (0.0000)	I(1)
LgINFR	-4.935** (0.0000)	-	I(0)
LgGDPPC	-1.790 (0.3855)	-4.358** (0.0004)	I(1)

Source: Researcher's computation using secondary data

The unit root test results in Table 4 above indicate that, aside from the Inflation rate (LgINFR), which was stationary at levels, other research variables were stationarised at first difference. The results thus affirm that variables for use in the model exhibit different degrees of stationarity. It was here that the researchers selected the Auto Regressive Distributed Lag (ARDL) model to estimate. ARDL has been reported to give reliable parameter estimates in series with mixed orders of integration, such as the case with this research.

Cointegration Test

A few of the variables in the study were unstable at their levels but became stable after taking first differences, showing the possibility of a long-run relationship between them. This kind of long-run relationship is known as cointegration. In order to determine whether such a relationship existed, the study employed the bounds test for cointegration in the ARDL model. The bounds test checks for the null hypothesis of no cointegration among the variables. If the F-statistic calculated is higher than the critical values at both the lower and upper points for all the significance levels, then the null hypothesis is rejected; otherwise, the null hypothesis is not rejected. The results of this test are shown in Table 4.5.

Table 5: ARDL bounds test results

Wald F-statistic = 13.723*** t = -7.343 k = 4, n = 32		
Critical Value: Narayan (2005)		
Level of Significance	Lower Bound	Upper Bound
1%	4.29	5.61
5%	3.23	4.35
10%	2.72	3.77

Source: Researcher's computation using secondary data

The results in Table 5 show that the F-statistic (13.723) exceeds the upper bound critical value of 5.61 at the 1% level of significance. The research thus rejected the bounds test null hypothesis of no cointegration. These results, therefore, affirm the existence of a long-run relationship among the research variables.

Model Estimation

Owing to the mixed stationarity of the variables within the model and the relatively short time series used in this study, the ARDL approach was considered the most suitable method. The approach is highly recommended in small sample sizes where data have various orders of integration. Enkoro (2016) says that one of the merits of the ARDL approach is that, when properly implemented, it effectively avoids endogeneity and serial

correlation issues. In the current research, the most suitable lag order was determined as two lags in the dependent variable and one lag in all the independent variables. The selection was confirmed through the use of the Schwarz Bayesian Information Criterion (SBIC) in the ARDL model as a step before the estimation of the model in error correction form. Table 6 presents the ARDL results in error correction form.

Table 6: Results of the estimated ARDL model

Dependent Variable: D.LgGFCF			
Independent Variables	Coefficient	Std. Error	P> t
ADJ LgGFCF_{t-1}	-0.6590483***	0.2273341	0.010
Long Run			
LgMSP	-0.4586287***	0.2212994	0.005
LgLNTR	-0.0577472**	0.0392343	0.015
LgINFR	-0.0350774***	0.0566714	0.005
LgGDPPC	0.8968751***	0.2874133	0.006
Short run			
LgGFCF _{t-1}	0.0829654**	0.1428303	0.015
D(LgMSP)	0.2306715**	0.2373159	0.034
D(LgLNTR)	-0.0336807**	0.0237013	0.017
D(LgINFR)	0.0470311	0.0251476	0.078
D(LgGDPPC)	0.7869167**	0.2807191	0.012
Constant	8.561797**	3.582832	0.028
R-Square: 0.7528			
Adj R-Square: 0.7411			
Root MSE: 0.0894			
No. Observations: 29			
Log likelihood: 35.793309			

Notes: D = First difference in variable. ***, **Indicate significance at 1% and 5% levels, respectively. ARDL regression (2, 1, 1, 1, 1). Source: Researcher's ARDL computation using secondary data

Table 6 ARDL estimates show several intriguing dynamics for private investment (LgGFCF) in Uganda. Private investment is significantly determined by its lagged level of the previous year, such that a one percentage point increase in last year's private investment raises current private investment by 0.08 percentage points, holding all else equal. The relationship is statistically significant at the 5% level.

Money supply is also demonstrated to have a short-run positive effect on private investment. An increase in money supply of one percent, for example, will result in an increase in private investment by 0.23 percent in the short run. In the long run, however, the effect of money supply turns negative, where an increase of one percent results in a reduction in private investment by 0.46 percent. Lending interest rates have an adverse impact in both the short and long run. A one percent rise in the lending rate lowers private investment by 0.03 percent in the short run and 0.058 percent in the long run.

Inflation does not affect private investment in the short run but, in the long run, a one percent rise in inflation reduces private investment by 0.035 percent. GDP per capita, on the other hand, has a positive impact on private investment in both the short and the long run. A one percent rise in GDP per capita raises private investment by 0.79 percent in the short run and 0.897 percent in the long run, *ceteris paribus*.

The error correction term is also substantial and carries a negative coefficient of -0.4586 at the 1% level, indicating that about 46% of short-run disequilibrium is corrected each year, thus enabling the model to converge to long-run equilibrium. The constant term is also positive (8.5618) at 5%, meaning that about 8.56 billion shillings of private investment cannot be accounted for by the independent variables of the model. Generally, these results both establish the short- and long-run monetary and macroeconomic sensitivities of private investment in Uganda.

Post Estimation Diagnostic Tests

After running the estimated model above, the research proceeded to carry out further diagnostic tests on the model to conclude that there are no common econometric problems.

Serial Correlation Test

The Breusch-Godfrey LM test for serial correlation with small samples was conducted in the study. The null hypothesis is that there is no serial correlation. The null hypothesis cannot be rejected in the scenario of the corresponding F-statistic at 5% level of significance; it is rejected. The results are 7 below

Table 7: Breusch-Godfrey LM test results

lags(p)	F	df	Prob.
1	2.676	1	0.6565

Ho: no serial correlation. Source: Author's computation based on secondary data

The research observed that the F-statistic (2.676) associated with the B-Godfrey test was not significant at 5% level. Thus, the null hypothesis could not be rejected. The research thus concluded that the model did not suffer from serial correlation.

Heteroscedasticity Test

The Breusch-Pagan test was conducted for the purpose of testing the Heteroscedasticity in the data. The null hypothesis of the test is no Heteroscedasticity. If the chi-square value of the test is not significant at the 5% level of significance, then the null cannot be rejected; it is rejected. The results are presented in Table 8 below.

Table 8: Breusch-Pagan Test results

chi2(1)	Prob > chi2
0.49	0.4837

Ho: homoscedasticity. Source: Author's computation based on secondary data

This study observed that the chi-square value (0.49) was not significant at 5% level. Thus, the null hypothesis of the test could not be rejected. The research thus concluded that the estimated model did not suffer from heteroscedasticity.

Test For Normality of Residuals

Skewness & Kurtosis test of Normality was applied in the study to test for the normal distribution of residuals within the model. Normality is used as the null hypothesis. The null hypothesis cannot be rejected but is rejected if the value of the chi-square, alongside the measures of skewness and kurtosis is not significant at 5% level of significance. The results are presented in Table 9 below.

Table 9: Skewness & Kurtosis tests for Normality results

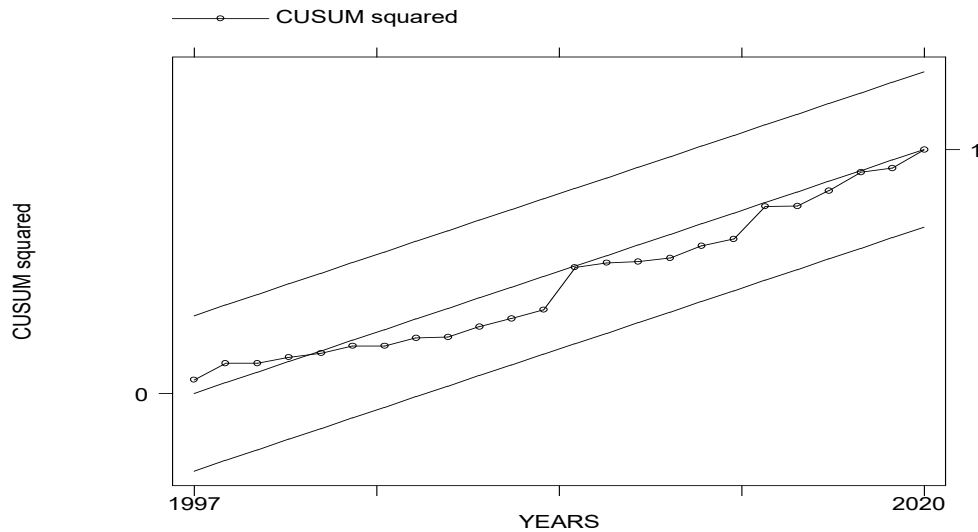
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
Residuals	29	0.0000	0.0005	20.89	0.2336

Ho: Normality. Source: Researcher's computation using secondary data

The results in Table 8 indicate that the chi-square value and the associated skewness and kurtosis are not significant at 5% level. The research thus could not reject the null hypothesis of normality, and thus concluded that the error terms in the model are normally distributed.

Test For Model Stability

The research was conducted to check if the model that was estimated was stable. The Cumulative Sum (CUSUM) test was employed. This test is based on recursive regression residuals plotted versus possible break points in the model in significant ranges of 5% significance. The model is stable as long as the CUSUM of residuals is within the 5% critical range. The test results are presented in the form of a graph below.



The CUSUM graph indicates that the dotted line (the cumulative sum of residuals) entirely falls within the upper and lower critical bounds over the research period. The research thus concluded that the estimated model is stable.

5. Discussion, Conclusions and Recommendations

This study is based on four major objectives from which four important hypotheses were drawn and tested. The discussion below explains the findings in relation to the objectives that the research set out to achieve.

Money Supply and Uganda's Private Investment

The first objective of this study was to examine how the money supply influences private investment in Uganda. Using empirical data, it was assumed that changes in the money supply affect private investment levels. The ARDL model results show that in the short term, money supply has a positive and significant impact on private investment, particularly in gross fixed capital formation. This short-term boost occurs because an increase in money supply tends to lower lending rates, making credit more accessible and encouraging investment.

However, in the long term, the effect of money supply on private investment is strongly negative. As the money supply grows over time, inflation rises, reducing the value of money and increasing production or investment costs, which in turn lowers private investment. The long-term contraction effect is larger than the short-term expansionary effect, suggesting that the negative impact dominates over time. In conclusion, while money supply can temporarily stimulate private investment, it cannot be relied upon as a sustainable driver of Uganda's private sector growth. These findings align with the results of Akhyuni and Aimon (2021), who also found a short-term positive but long-term negative effect of money supply on investment.

Lending Interest Rate and Uganda's Private Investment

The second objective of the study aimed at examining the role of lending interest rates on private investment in Uganda. Based on empirical evidence, it was anticipated that changes in lending rates would have an impact on the volume of private investment in the country. Empirical evidence from the ARDL model revealed that lending interest rates negatively impact private investment in the long and short term. The null hypothesis could not therefore, be rejected.

In the short run, higher lending rates reduce private investment since they raise the cost of capital and add to the operating expense for businesses. If borrowing is expensive, businesses are forced to reduce their investment and production plans. The negative effect perpetuates in the long run, thus ongoing high lending rates continue to restrain private investment in the long run. Such findings are consistent with theoretical expectations as well as previous empirical evidence, e.g., De Groot and Haas (2022), that highlight the discouraging effect of high interest rates on private sector investment.

Inflation Rate and Uganda's Private Investment

The third objective of the research was to analyze the impact of inflation on private investment in Uganda. From the results with the ARDL model, it was found that inflation has a significant influence on private investment with both a positive short-run and a negative long-run impact. The null hypothesis, thus, could not be rejected. In the short term, higher inflation actually encourages private investment. This may be regarded as demand-driven investment, where higher prices equate to higher demand, which encourages producers to produce more in order to meet the demand in the market (Sodini & Virgillito, 2015). This result aligns with Muritala's (2011) findings in Nigeria.

But over the long run, inflation negatively affects private investment. As prices rise persistently, production costs of raw materials and labor will also tend to increase, and therefore investment will be less attractive. It deters companies from expanding or bringing new investments, which leads to decreased overall private investment in the long run (Azam & Khan, 2022).

Conclusion

This study aimed to examine the effect of monetary policy, in the form of money supply, lending rates, and inflation, on private investment in Uganda, as indicated by gross fixed capital formation. The Autoregressive Distributed Lag (ARDL) approach was utilized since it provides good estimates even when variables have different orders of integration. The results showed that, in the short term, money supply and inflation both have positive impacts on private investment, and a rise in lending interest rates decreases it. In the long term, all three monetary policy variables were determined to have negative impacts on private investment. The study, therefore, implies that even as expansionary monetary policy will stimulate investment in the short run, it must be properly controlled in the long run to sustain and augment private sector growth.

Recommendations

The government should stop constantly expanding the money supply, as it may have detrimental effects on private investment in the long run. However, money supply increases in the short run can be tightly managed to support private investment, particularly by raising the narrow money component (M2). Lending rates should also be low and stable, since high or volatile interest rates can hamper business activity and deter investment. Similarly, inflation needs to be low, especially in the long run, as rising prices discourage private investment. Inflation management by implementing a tight monetary policy can deliver a stable environment favorable to long-run private sector development.

Study Limitations

This study was limited by the availability of data on the research variables. Although the researcher would have loved to go further back in time, it was not possible because of the shortness of the available data series.

Areas For Further Research

Further studies on this subject can consider carrying out a comparative study across East Africa to understand how the different member countries' monetary policies affect growth.

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