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MONETARY POLICY AND PRIVATE INVESTMENT: AUTOREGRESSIVE DISTRIBUTED LAG APPROACH: EVIDENCE FROM ETHIOPIA

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KEY WORDS

Private investment; lending rate; domestic credit; autoregressive distributed lag

ABSTRACT

Investment fueled by the private sector is a catalyst for achieving sustainable economic growth. This study examines the effect of monetary policy on private sector investment in Ethiopia. The time series data collected from National Bank of Ethiopia, Ethiopian Investment Commission and the World Bank covering the period of 1992-2022. Auto Regressive Distributed Lag and Error Correction Model employed for the time series analyses. The results revealed that private investment significantly affected by the monetary policy both in short-run and long-run. In the long-run, lending interest rate and broad money supply negatively and significantly affects the private investment whereas deposit interest rate, domestic credit to private sector, government domestic debt and trade openness positively and significantly influences private investment. In short-run, lending interest rate, broad money supply and trade openness positively and significantly affect private investment in Ethiopia. On the other hand, government domestic debt and inflation negatively and significantly influences private investment in short-run dimension. The results show important policy implications for both regulatory authorities and the government. National Bank of Ethiopia suggested to formulate policy reform that can encourage private sector investment. It is essential for the government to create stable political and economic environment as well as favorable investment climate and hence, the private sector investment will boost and contributes more to supply side and high employment opportunities for this large portion of young generation in the country.

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1. INTRORDUCTION

Investment is a key macroeconomic variable necessary for economic growth and development and specially, private sector investment is the main engine for economic growth across the globe. As per the IMF (2011) for countries to bring accelerated economic growth and development, not more than 20% of business to be in the hand of the state and the rest should be left for private sector. A strong investment potential could guarantee a rapid and sustainable economic development (Dang et al., 2020).

Majority of the countries would focus their best efforts on improving environment and institutions for investment to attract investment investors (Agrawal & Khan, 2011). To achieve this, the efficiency of the government's fiscal and monetary policy plays great role in addressing issues arising from economic instability. Monetary policy is important for the growth of private sector investment in creating an enabling environment (Mohan, 2008), because it is used as the principal economic management tools used by central bank to shape economic performance. Measured against fiscal policy, monetary policy is said to be quicker solving economic shocks (Olweny & Chiluwe, 2012) since central bank uses it as a major economic stabilization weapon designed to regulate, control volume, cost, availability and direction of money and credit in an economy to achieve macroeconomic policy objectives. Iyoha (2004) stated that private investment is determined by monetary and macroeconomic variables.

The classical theory of private sector investment states that private investment is affected by changes in monetary policy instruments (Olweny & Chiluwe, 2012). The behavior of the monetary sector is influenced by the monetary policy since changes in the behavior of monetary sector influences various monetary variables. Monetary policy affects the level of money based on the type of monitory policy applied to the economy (Ebisine & Oki, 2021). According to Khan (2010), monetary policy objectives are concerned with the management of numerous monetary targets (boosting growth, attaining full employment, stabilizing price, averting economic crisis, stabilizing real exchange rate and interest rates) even if the objectives vary from country to country since it relies on priorities designed by countries to ensure reduction of inflation and price stability.

Financial reforms promote economic growth by encouraging savings and investments. Policy reform that keeps deposit interest rates at low levels may have a negative impact on savings and investments. In developing countries private sector investment is determined broadly by growth of GDP, money supply, level of foreign direct investment, real exchange rates, public investment, government fiscal deficits and real interest rates (Olweny & Chiluwe, 2012). Government influences the money supply through monetary policy by adjusting interest rate, reserve requirements and sale of government securities and foreign exchange. Through the control of monetary policy, monetary authorities directly and indirectly control the demand and supply for money. This influences an output and private sector investment (Olweny & Chiluwe, 2012).

Tight monetary policy results in crowding out of domestic private investment since the cost of borrowing becomes high because such policy reduces money supply and raises interest rate. This leads to low productivity and unemployment in economy. Monetary policy that facilitates credit to private investment encourages the growth of private investment whilst tight monetary policy that restricts credit to businesses discourages private sector growth (Gaiotti & Generale, 2001).

Empirically, on the effectiveness of monitory policy, there are different arguments with different results. Handa (2009) states that monetary policy is expected to be a complement to the private sectors through controlling the amount of money circulation in the market, influencing what people pay to borrow or receive for saving and affecting the exchange rate between the national and foreign currencies by restricting exchange rates to influence the market rate. Others have doubt on the effectiveness of monetary policy. Alatiqi and Fazel (2008) indicated that no causal relation from money supply to interest rates, interest rates to stock prices, results in insignificant long-term causal relation from money supply to stock prices. According to Ezie (2012), monetary policy measures had no significant impact on private sector investment. The effectiveness of monetary policy depends on developments of financial markets but in Sub-Saharan African countries which are characterized with underdevelopment of financial system, monetary policy is ineffective (Hailu & Debele, 2015). On the other side, Olweny and Chiluw

(2012), Ribeiro (2001) and Asante (2000) are reporting that there are conflicting results concerning the power of monetary policy in influencing private investment.

Other authors advocate the monetary policy strongly affect the private sector development. The work of Hailu and Debele (2015) disproves that monetary policy measures are more influential than fiscal policy in promoting private investment. The study of Bekele and Gidey (2021) in Ethiopia proves that monetary policy has a positive effect on private investment.

The Keynesian and Monetarists views on interest rates dominate the debate on whether changes in interest rates have an impact on investment (Appelt, 2016). The Keynesian school believe that interest rate is primarily a monetary phenomenon that is determined by the supply of and demand for money. Changes in interest rates have minimal impact on investment and due to this the demand for investment funds is interest inelastic (Keynes, 1936). The Monetarists view is that interest rates are a function of the real economy determined by the supply and demand for loanable funds, a market which reflects actual opportunities and constraints in the investment sector (Friedman, 1968). Change in the interest rates causes far-reaching effects on investment and demand for investment finance is interest elastic (Olweny & Chiluwe, 2012). Mensah and Abor (2014) indicated, high lending rate tends to reduce demand for credit facilities due to the high cost of capital leading to a cut-down in investment.

According to report o Chauffour and Gobezie (2019), credit to the private sector did not exceed 12% of GDP in 2018 and the credit market is skewed towards state-owned enterprises and the private credit over the past 10 years declined significantly. To this opposite, the state-owned enterprise's credit as a percentage of GDP in the last 10 years increased from 5.2% in 2007 to 17.2 % in 2018 and the share of credit in total outstanding domestic credit for state owned enterprises increased from 14% in 2007 to 54% in 2018 (Chauffour & Gobezie, 2019).

For ensuring its directed credit policy, National Bank of Ethiopia has introduced an explicit directive called 27% NBE bill purchase directive MFA/ NBEBILLS/001/2011(Yewondwossen, 2019) that forces private commercial banks to invest 27% of their every new loan disbursement in governments securities for five years except the state-owned banks and this directive diverted financial resources from the private to the public sector as well as the 27% NBE bill requirement has the potential of crowding out private sector financing. Immediately after the placement of the "27% Mandatory Rule" of NBE bill purchase, private investment (both domestic and foreign investment) significantly declined.

Empirically directed credit policy has negative effect on the private sector. Ikhide and Alawode (2001) and Nathan (2013) reported that directed credit policies damage the economy by reducing savings and has significant negative effect on private sector credit and also other government policies have challenged the performance of private commercial banks. As per the review of the authors, there are very few studies on the topic of the underlying study like Hailu and Debele, (2015), Bekele and Gidey (2021). Therefore, in this study, the authors focused on lending interest rate, deposit interest rate, broad money supply, domestic credit to private sectors, government domestic debt and other control variables like inflation and the trade openness to objectively investigate how monetary policy influences the private sector investment in Ethiopia.

2. Literature Review

Scholars agree that the market rate of interest, the total social savings and investment are closely linked. When lending interest rate decline, investment would be stimulated (Wuhan et al., 2015) and (Mushtaq & Siddiqui, 2016). Lending rates influences cost of business and finally affect cost of living (Mwega, 2014). Brima and Brima (2017) indicated that interest rate has a direct effect and negative relationship on private sector investment and when interest rates increase, private sector investment decreases because the loans will cost much more to repay. Demand for credit rises as the cost of financing investments reduces (Brima & Brima, 2017). The study of Ebisine and Oki (2021) showed the significant relationship between private investment and interest rate in short-run. Ang (2009) identified that interest rate control has a positive impact on private investment in long-run. Misati and Nyamongo (2011) and Ndikumana (2016) found that lending interest rate affects domestic investment negatively through the bank lending. Hailu and Debele ((2015) in the short term, the real interest rate's effect on investment was found to be positive in Ethiopia, but insignificant in the long-term. Agu (2015) found positive effect of lending interest rate in

short-run. Lucky and Kingsley (2017) identified, lending rate has positive but insignificant relationship in long-run with domestic real investment. Eregha (2010) investigated that interest rate is negatively correlated with investment but insignificant in the long-run. Geddafa (2023) and Karim (2012) indicated that in long-run investment negatively and significantly affected by interest rate.

According to Emmons and Schmid (2004), interest rates could influence investment decisions in both directions and the impact of monetary policy on capital investment through interest rate channel appears inconclusive. Karim and Saini (2013) found that the existence of negative effect the interest rate on firm-level investment. Interest rate has significant positive impacts on private investment. Chatelain *et al*. (2003) also found that monetary policy plays a significant role in corporate investment through the interest rate channel. Frimpong and Marbuah (2010) showed that private investment is determined in the short-run by real interest rate. Lucky and Kingsley (2017) proved that saving rate have positive relationship with domestic real investment. Lesotlho (2006) found that with rising the interest rates on deposits, more real balances which can be used to finance private investment attracted and support private investment.

Money supply was found to be effective monetary policy instrument than interest rate. This is based on the fact that private investment reacts more to changes in money supply than interest rate. In the short term**,** money supply may negatively affect private investment (Hailu & Debele, 2015). Brima and Brima (2017) and Ebisine and Oki, (2021) found that money supply positively affects investment activity in short run.. According to Olweny and Chiluwe (2012), in the long run, money supply has positive relationship with private sector investment.

Ndikumana (2016) found that monetary policy affects domestic investment negatively indirectly through the quantity channel. Broad money supply has significant positive impacts on private investment (Bekele & Gidey, 2021). In the long-run, impact of money supply is significant and positive on investment (Chaudhry et al., 2021). In sub‒Saharan African countries, changes in broad money supply immediately affect bank's balance sheets and bank's liability in which ultimately influencing private sector through bank credit (Hailu & Debele, 2015). The impact of money supply target on investment does not depend on the level of the inflation rate (Ezeibekwe, 2020).

Domestic credit to private sector is expected to reduce the financial challenges of business firms or investors and those who complain about the access to credit for those who are in need of financial resources. This enables one to expect a positive relationship between domestic credit and private investment. The study of Ebisine and Oki (2021) found that there is a significant and negative relationship between private investment and credit to private sector in short run. Misati and Nyamongo (2011) showed that expansion of credit lines helps to encourage investment. Lucky and Kingsley (2017) investigated that domestic credit has positive relationship with domestic real investment in long-run.

Bekele and Gidey (2021) demonstrated that domestic credit to the private sector has significant positive impact on private investment. The authors further stated that monetary policy interventions such as the expansion or enhanced allocation of credit resources to local firms could be seen as the catalyst for private investment development. Okorie and Chikwendu(2019) found that private sector credit has positive impact on private investment in short-run but insignificant effect in long-run. Besides, Syed et al (2007) and Geddafa (2023) also found positive impact of domestic credit on private investment.

Ajide and Lawanson (2012), Asante (2000) and Lesotlho (2006) found that in the long and short run credit to the private sector affect private investment positively. Besides, Al-Khatib et al. (2012) found that domestic credit and the development level of the financial sector have a positive and significant effect on domestic investment in short run but insignificant in long-run. Ouattara (2004) found that the credit to private sector affects private investment negatively in long-run.

The debt to GDP ratio works as an indicator of the financial leverage for an economy. A low ratio points that an economy's goods and services production is adequate to pay off its debts without letting further debts being incurred (Ruchi & Dabas, 2017). Private sector investment is influenced by the amount of

domestic debt borrowed by the government from the financial sector and huge government borrowing of domestic savings reduces the availability of funds for private sector investment which implies negative relationship between private sector investment and government borrowing in short run (Brima & Brima, 2017). Maana et al. (2008) indicated that government borrowing has negative impact on private investment that means an increase in the domestic debt to meet the need to expand government spending may cause interest rates to rise in bringing the capital market into equilibrium considering money supply remain constant. Olweny and Chiluwe (2012) identified that in long run, government domestic debt has an inverse relationship to private sector investment. Frimpong and Marbuah (2010), indicated that external debt significantly influences private investment in the long-run.

Monetary policy should be tightened to achieve single digit inflation since investors both private and foreign may not be willing to invest in an environment with high inflation rate (Dobbrinsky, 2005) and showing an inverse relationship between inflation and private sector investment as increase in the rate of inflation may discourage private sector investment. Brima and Brima (2017) and Ezeibekwe (2020) investigated that inflation exert a negative effect on private investment. Ebisine and Oki (2021) and Frimpong and Marbuah (2010) investigated that inflation affects private investment in the short-run.

Trade liberalization and economic situation are of these factors that can play a vital role in boosting the private investment in the country (Mohsen, 2020). Asante (2000) concluded that a restrictive trade regime has had a negative effect on private investment, while trade liberalization affects it positively. Ouattara (2004), Bibi et al. (2012) and Chaudhry et al (2021) found that trade openness affects negatively the domestic investment in long-run, because trade openness helps in creating more chances for the outflow of capital out of the economy and the degree of openness and governance measures are strong determining variables on private investment mobilization. Frimpong and Marbuah (2010) indicated that private investment is affected in the short-run by openness negatively. As of Salahuddin et al (2009), trade openness showed significant and positive influence on investment.

3. Research Methodology

The authors follow the positivist research paradigm in this study. This is because of that the positivist research paradigm is committed to value neutrality, statistical measurement, quantifiable elements and observable events to establish causal laws (Seale, 2000). The positivists believe in the possibility of establishing cause-effect relationship to make predictions and establish scientific laws and the role of the neutral researcher is to present an objective explanation of matters of concern and predict laws as per Grix (2004). In line with the positivist philosophical framework, quantitative research approach and explanatory design applied for this study to test the relation among variables and these variable in turn measured and used to analyze statistical procedures (Creswell, 2009).

The authors used time series analysis for the data collected from National Bank of Ethiopia, Ethiopian Investment Commission and the World Bank for 31 years (1992 -2022). Descriptive techniques and econometric model, the Autoregressive Distributive Lag and Error Correction Model used for estimation. This model used by Hailu and Debele (2015), Ang (2009), Ajide (2013), Bekele and Gidey (2021) among other

Model Specification for Autoregressive Distributed Lag Model

Autoregressive distributed lag cointegration technique is preferable when dealing with variables that are integrated of different order, I(0), I(1) or combination of the both and robust when there is a single long run relationship between the underlying variables in a small sample size (Nkoro & Uko, 2016). The study used the autoregressive distributed lag-bounds testing approach developed by Pesaran et al. (Pesaran et al., 2001). The ARDL model is important for estimating the effect of time lag of explanatory variables in time series data. The model reduces serial correlation and endogeneity problems and gives robust results for small samples and estimates the long and short-run parameters of the model at the same time. This method is possible when different variables have different optimal numbers of lags and is important in identifying the cointegrating vectors.

Private investment is the function of monetary variables specified as follows:

PvI = f(LIR+ DIR+BMS+ DC+ GDD +Inf +TO)

Where: PvI is Private Investment, DIR shows Deposit Interest Rate**,** LIR represents Lending Interest Rate**,** BMS is Broad Money Supply**,** DCP represents Domestic Credit to Private sector**,** GDD indicates Government Domestic Debt and Control Variables: Inf shows Inflation Rate and TO is Trade Openness.

The generalized Autoregressive Disturbed Lage (ARDL) model is specified below:

$$\boldsymbol{ARDL_{(p,q)}}: \boldsymbol{Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \beta_3 Y_{t-3} + - - - + \beta_p Y_{t-p} + \delta_1 X_t + \delta_2 X_{t-1} + \delta_3 X_{t-2} + - - - + \delta_q X_{t-q} + \epsilon_t} \quad ---------(1)$$

$$\boldsymbol{Y_t = \beta_{0i} + \sum_{i=1}^{p} \beta_i Y_{t-i} + \sum_{i=1}^{q} \delta_i X_{t-i} + \varepsilon_i} \quad ----------(2)$$

Where: lagged $\boldsymbol{Y}$'s constitutes the autoregressive part, lagged $\boldsymbol{X}$'s represents distributive part and p is autoregressive lags term and $\boldsymbol{q}$ is distributive lags term. $\boldsymbol{Y_t}$ shows the dependent variable, $\boldsymbol{\beta_0}$ indicates constant**,** $\boldsymbol{Y_{t-i}}$is the lag value of the dependent variable**,** $\boldsymbol{X_{t-i}}$ shows the lag value for independent variables**,** $\boldsymbol{\beta}$ **and** $\boldsymbol{\delta}$ show coefficient and $\boldsymbol{\varepsilon_i}$ indicates the error terms.

For the sake of cointegration test, it requires checking by establishing if there exist long run relationship among variables of interests**.** Bound testing procedure developed by Pesaran et al (Pesaran et al., 2001) is used for identifying the existence of long run relationship among variables. This is considered essential as evidence of cointegrating relationship rules out the possibility of spurious regression. Bound testing procedure is important and serves in good manner specially for small sample size.

$$\Delta \boldsymbol{Y_{it} = \beta_0 + \beta_1 Y_{it-1} + \beta_2 X_{it-1} + \sum_{i=1}^{p} \beta_i \Delta Y_{it-1} + \sum_{j=0}^{q} \beta_j \Delta X_{ij-1} + \varepsilon_t} \quad --- \quad (3)$$

Where: $\boldsymbol{Y_{it}}$ and $\boldsymbol{X_{it-1}}$ indicates vectors of variables and $\boldsymbol{Y_{it}}$ represents a vector of dependent variable and $\boldsymbol{X_{it}}$ indicates a vector of independent variables at the same time**.** Δ shows the difference operator in general.

To estimate the effect of monetary policy on the private investment on the basis of Keynesian demand function model, the ARDL framework is presented as follows:

$$\Delta PvI_i = \beta_0 + \beta_1 PvI_{t-1} + \beta_2 LIR_{t-1} + \beta_3 DIR_{t-1} + \beta_4 BMS_{t-1} + \beta_5 DC_{t-1} + \beta_6 GDD_{t-1} + \beta_7 Inf_{t-1} + \beta_8 TO_{t-1} + \sum_{i=1}^{p} \delta_{1i} \Delta PvI_{t-1} + \sum_{i=1}^{p} \delta_{2i} \Delta LIR_{t-1} + \sum_{i=1}^{p} \delta_{3i} \Delta DIR_{t-1} + \sum_{i=1}^{p} \delta_{4i} \Delta BMS_{t-1} + \sum_{i=1}^{p} \delta_{5i} \Delta DC_{t-1} + \sum_{i=1}^{p} \delta_{6i} \Delta GDD_{t-1} + \sum_{i=1}^{p} \delta_{7i} \Delta Inf_{t-1} + \sum_{i=1}^{p} \delta_{8i} \Delta TO_{t-1} + \cup_i \quad ----------(4)$$

Where: Δ denotes the first difference operator, β_0 constant term, $\cup_i$ is the white noise of residuals, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ and β_8 are coefficients of the short-run dynamics of the model and $\delta_{1i}, \delta_{2i}, \delta_{3i}, \delta_{4i}, \delta_{5i}, \delta_{6i}, \delta_{7i}$ and δ_{8i} indicates the coefficients of the long-run relationship model. To identify whether there is a long-run relationship among the variables, the bound test based on the joint F-statistics test is done to check the joint significance of the lagged level variables. The hypothesis:

Null hypothesis: no-cointegration:

H0: $\beta_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8$

Alternative hypothesis: the existence of co-integration among variables

H1: $\beta_0 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq \beta_8$

Once the co-integration bound test is done, the next step is the estimation short-run or Error Correction estimation as follows:

$$\Delta PvI_i = \beta_0 + \sum_{i=1}^{p} \delta_{1i} \Delta PvI_{t-1} + \sum_{i=1}^{p} \delta_{2i} \Delta LIR_{t-1} + \sum_{i=1}^{p} \delta_{3i} \Delta DIR_{t-1} + \sum_{i=1}^{p} \delta_{4i} \Delta BMS_{t-1} + \sum_{i=1}^{p} \delta_{5i} \Delta DC_{t-1} + \sum_{i=1}^{p} \delta_{6i} \Delta GDD_{t-1} + \sum_{i=1}^{p} \delta_{7i} \Delta Inf_{t-1} + \sum_{i=1}^{p} \delta_{8i} \Delta TO_{t-1} + \gamma ECM_{t-1} + \cup_i \quad ----------(5)$$

Where: ECM_{t-1} is the error correction model required to be significant at 5% and negative sign in the model, considered as rate at which the adjustment take place in the long-run relation equilibrium. $\boldsymbol{\gamma}$ is the coefficient for measuring speed adjustm

4. RESULTS AND DISCUSSIONS

4.1 Descriptive Results

As Table 1 indicates the mean value of private investment as a percentage of GDP is 3.31. The maximum value for private investment shows 10.93%

and the minimum value is 0.04% during the last 31 years. The variation between the two values, indicates the growth of private sector investment relatively in Ethiopia.

Table 1: Summary of Descriptive Statistical Results

Variable	Mean	Std. Dev.	Min	Max
Private Investment	0.0331	0.0268	0.0004	0.1093
Lending Interest Rate	0.1237	0.0180	0.0680	0.1550
Deposit Interest Rate	0.0589	0.0229	0.0300	0.1000
Broad Money Supply	0.3458	0.0481	0.2700	0.4500
Domestic Credit to Private Sector	0.1493	0.0488	0.0361	0.2252
Government Domestic Debt	0.3222	0.0625	0.1540	0.4180
Inflation	0.1135	0.1352	-0.1077	0.5524
Trade Openness	0.2731	0.0801	0.0850	0.4022

Source: Authors' computation (2024)

The private investment sector has shown relative growth since the fall of Derg regime because of relative favorable investment environment though great fluctuation observed. Figure 1 reveals that the private sector investment is less than the public sector investment. Government takes the lion share of investment in Ethiopia in supplying basic infrastructure that facilitates private investment growth in the long-run. Between 1999 and 2006, both private and public investment had shown good performance in Ethiopia. But after 2006 both declined especially the private investment highly declined.

The private investment sector in Ethiopia has no long history due to changes in economic policy that the states applied. During Derg regime, since the economic policy was command economic policy, there were no significant private investment sector and even most of the private properties built during the policy Emperor Haile Selassie I were nationalized when Derg came to power. The private investment sector started after Ethiopian People's Revolutionary Democratic Front (EPRDF) came to power in 1991. Since then, the trend of private sector investment within these 31 years shown ups and downs. As per its contribution to the GDP, more than average, it had shown good progress from 1992-1996. During this time most of state-owned enterprises were privatized. The new private banks also started establishment due to arrangements of the new policy for the finance industry even though such policy did not allow the foreign sectors to take part in such investment.

As the trend of private investment from Figure 1 depicts, the direction of growth in private investment changed downward from 1996 to 1999 from 7.17 % to 2.5% to GDP contribution. This may be because of the Ethio-Eritrean war that contributed to such decline. But later from 2000 to 2006, there was very good investment condition in both private and public investment and the progress shown very promising movement until it reaches its maximum contribution to GDP at 10.93% for private and 55.81%. Most of the investments were in the service sectors and no much investment in the agriculture and manufacturing sector comparatively

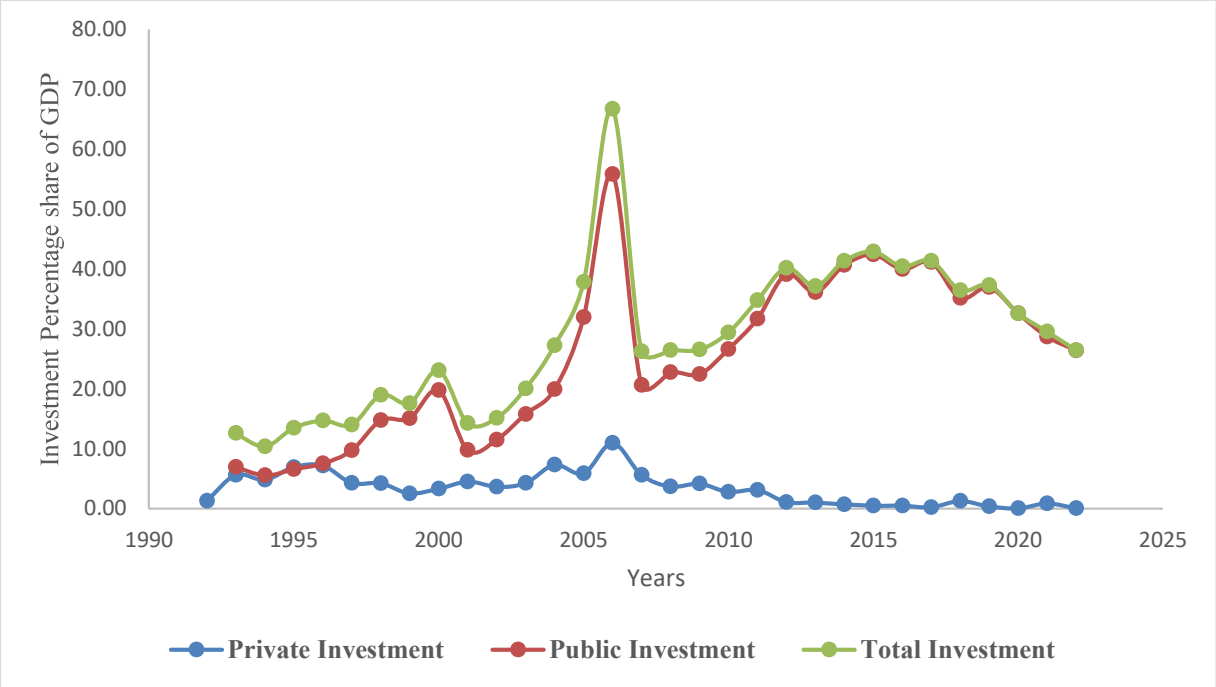

Figure 1: Trends of Investment in Ethiopia (1992-2022)
Source: Authors' Computation on the basis of MBE & EIC (2023)

On the other hand, the trend of private investment declined since 2006 to present in a very surprising situation and unable to recover much till 2022. There may be many factors contributed to such a situation like the government bureaucracy, ease of doing business in which Ethiopia is at the back of many African countries, the political unrest for long period of time, the outbreak of Covid-19 in the world, the devastating war in the northern part of the country among others.

The other bottlenecked problem related to the decline of private investment sector may be due to directed credit by the government through monetary policy. When the direction of credit flow shifted towards selected government sectors, the private sector unable raise adequate loan from finance industry. This is the reason why credit to the private sector did not exceed 12% of GDP in 2017/18 and the credit market is skewed towards state-owned enterprises and the private credit over the past 10 years declined significantly. During this time the public investments were in good position relative to the private one as Figure 1 shows. This is due to that the state-owned enterprise's credit in the last 10 years increased from 5.2% in 2007 to 17.2 % in 2018 and the share of credit in total outstanding domestic credit for state owned enterprises increased from 14% in 2007 to 54% in 2018, even though they are inefficient.

The major way through which shift of credit done was via "The 27% Rule" the mandatory purchase of NBE bill, done in 2011 with the directive MFA/NBEBILLS/001/2011, which forced private commercial banks to invest 27% of their every new loan disbursement in governments securities for five years except the state-owned banks, at 2% less than the cost of deposit rate they collect from the public. MFA/NBEBILLS/001/2011 directive diverted financial resources from the private to the public sector. The government also imposed the long-standing credit ceilings on private banks, which reduced the volume of credit, which was removed later 2011.

From the descriptive Table 1, loan interest rate indicated the average value of 12.37% for the data of 31 years. Along the study years, the lending interest rate shown rise from the minimum rate of 6.8% to the maximum rate of 15.5% in the banking business in Ethiopia. This growth in lending rate has its negative impact in promoting the private sector investment. The higher the lending rate, the lower the possibility of access to investment finance and discourages the private. This is evidenced with the regression result of the long-run effects of lending interest rate over the private sector investment in Ethiopia.

Table 1 also indicated the mean value of 34.58% with the lowest of 27% and the highest of 45% for broad

money supply over the period of 31 years. When the money circulates in the market is large, it is an indication of following relaxed monetary policy. This has its contribution in solving the problem of access to finance for the private sector investment. The higher the money circulates in the market, the higher the banks able to collect in the form of deposit from the market and the higher the possibility for investors to get more money, assuming that cost of collection and price of loan remain constant. But when money circulates in the economy diminishes, banks unable to collect enough deposit and face with the challenges of providing adequate loan to their borrowers. This further affects their banking operation and negatively influences their banking profit. Therefore, holding optimum supply in the economy is a solution to such challenges.

Pre-estimation Test

Unit Root Test of Variables

To test for stationarity in time series data, the test statistics value and the critical values compared with each other. If the absolute value of test statistics is greater than the absolute critical value either at level or first difference, the data is stationary.

Table 2: Test for Stationarity of the time series data

Variables	ADF test statistics at I(0) level				ADF test statistics at I(1) level				
	Intercept		Trend & Intercept		Intercept		Trend & Intercept		
	Test Stat	Critical Value (5%)	Test Stat	Critical Value (5%)	Test Stat	Critical Value (5%)	Test Stat	Critical Value (5%)	Order of Integration
PvI	-1.161	-1.950	-2.217	-3.584	-4.132	-1.950	-4.046	-3.588	I(1)
LIR	-0.132	-1.950	-1.524	-3.584	-4.555	-1.950	-4.724	-3.588	I (1)
DIR	-1.043	-1.950	-1.644	-3.584	-3.960	-1.950	-3.638	-3.588	I(1)
BMS	-0.386	-1.950	-2.493	-3.584	-3.181	-1.950	-3.121	-3.588	I(1)
DC	-0.464	-1.950	-3.180	-3.584	-2.148	-1.950	-2.226	-3.588	I(1)
GDD	-0.744	-1.950	-2.346	-3.584	-3.130	-1.950	-3.099	-3.588	I(1)
Inf	-1.494	-1.950	-4.058	-3.584	-7.775	-1.950	-7.639	-3.588	I(0)
TO	-0.345	-1.950	-1.520	-3.584	-3.139	-1.950	-3.573	-3.588	I(1)

Source: Authors Computations (2024)

But if the absolute value of test statistics is less than the absolute critical value at 5% level of significance or if the critical value is greater than the test statistics at 5% level of significance, the data is non-stationary or unit root according to the Augmented Dickey Fuller test. Non-stationarity in time series data can lead to spurious regressions showing that significant relationship where there is none, assuming other things remain constant. The spurious regression is characterized with very high coefficient and low Durbin Waston test. Therefore, to minimize such problem the researchers conducted unit root test using the common testing method of Augmented Dickey-Fuller. The unit root test using ADF indicates that at 5% level of significance, most variables are stationary at first difference.

ARDL Bound Co-integration Test

To test the existence of long-run co-integration, the F-statistics value is the common test method used to compare the lower bound (I(0)) and upper bound (I(1)) value. The ARDL bound test in this study presented in Table 3. The F-statistics value shows 6.274. This value is greater than the lower (I(0)) and upper values (I(0)) at 10%, 5%, 2.5% and 1% critical values. The null hypothesis is rejected because the test indicated the presence of both long-run and short-run cointegration in the model (the private investment and other explanatory variables)

Table 3: ARDL Bound Test

Bound	Critical Values				F-Statistics
	10%	5%	2.5%	1%	
Upper Bound	3.13	3.50	3.84	4.26	**6.274**
Lower Bound	2.03	2.32	2.60	2.96	

Therefore, once the null hypothesis of no co-integration is rejected, it is feasible for estimating the long-run and short-run model (ECM).

4.2 Regression Results

4.2.1 The Long-Run Estimation Results

From Table 4, in the long-run, the lending interest rate negatively and significantly affects the private sector investment. The result reveals that when lending interest rate increases by 1%, the private investment declines by 3.65%. The more the lending interest rate, the less possibility for private investment. Increasing in lending interest rate means that increasing cost of financing investment. The more price of loan, the less access to finance and the more decline in private investment. Rise in lending interest rate discourages the private sector developments. This is especially in a country where restrictive monetary policy is applied for the sake of achieving different monetary policy objectives like stabilizing inflation or reducing the large money circulation in the economy. To the opposite, when the lending interest rate declines, the private sector investment able to get adequate finance and contributes to more development of the sector. As observed from the Figure 4.2, the private investment declined because of the domestic credit to the private investment. This can be because of the increased lending rate even though the frequency of increment in lending rate is not as high as other factors of investment.

This result similar with the finding of Karim (2012), Karim and Saini (2013), Misati and Nyamongo (2011) and Ndikumana (2016) who investigated that monetary policy (lending interest rate) negatively and significantly influence private investment in the long-run. This finding is against the work of Ang (2009) identified that interest rate control has a positive impact on private investment in long-run. Hailu and Debele ((2015) and Lucky amd Kingsley (2017) the real interest rate's effect on investment was found to be positive though insignificant in the long-run period.

Table 4: ARDL Long-run Estimation Result

ARDL (2,2,2,2,2,2,2,2,1) numbers in the bracket shows the optimal lag length selected for PvI, LIR, DIR, BMS, GDD, DC, TO and Inf, respectively selected on the basis of Akaike Information Criteria (AIC). The dependent variable here is the private investment (PvI)

Variables	Coef.	Std. Err	t-value	P> (t)
LIR	-3.6534	1.2647	-2.89	0.028**
DIR	2.6772	0.9176	2.92	0.027**
BMS	-1.4771	0.5526	-2.67	0.037**
DC	2.2211	0.5997	3.70	0.010**
GDD	1.3291	0.3800	3.50	0.013**
Inf	0.0648	0.1057	0.61	0.563
TO	0.5954	0.1739	3.42	0.014**
Sample: 1994 - 2022 Number of obs. = 29, R-squared = 0.9648				
Adj R-squared = 0.8357, Log likelihood = 123.37279, Root MSE = 0.0076				

Source: Authors' Computation (Stata Result) (2024).

Where: LIR-Lending Interest Rate, DIR-Deposit Interest Rate, BMS-Broad Money Supply, DC-Domestic Credit to Private sector, GDD-Government Domestic Debt, Inf-Inflation, TO-Tarde Openness.

The other long-run result from Table 4 is the deposit interest rate which showed positive and significant effect on the private investment at 5% level of significance. If National Bank of Ethiopia increases deposit rate by 1%, the private investment increases by 2.68%. Higher deposit rate encourages saving. This implies that when deposit rate increases, it attracts more deposit to flow to banks because, depositors want utilize the opportunity for getting better return. Through their intermediation function, this enables banks to get more money to lend to the private sector. Though the deposit rate is cost to the banks, the cost of such deposit is outweighed by the benefit derived by banking business through collecting adequate deposit and properly extending the loan. It is obvious that when cost of deposit collection increases, the price of loan expected to increase. Banks can use economies of scale through collecting higher amount of deposit money. This result is similar with the work of Lucky and Kingsley (2017) and Lesotlho (2006) who found that saving rate have positive relationship with domestic real investment and support private investment.

The long run relation of the broad money supply with the private sector investment shown negative and significant. It reveals that the broad money supply negatively influences the private investment at 5% level of significance. When broad money supply increase by 1%, the private sector investment declines by 1.48%. When there is high injection of large amount of money to the market, it might cause inflation or rise in price of assets and other materials because of growing demand and increased consumption at individual, household and government level. The rise in inflation may result the application of the restrictive monetary policy (increasing deposit rate, encouraging creditors to increase lending rate, rising reserve and liquidity requirement, issuing government treasury bill). Such action finally leads to decline in private sector investment. Also, the existence of inflation erodes the purchasing power of money and finally results to decline in private investment. This result is in contradict with the work of Dang et al (2020) , Chaudhry et al (2021), Karim (2012), Hailu and Debele (2015) and Bekele and Gidey (2021).

The long-run result of government domestic debt revealed positive and significant effect on the private sector investment at 5% level of significance. The result showed that when government domestic debt increases by 1%, the private investment increases by 1.33%. Higher public expenditure through basic infrastructure may motivates the private sector investors. When government builds roads, expand power generation, telecom and other necessary facilities, private sector encouraged to utilize the opportunity and results to increase the private sector investment assuming that other things remain constant. In long-run the government domestic debt has a crowding-in effect on the private sector investment. This may imply complement of the public investment to the private investment. This result is contradicting with the finding of Maana et al. (2008), Olweny and Chiluwe (2012) as well as Brima and Brima (2017) who indicated that negative and significant impact of government borrowing on private investment long-run.

The domestic credit to private sector positively and significantly affects the private investment at 5% level of significance in long-run. When domestic credit to private sector increases by 1%, the private investment increases by 2.22%. The higher domestic credit, the higher private investment. This is when access to credit increases, private sector investors encouraged to engage in more investment since finance is one of the basic key solutions in solving challenges of investment. This finally contributes to the development of private sector and high contribution to the national economic growth. Monetary policy which encourages the private sector investment will boosts the growth in economy and alleviates poverty.

This result is supported by Misati and Nyamongo (2011), Lucky and Kingsley (2017), Dang et al (2020), Okorie and Chikwendu (2019), Besides, Syed et al (2007), Lesotlho (2006), Ajide and Lawanson (2012), Bekele and Gidey (2021) and Geddafa (2023). But this result is not agreeing with the work of Ebisine and Oki (2021) and Ouattara (2004).

Trade openness has positive and significant effects on private investment at 5% level of significance. This implies that when trade openness increases by 1%, the private investment increases by 0.59%. The higher the trade openness in the country, the more possibility for private sector investment in the long-run. The less the trade openness, the less the private sector investment. This result is similar with Mohsen (2020), Chaudhry et al. (2021). Salahuddin et al (2009) and Geddafa (2023) who found positive and significant impact of trade openness in the long-run on the private sector investment magnifying that trade liberalization play a vital role in boosting the private investment. Asante (2000) also concluded that a restrictive trade regime

has had a negative effect on private investment. But Ouattara (2004) found that private investment is negatively and significantly affected in long-run.

4.2.2 Short -Run Estimation (ECM)

Table 5 reveals the error correction coefficient for the private investment negatively and significantly related at 1% level of significance. This indicates the co-integration of variables (dependent and independent variables) which satisfies one of the requirements among others. On the other side, the estimated short-run coefficient of error correction - 0.5943 is below the absolute value of 1, indicating the high speed of adjustment to the long-run equilibrium. This negative coefficient shows that the private investment converges towards its equilibrium at 59.43% every year. This indicates that about 59.43% of last year's disequilibrium is corrected by the changes in private investment (Pesaran et al., 2001).

The short-run effect of lending interest rate on the private investment indicates positive relation and significant at 5% level of significance both at first and lag difference. When the first difference of lending interest rate increases by 1%, the private investment increases by 2.42%. When the first lag difference of the lending interest rate increases by 1% again, the private investment increases by 1.3%. This result is in agreement with Agu(2015), Hailu and Debele((2015) as well as Frimpong and Marbuah(2010) who found positive and significant effect of lending interest rate on private investment in short-run. This result is contradicting with Brima and Brima(2017), Misati and Nyamongo(2011), Bekele and Gidey(2021) and Geddafa (2023) who indicated that lending interest rate negatively and significantly influence the private investment in short-run.

Table 5: ARDL Short-run estimation (ECM)

Variables	Coef.	Std. Err	t-value	P>(t)
LDPvI	-0.6253	0.1276	-4.90	0.003***
DLIR	2.4197	0.6562	3.69	0.010**
LDLIR	1.3134	0.4466	2.94	0.026**
DDIR	-0.8322	0.5299	-1.57	0.167
LDDIR	-0.3099	0.3639	-0.85	0.427
DBMS	0.9624	0.2830	3.40	0.014**
LDBMS	0.5950	0.1959	3.04	0.023**
DDC	-0.0648	0.3915	-0.17	0.874
LDDC	0.3696	0.3178	1.16	0.289
DGDD	-0.6113	0.1725	-3.54	0.012**
LDGDD	-0.1975	0.0816	-2.42	0.052*
DInf	-0.1006	0.0372	-2.71	0.035**
DTO	0.1193	0.1080	1.10	0.312
LDTO	0.1897	0.0874	2.17	0.073*
ECM (-1)	**-0.5943**	**.1411**	**-4.21**	**0.006**
_cons	-0.0659	0.10492	-0.63	0.553

***Where**: D-represents Difference, LD-indicates Lag Difference*

Source: Stata Result (2024)

Broad money supply has a positive and significant effect on the private investment both at its first difference and first lag difference. When the first difference of broad money supply increases by 1%, the private investment increases by 0.96%. Again, when the one-year lag of broad money supply increases by 1%, it contributes to private investment to increase by 0.6%. An increase in the money supply than the normally circulating size of money in the economy contributes to an increase in the private investment. A growing money supply increases the confidence of consumers and encourages spending. Such encouraged spending increases the demand for goods and services and this results to expansion of business activities. This shows that when there is additional money injection to the economy, the personal consumption, investment expenditure and the government expenditure increases because this increases the purchasing power of such economic agents. This further increases the demand of all sectors and requests for further investment and production. In general, an increase in money supply enhances the banks' capital position and encourages more loan to the private sector investment assuming that other

factors remain constant. This result is supported by Ebisine and Oki(2021), Hailu and Debele(2015), Brima and Brima(2017) as well as Olweny and Chiluwe(2012).

The short run effect of government domestic debt on private investment is negative and significant at 5% level of significance at its first and first lag difference. This implies that expansion in government domestic debt results to decline in private investment in short-run. This indicates that when government raises more money for public expenditure purpose, the private sector faces the shortage of finance. This is because both government and the private sectors are competing for the limited financial resources locally. Then this creates bottle neck to investors and results to crowding-out of private sector investment.

In Ethiopia, the government invests on construction of road, dams, housing (condominium), hospitals, subsidy of basic public goods like fertilizers, fuels, and others among others. These demands large government expenditure. To finance all these, the tax that government collects from the nation is not adequate. So, government raises money from domestic market in addition to the international debt. The domestic sources of government debt (mostly through state owned enterprises) are from commercial bank of Ethiopia and development bank of Ethiopia (through raising money in selling bond). These left the private sectors to the corner for getting adequate finance for their investment. Therefore, rise in expenditure of government has crowded out private sector investment as IS-LM theory explains. Through changing of monetary policy, increasing government spending through may reduce the prospects for boosting investment of non-bank financial sources as the classical theory of private investment explains. This creates difficulties of competing with government borrowing for limited loanable funds available in the economy. Then, change in monetary policy inversely affected private investment. Increases in government spending financed by monetary policy changes tend to reduce the private sector's ability to access funds for investment. The crowding out effect "displacement of private sector investment by government borrowing" may result. This finding is supported with the work of Brima and Brima (2017) and Maana et al. (2008) indicating that private sector investment is influenced negatively by the amount of domestic debt borrowed by the government from the financial sector.

The trade openness positively and significantly affects private investment at its first lag difference. When the one-year lag of trade openness increases by 1%, the current private investment increases by 0.19%. The more the economy is open to more export to the global market and import to the country from abroad, the more private investment is encouraged. When export increases, it implies that higher domestic investment in different areas considering smooth environment locally. On the other hand, higher import also indicates more investment in international trade because of high demand for the product or service in domestic market for foreign product. Therefore, the more the economy is amalgamated with the global economy, the more the private sector investment. This result agree with Salahuddin et al (2009), but opposed by Frimpong and Marbuah (2010).

In short-run inflation negatively and significantly affects private sector investment. Assuming others remain constant, when inflation rate rise by 1%, the private investment declines by 0.1%. This indicates that the higher the inflation, the lower the private sector investment. When inflation rise, the purchasing power of money declines, then the input required by investors will rise up. This is especially in Ethiopia, most of the higher investment inputs are import based for further production or service delivery. When investors import such inputs, they have to pay more money for such input and later they transfer such costs to their customers through high price of their product or services. Such action push away customers and finally discourages investment. This result is similar with the work of Brima and Brima(2017), Ebisine and Oki(2021), Ezeibekwe (2020) and Frimpong and Marbuah(2010) in which authors investigated the negative impact of inflation on private investment.

Post-estimation Tests

1. Serial Correlation Test: Durbin Watson test

For identifying whether there is serial correlation or not in the model, Durbin Watson statistic (d-statistic) is the common method. Therefore, there is no problem of serial correlation in the model, because the value of Durbin-Watson d-statistic (23, 29) is 2.351187.

2. Test for Normality

Skewness/Kurtosis tests for Normality

Test for normality shows a test for detecting whether the residuals are normally distributed or not. One of the methods for testing the normal distribution of the residuals is through using Skewness/Kurtosis tests. Therefore, according to Table 6, the result of P-value

indicated 0.1235 which is greater than 5%. implying that the residuals are normally distributed.

Table 6: Skewness/Kurtosis tests for Normality

Skewness/Kurtosis tests for Normality					
					------ joint ------
variable	Obs.	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
resid	29	0.7577	0.0482	4.18	**0.1235**

3. Model stability (CUSUM Test)

According to this method, to say that the model is stable, the line or the graph should oscillate between the upper and lower limit boundary. Figure 2, the plot of cumulative sum square of recursive residuals indicates between the critical bounds at the 5%. As the evidence depicts, the line of CUSUM square is between the specified limits confirming that the equation is correctly specified, and the model satisfies the stability criteria. Therefore, the estimated results from the model are both efficient and reliable result.

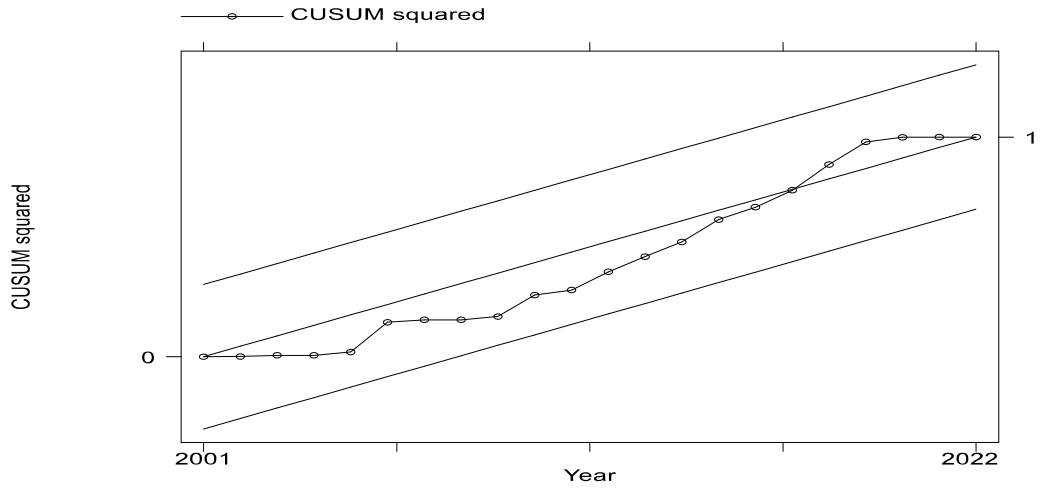

Figure 2: Model stability test

5 Conclusion

Strong and vibrant private sector investment is a base for the sustainable development and economic growth. This study aimed to identidy the effect of monetary policy on the private sector investment in Ethiopia using time series data from 1992 to 2022. The study employed Autoregressive Distributed Lag and Error Correction Model. The regression results revealed that significant effect of monetary policy instruments on the private sector investment in Ethiopia both in short-run and long-run. In long-run, lending interest rate and broad money supply affected negatively and significantly the private sector investment whereas deposit interest rate, domestic credit given to private sector, the government domestic debt and trade openness influenced the private investment sector positively and significantly. Inflation rate remain insignificant in the long-run. From short-run dimension, the lending interest rate, broad money supply and openness to global trade through import and export revealed positive and significant influence on private investment but government domestic debt and inflation influenced private investment negatively and significantly. The deposit interest rate and the domestic credit to the private sector remain insignificant in short run on private investment.

Therefore, private investment sector in Ethiopia explained more by lending interest rate, deposit interest rate, broad money supply, domestic credit to private sector, government domestic debt and trade openness both in short-run and long-run perspectives. From these, the authors conclude that monetary policy is strongly influential in promoting private investment in Ethiopia.

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