RESEARCH

Does financial repression inhibit or facilitate private investment? The case of Ethiopia

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Abstract

This study examines the impact of financial repression (FR) on private investment in Ethiopia over the period 1980 to 2020. Investigating the consequences of FR policies makes use of the cointegration technique. The dynamic ordinary least square (DOLS) estimation result demonstrated that FR has a detrimental and statistically significant impact on private investment, resulting in considerable lost opportunities for private investors by driving away banks' productive investment. In addition, the structural reforms implemented since 2011 have a beneficial and significant influence on private investment. The effects of financial development, per capita GDP, and domestic lending to the private sector all produce similar consequences. Additionally, Ethiopia's private investment is negatively impacted by trade liberalization and inflation. The primary findings are used to infer potential policy implications.

Keywords Financial repression, Private investment, Dynamic OLS, Ethiopia

JEL Classification E2, E4, E5, G18, G21

Introduction

Financial repression (FR) happens when governments implement policies that channel funds to themselves that would otherwise go elsewhere in a free market. Policies include directed lending to the government by captive domestic audiences explicit or implicit interest rate caps, cross-border capital movement regulation, and a tighter connection between the government and banks, either explicitly through public ownership of some of the banks or through heavy "moral suasion. FR is sometimes accompanied with very high reserve requirements (or liquidity requirements), securities transaction levies, prohibitions on gold purchases, or the issuance of large sums of nonmarketable government debt [45]. FR issues are currently discussed under the wide umbrella of "macroprudential regulation," which refers to government measures to guarantee the health of an entire financial system [44]

Governments are attempting to manipulate financial markets in order to reduce the cost of debt financing and ensure the financial system's overall health [45]. Reinhart and Sbrancia [44] argue that high public debt often produces the drama of default and restructuring. But debt is also reduced through financial repression (FR), a tax on bondholders and savers via negative or below-market real interest rates. After World War II, capital controls and regulatory restrictions created a captive audience for government debt, limiting tax-base erosion. FR is most successful in liquidating debt when accompanied by inflation. They suggested that FR may be part of the toolkit deployed to cope with the most recent surge in public debt in advanced economies.

Furthermore, [45] argued that high public and private indebtedness in advanced economies, as well as perceived risks of currency mismatch and overvaluation in developing nations confronting spikes in capital inflows are interacting to create a "home bias" in finance and a comeback of FR. While emerging markets may increasingly rely on financial regulation to keep international

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capital out, advanced economies have incentives to retain capital in and create a captive home audience to pay current public debt. Concerned about potential overheating, growing inflationary pressures, and related competitiveness difficulties, emerging market nations are changing their regulatory frameworks to discourage foreign investors in their never-ending pursuit of greater yields. This provides a common platform for advanced and developing market economies to agree on stronger regulation and or limitations on international financial flows, as well as a return to more tightly controlled domestic financial environments—in other words, FR. Governments, of course, do not refer to these steps as FR, but rather as part of "macro-prudential regulation," which is intended to maintain the general health of the financial system.

Furthermore, Rey [46] added that it is only through capital account control that independent monetary policies can be implemented. Prudential limitations on capital flows to emerging economies may be beneficial from a welfare standpoint since they minimize the frequency and severity of financial crises, therefore reducing the pecuniary externalities that arise during such crises. Such regulations can encourage private agents to internalize externalities, resulting in greater macroeconomic stability and welfare [35]. On the other hand obstfeld [43] and others magnify the benefits of financial liberalization in terms of reducing the ability of people in state authority in taking rents. Free capital movements make it more difficult for the state to expropriate investors since they allow them to flee [54].

Ethiopia has one of the world's most underdeveloped financial systems, ranking 126th out of 140 countries [29]. Ethiopia's monetary and foreign exchange policy framework has relied on some standard FR tools. According to Ethiopia country report issued by Deloitte [15], Ethiopia's financial system is very tightly controlled, there are still barriers preventing foreign engagement in several financial sectors, and the banking system is yet immature. State-owned financial institutions continue to dominate the banking industry. The commercial bank of Ethiopia (CBE) accounts for 47.7 percent of loans. The national bank of Ethiopia (NBE) issued a directive in 2011 requiring commercial banks to make investments equal to 27 percent of their lending on NBE's bonds. The money raised would have been helping the Development Bank of Ethiopia (DBE) finance loans for the major industries. For instance, on average the NBE financed about half of the domestic financing during the last three years at a rate of 3 percent per annum. This is because NBE is not independent from the government. While the NBE is legally an "autonomous institution" as stated in both the 1994 and 2008 NBE Establishment Proclamations,[1] it is required to meet the government's requests for credits and advances for each fiscal year (Article 13.1). The NBE is engaged in large direct and indirect quasi-fiscal operations; direct advances to the government to finance the annual budget and indirect financing to the government through credit extended to the DBE to acquire T-bills. Furthermore, the NBE indirectly finances state-owned enterprises (SOEs) by providing liquidity to the CBE in the form of 5-year bonds [13].

In addition, following the 15% devaluation of the Birr (Ethiopia's national currency) in October 2017, the NBE has lost its effectiveness in preventing an overvaluation of the Birr. By the end of September 2018, the real effective exchange rate (REER) had only decreased by 1.5 percent. As a result, inflation differentials eroded 90 percent of the benefits of nominal devaluation, making it difficult for the NBE to maintain a stable rate of exchange [13, 29]. The Birr's overvaluation weakened Ethiopia's external position and Ethiopia appears to be retreating rather than integrating into the global economy. On average, trade openness decreased from 20 percent of GDP in 2014–15 to 16 percent in 2017–18. The forex reserve is alarmingly low right now, falling short of both model-based and rule-of-thumb norms. In December 2018, the NBE's net foreign assets totaled $395 million, or less than $4 per resident [29]. Over time, the framework has resulted in the accumulation of significant macro-financial imbalances [13]. These make it worthwhile to empirically investigate the impact of the Ethiopian government's financial policies on private investment.

Previous studies have focused on the relationship between FR and economic growth, the cost of FR, and financial sector reforms implemented by countries. However, the researcher has never come across a single study that examined the causal relationship between FR policy and private investment. Therefore, this study will bring new insights to the existing literature in several ways: First, it is the first study conducted in a country experiencing a severe FR, resulting in huge opportunity costs for banks due to inefficient resource allocation. The results of this study can provide policy makers with objective evidence on the link between FR policies and private investment. Second, the study examined the extensive and fragmented literature on the benefits and costs of FR policies experienced by countries. This study provides comprehensive conclusions on financial liberalization and FR policy. Third, the study provides recommendations and steps that governments can take to strategically reorganize the financial system and bring

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[1] Proclamation No. 83/1994 and Proclamation No. 591/2008.

about optimal financial reforms that can mitigate the crowding-out effects of FR on private investment.

Literature review

Financial repression refers to a variety of policies, government regulations, laws, and market restrictions to capture a significant portion of the financial system's resources for funding the public sector at below-market prices [13, 39, 51]. Direct lending to the government by captive domestic audiences, explicit or implicit interest rate caps, credit ceilings or restrictions on credit allocation directions, restrictions on market entry into the financial sector, exchange and capital controls, high liquidity ratio and bank reserve requirements, Prohibitions on gold transactions, and government ownership or dominance of banks through heavy moral suasion are examples of such policies. Historically, governments have used a combination of these policies to reduce domestic debt and direct savings to priority purposes. It is a transfer from creditors (savers) to borrowers when FR causes negative real interest rates and reduces or liquidates existing debts (government and private) [11, 45].

McKinnon [39], Shaw [51] were the first to advance the concept of FR. They contend that a sluggish financial industry inhibits both saving and investments since the rates of return are lower than in a competitive market. Banks' failure to obtain high equilibrium rates of return from their favored borrowers results in an abnormally low return to depositors, which may be negative in real terms if inflation is strong. Although FR is not limited to banks, the crowding out of bank lending can be especially problematic because it cannot be easily replaced with other forms of financing. The crowding-out pattern holds across firms with different relationship with banks within a given country [8]. McKinnon and Shaw [51] put out the notion that increase in domestic real money balances is positively correlated with private investment in developing nations due to the difficulties in applying the conventional neoclassical paradigm to these countries. This hypothesis is based on the concept that private investors in these countries must accumulate cash reserves prior to starting investment endeavors because of their limited access to credit and stock markets. As real deposit interest rates directly impact real money balances in these nations, there should be a positive correlation between private investment and real interest rates. This method ignores the negative effects of higher real rates on investment because the neoclassical investment model often results in increased user costs of capital [26].

Developing nations, with insufficient capital markets, "repressed" their financial systems in order to turn their banking sector into the official marketplace where scarce money was intermediated between savers and investors [51]. As a result, governments able to obtain savings from households at suppressed deposit rates and distribute credit to selected borrowers under non-market terms and conditions. These governmental actions have sometimes been referred to as "double FR" because they targeted both the asset side and the liability side of bank balance sheets [57]. Van Riet [58] argued on two opposing theories for the occurrence of very low interest rates. The Keynesian-derived secular stagnation hypothesis contends that persistent non-monetary forces have resulted in a structural excess of desired savings over planned investments, which has continuously pushed down the equilibrium real interest rate consistent with a balanced economy. In turn, major central banks failed to cut their monetary policy rates sufficiently to stimulate aggregate demand, resulting in anemic economic recoveries and hysteresis effects. The FR doctrine, on the other hand, contends that central banks promoted low interest rates in order to ease government budget constraints and fulfill political agendas.

Ethiopia has a long history of double FR using a variety of standard FR tools, including the NBE's financing of the government, the state bank's dominance, mandatory requirement to fund priority projects and directed credit, administered interest rates, a captive domestic market for government debt, high liquidity and capital requirements, and strict foreign exchange controls [13]. FR on the asset side of the balance sheet is created by the statutory liquidity ratio (SLR) requirement that forces banks to hold government securities, and priority sector lending that forces resource deployment in less than-fully efficient ways. In principle, the SLR can perform a micro-prudential policy role because any unexpected demand from depositors can be quickly met by liquidating these assets [24]. Van Riet [57] argued that in a liberalized financial system credit and debt resolution decisions are left to free market forces subject to objective prudential criteria on which private agents can base their expectations of government actions. In practice, the SLR has become a means of financing a bulk of the government's fiscal deficit, suggesting that SLR cuts are related to the government's fiscal position.

In Ethiopia, all commercial banks should maintain liquid assets of no less than 15 percent of their net current liabilities comprises of demand, savings and time deposits and similar liabilities with less than a month maturity.[2] This is in addition to the usual mandatory reserve requirement of not less than 5 percent of all birr and foreign currency deposit liabilities held by banks in the form of demand, saving and time deposits. The high

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[2] Directive No. SBB/57/2014.

rate of liquidity requirements is used as a mechanism to generate seigniorage revenue, and by international comparisons, the level of liquidity requirements is high and onerous in Ethiopia [13]. Van Riet [57] argued in this regard that in a repressed financial system the government controls both the credit intermediation and debt resolution process using purely discretionary measures, creating market uncertainty. Gennaioli et al. [21] added that government defaults are costly because they destroy the balance sheets of domestic banks that lead to declines in private credit.

Many opinions have been uttered regarding the necessity of viewing monetary policy variables, such as the legal reserve ratio, or micro-prudential policy variables, such as the liquidity ratio or a capital requirement, as FR tools rather than as common instruments for preserving macroeconomic and financial stability. One of the viewpoints is that central banks failed to enforce prudential norms regarding financial intermediaries, either because of a mistaken notion that banks are similar to butcher shops or a lack of skilled staff [16]. Another view is that because policymakers cross the line to FR when bank reserve requirements are not remunerated (at the market interest rate) and when bank holdings of government bonds are exempted from liquidity and capital requirements.

FR on the liability side is created due to the fact that high inflation has led to negative real interest rates and a sharp drop in household savings in the nation. Currency balances might be subject to an inflationary tax because the fiscal system is unable to secure funding from noninflationary sources, or it might just be a by-product of an inflationary spiral whose inertial momentum could only be stopped by a severe real contraction [16]. Additionally, a change in the currency rate caused by capital flows may have an impact on the balance sheet. Depreciating currencies and falling asset values decrease domestic agents' net worth and collateral, which in turn restricts their access to credit. As Leo Tolstoy famously said, "Perfect credit markets are all alike, every imperfect credit market is imperfect in its own way," the routes via which such credit market faults play out are complicated and varied. Financial amplification effects appear when an economy goes through a self-reinforcing feedback loop of falling asset values and exchange rates, deteriorating balance sheets, and decreased economic activity [35].

In Ethiopia, private banks' intermediation is constrained beyond standard prudential regulation. The NBE is not independent of the government but serves as its banker and fiscal agent though NBE officials state that these restrictions are intended for prudential regulation. The fact that the introduction of such policies with amendments to the 27-percent rule indicates that the prudential regulation motive is not the central motive [13]. The NBE administers various interest rates (sets 7% minimum interest for savings and time deposits. This implies that private banks are subject to mechanical structural financial losses on a portion of their balance sheet because the interest rate they must pay on their savings and time deposits is 2 percentage points higher than the interest rate they must receive on the NBE-mandated T-bills they must buy, which is set at 5percent by the NBE and ministry of finance (MoF). However, banks are free to determine demand deposit and the lending rate on their loans and advances. Consequently, Banks can pass the cost of the 27-percent rule and mandatory minimum deposit interest rate to their private sector borrowers. The NBE also exercises moral suasion on the lending rates of the CBE and DBE.

Furthermore, the development of private banks in the country is hampered by operational limitations and shareholder caps. For the former, no person—aside from the government—may own more than 5% of the total shares of a bank, either individually or jointly with his or her spouse. For the latter, commercial banks should annually renew their business license after becoming founded. The NBE must give its written consent before appointing (and terminating) a bank's board of directors member, chief executive officer, or senior executive officer. Private Banks are subject to strict limitations on their extension of loans and advances. For instance, in 2017/18, the NBE limited the outstanding loan growth rate in private banks to 16.5 percent in non-priority sectors—businesses other than export and manufacturing sectors. Broner et al. [10] have argued in this context that undercapitalized resident banks holding a growing share of government debt goes at the expense of credit supply to the domestic private sector. A fiscal stimulus in this situation is less effective because private borrowers are crowded out, especially in turbulent times, when due to financial frictions alternative market funding is scarce, Ethiopia is exemplary in this context. Furthermore, financial institutions that are incentivized to maintain a high exposure to their own sovereign are vulnerable to fiscal shocks that lead to valuation losses and weaken their balance sheets.

Apart from the domestic financial environments, capital controls is another FR policy in Ethiopia that raises the cost of capital by creating financial autarky, limits the ability of both domestic and foreign investors to diversify portfolios, and assists inefficient financial institutions in surviving [13]. The banking sector is closed to foreign participation[3] and Ethiopia's national currency is

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[3] Proclamation No. 592/2008.

not freely convertible.[4] From a political economy stand point, the NBE is not independent from the government on top of the political instability in the country. Roubini and Sala-i-Martin [48] have argued on the relationship between increasingly loose monetary conditions and political instability. This relationship is found to be bidirectional in that on the one hand preferential access to low-interest-rate credit benefits some firms, sectors, or regions at the expense of others. On the other hand, the resulting loss of support for the established policy usually prompts the government to increase redistribution efforts in order to restore political stability. Korinek [35] and Rey [46] argued that it is crucial to underline that non-capital-control macro-prudential interventions may endanger the relationship between domestic monetary policy and capital inflows. Prudent capital regulations can encourage private agents to internalize externalities, resulting in greater macroeconomic stability and welfare.

On the other hand, obstfeld [43] argued that financial liberalization reduces the ability of people in state authority to take rents. If they try, local investors will withdraw their funds, foreign investors will return home, and local enterprises would become uncompetitive. Financial liberalization will almost certainly result in a more competitive and resilient domestic financial sector in a variety of ways. Free capital movements make it more difficult for the state to expropriate investors since they allow them to flee [54]. Furthermore, rising merchandise trade and domestic financial deepening make capital controls more difficult to implement.

In principle, FR policies, be it national or international, are implemented to combat weak economies, stimulate economic growth, and reduce unemployment as macroprudential policies. If this were the case, low real interest rates would normally reduce savings, shift consumption from future to present years, and result in stronger economic growth. Chari et al. [11] argue that FR policies should be used only when two conditions are met: (1) the government has an urgent need to issue debt and (2) has difficulty issuing such debt due to concerns about its willingness to repay its debts. FR policies are advantageous to captures savings and keeps nominal interest rates lower than they would otherwise be, lowering interest expenses for a given stock of debt and helping to reduce the deficit. It has also been argued that FR policies can have a positive impact when they address market failures successfully. Interest rate restrictions, for example, may be able to address moral hazard by banks in the context of imperfect information, improving banking system stability and increasing depositors' willingness to hold bank

deposits. FR protects the domestic banking system from the spread of international financial crises when market entry restrictions, exchange and capital controls are in place [13].

On the contrary, financial liberalization is assumed to reduce state-imposed credit restrictions and ensure a more efficient allocation of formal credit, in which the financial sector reduces information and transaction costs for firms when acquiring finance for investment [25, 56]. As economic controls are removed through liberalization, the association with higher real interest rates will stimulate savings, and savings is a key determinant of growth [51]. Low-yielding investment projects would be phased out as the real interest rate reached equilibrium, increasing the overall efficiency of investment projects. Furthermore, economic liberalization would increase transparency and accountability, reducing adverse selection and moral hazard while improving market liquidity [53]. However, financial liberalization has not always resulted in higher growth, owing to a weak link between real interest rates and savings caused by poor institutional quality and ineffective sequencing of liberalization and institutional reforms [23]. The proper sequencing of institutional development and the reconstitution of market forces is required for developing countries to exit financial repression. As a result, fiscal and monetary consolidation must come before financial market liberalization; otherwise, central banks' low-cost liquidity provision would cause financial markets to destabilize [32].

The empirical literature on the benefits and costs of FR is highly fragmented. Some researchers have focused on the link between FR and economic growth [30, 33, 48, 62]. Others have noted the link between finance and growth [6]. Some show the cost of FR [20]. Some consider the optimal level of FR [12]. Some others have examined the impact of legal systems on private investment [37]. Others have examined the impact of government policies on private investment [50], and others have examined the literature on FR and liberalization [36]. Lu and Yao [37] examined the impact of legal regimes on private investment and growth. The results show that the legal system restrains private investment and does not affect financial depth, but increases the private share of bank lending and bank competition. They conclude that legal systems must be complemented by other institutions in order to function properly. The effect of government policy on private investment is mixed with some evidence of crowding out in credit markets and of crowding in as a result of government investment in infrastructure [50].

In sum, the literature on FR and liberalization remains controversial for its theoretical conclusions and policy implications [36]. The aforementioned discussion shows that the extent of private banks' intermediation

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[4] Directive No. FXD/49/2017.

is constrained beyond standard prudential regulation in Ethiopia though NBE officials state that these restrictions are intended for prudential regulation. The weak and ineffective state-dominated banking system was a significant impediment to economic progress [9]. Finally, the researcher didn't come across a single study that empirically examined the link between FR and private investment. Prior studies in Ethiopia have concentrated on the existence and extent of FR and liberalization. Existing FR in Ethiopia was explored by [13], and finds that Ethiopia's framework for managing currency and foreign exchange policies is based on several standard tools of FR. The study suggests that over time, this framework has resulted in the accumulation of huge macro-financial imbalances. The country's financial sector has been operating under a FR framework for the past ten years as the government has used it to manage its monetary and forex policy and finance significant infrastructure projects and state-owned enterprises (SOEs) [13].

Methods
Empirical model
The dynamic ordinary least square (DOLS) method proposed by Stock and Watson [52] is adopted for this study due to the reason that the variables are non-stationary at level, cointegrated, suspection of reversed causality, and multicollinearity issues. That is because, in the case of static OLS (SOLS) the design matrix only includes the explanatory variables and the intercept [17], however, the DOLS model includes leads and lags (nuisance parameters) of the first differences of the explanatory variables to combat the issue of endogeneity, serial correlation, small sample bias and uses white Heteroscedasticity standard errors [38]. The DOLS is robust to deviations from standard regression assumptions in terms of residual correlation, Heteroscedasticity, misspecification of functional form, and residual non-normality [5]. To empirically examine the effect of FR on private investment, the following general equation is specified with a design matrix only includes the explanatory variables and the intercept:

$$y = X\beta + \varepsilon, \tag{1}$$

where y is an n×1 vector of response variable, X an n×p design matrix, β a p×1 vector consisting of the population parameters, and ε an n×1 vector of error terms assumed to be independently and identically distributed (i.i.d). However, DOLS model works irrespectively of the order of integration and the existence or absence of cointegration. Suppose that y has been found to be I (1) and at least some of the explanatory variables I (1) or I (0), then DOLS estimates are obtained by estimating the following equation.

$$y_t = \gamma_t + \beta' z_t + \sum_{j=-p}^{p} \gamma_j \Delta z_{t+j} + \varepsilon_t \tag{2}$$

where t = 1, 2, 3...N; γ_t = time trend or effect; z_t is a vector of explanatory variables; β' is the estimated long-run impact, first-differenced regressors, leads and lags are shown by p, while γ_j is the coefficient of a lead or lag of the first difference of explanatory variables, and ε_t denotes the error term that should follow the I(0) process. Thus, the cointegration equation with the application of DOLS approach proposed by Kao and Chiang [34] is specified as follows:

$$\begin{aligned} Y_t = {}& \beta_0 + \beta_1 \ln \text{GDPC}_t + \beta_2 \text{OPEN}_t + \beta_3 \text{FDI}_t \\ & + \beta_4 \text{FRI}_t + \beta_5 \text{DCP}_t + \beta_6 \text{PUI} + \beta_7 \text{GNS} \\ & + \beta_8 \text{GI}_t + \beta_9 \text{INF}_t + \beta_{10} Z_t + \varepsilon_t \end{aligned} \tag{3}$$

The dependent variable Y is the ratio of private investment (%GDP), and the explanatory variables are as follows:

LnGDPC is the log of GDP per capita. Because higher income countries are better able to allocate resources to saving, the impact of GDP per capita on private investment is anticipated to be positive. Given the shortcomings of the capital markets and the apparent need to finance the majority of investment projects, at least in part, through domestic savings, this ability is especially crucial. Trade openness (OPEN), measured by the sum of imports and exports relative to GDP, is another factor that influences private investment and, eventually, economic growth. Neoclassical thinking asserts that trade openness has a number of benefits, including: Efficiencies associated with specialization and competition with international trade; technology transfer with imported inputs; economies of scale through market expansion; and idea dissemination through cross-cultural interaction [19]. Contrarily, competition brought about by trade openness can lower the return on R&D investments and impede innovation. Imports compete with underdeveloped home industry, while exports frequently encounter very volatile international markets. Thus, its effect on private investment is subject to empirical investigation.

FDI is financial development index computed by the principal components analysis (PCA), which comprises of financial market (FM) development-FM depth, efficiency, and access, and financial institutions (FI) development-FI depths, efficiency and access. This index is anticipated to have a favorable impact on private investment since a more accessible, efficient, and outward-looking financial system would generate domestic capital for the private sector. FRI is the financial repression index computed using PCA on the

six components: real deposit rate (RDR), interest rate restriction (IRR), capital account control (CAC), legal reserve ratio (LRR), and the share of state sector (SSS) and directed lending (DL).

DCP is domestic credit to the private sector (%GDP), used to capture the availability of domestic funds to the private investment, and expected to have positive effect on private investment. Used to reflect the fact that countries where the private sector has been allowed to take on a larger role in the investment process have managed to raise the overall level of savings, and therefore total investment.

Government spending (PUI) is measured as government spending as a percentage of GDP. PUI that leads to a significant fiscal imbalance could drive away private investment due to high interest rates, credit restrictions, and increased current and future tax obligations. But, PUI crowds in private investment by increasing private returns through the provision of infrastructures such as communication, transports, and energy. Gross national saving (% of GDP) is critically important to help maintain a higher-level investment [42].

Gross national saving (GNS) is measured by GNS as percentage of GDP. The Feldstein–Horioka [18] conundrum demonstrates a substantial positive relationship between domestic savings and investment. Narayan [41] advances the notion that saving and investment are causally associated, if a country achieves its solvency condition. Meaning that, capital mobility and a strong relationship between saving and investment can coexist with government current account targeting. In particular, in the event of current account imbalances, monetary and/or fiscal policy is/are used to stabilize the country's external position, hence strengthening the saving-investment relationship. More recent research also indicates that saving and investment are cointegrated variables with a dynamic relationship, investment affects saving and vice versa [31].

Inflation (INF) is measured by the change in consumer price index (CPI). High inflation rates have a negative impact on private investment because they make longer-term investment projects riskier, shorten the average maturity of commercial credit, and skew the informational value of comparable pricing. High inflation rates are also frequently viewed as a sign of macroeconomic instability and a nation's incapacity to manage macroeconomic policies, both of which have a negative impact on investments.

The Z is a dummy variable created to capture suspected structural breaks in the data in the year 2011; a dummy variable equal to 1 for periods after 2011, 0 otherwise. Structural reforms such as growth and transformation plans (GTP) made since 2011 are expected to have positive effect on private investment.

GI is a proxy for institutional quality measured by the component index of world governance indicators-government effectiveness (GE), control of corruption (CC), rule of law (RL), regulatory quality (RQ), political stability (PS), and voice and accountability (VA). Government effectiveness is used to describe public service quality, public service capacity, and independence from political pressure and the quality of policy making. Corruption control is used to describe the extent to which public power is exercised for private gain, including corruption large and small, as well as the "conquest" of states by elites and private interests. Rule of law is used to indicate the degree to which an agent trusts and adheres to the rules of society, particularly the enforcement of contracts, the quality of police and courts, and the potential for crime and violence. Regulatory quality is used to describe a government's ability to formulate and implement sound policies and regulations that enable and promote private sector development. Political stability is used to describe the potential for government destabilization through unconstitutional or violent means, including terrorism. Voice and accountability are used to describe freedom of expression and association, free media, as well as the extent to which citizens have a say in choosing their government.

The data and diagnostic tests

To examine the effect of FR on private investment, annual data over a period 1980–2020 is used. The study period is selected based on data availability for all variables in the empirical model. The data are retrieved from the databases of World Development Indicators, world banks world governance index, IMF's financial development database, and NBE's annual report and different financial policy directives. It is typical to carry out several diagnostic (post-estimation) tests to uphold the model's effectiveness and the consistency of the estimated parameters. Using the necessary test statistics, tests for multicollinearity, normality, serial correlation, functional form, and model stability have been run.

Constructing FR index (FRI)

A composite measure of FRI is used in this study, following Huang and Wang [28] and some lessons taken from Abiad et al. [1], to take advantage on single proxies as in the case of Johansson and Wang [30] and Whalen [60], they used real interest rate and the ratio of net interest income to total interest, respectively, as a proxy for financial repression. A composite FRI is computed using principal component analysis (PCA) for which strong

Table 1 Correlation matrix of FR variables

Variables	RDR	IRR	CAC	LRR	SSS	DL
RDR	1					
IRR	− 0.977	1				
CAC	0.258	− 0.265	1.000			
LRR	0.217	− 0.287	0.090	1.000		
SSS	− 0.974	0.971	− 0.245	− 0.336	1.000	
DL	− 0.222	0.339	0.183	− 0.101	0.198	1.000

Source: Stata output

Table 2 Descriptive statistics for FRI

Variable	Obs	Mean	SD	Min	Max
RDR	41	0.720	0.195	0.500	1.000
IRR	41	0.625	0.325	0.071	1.000
CAC	41	3.768	0.151	3.734	4.427
LRR	41	0.062	0.031	0.050	0.150
SSS	41	0.617	0.349	0.080	1.000
DL	41	0.860	0.137	0.500	1.000

Source: Stata output

conceptual foundation needs to support the assumption that a structure does exist before the factor analysis is performed. A statistically significant Bartlett's test of sphericity (sig. < 0.05) indicates that sufficient correlations exist among the variables to proceed with PCA. It is indeed recommended to see the correlation matrix (Table 1) of the six variables to construct a single FRI. The correlation coefficients are indeed quite high for most pairs of variables.

Table 2 shows the summary statistics of policy variables used to compute FRI. This study adopted broad definitions from [4, 28] to measure all the variables used to compute the FRI. Real deposit rate (RDR) is set to zero if real interest rate is positive and to 0.5 if it is negative but higher than 5% and to 1 if real interest rate is negative but lower than − 5%. This variable has remained negative for the entire period covered in this study as indicated in Table 2. Its range varies from 0.5 to 1.00 with a mean value of 0.72.

The variable interest rate restriction (IRR) is the proportion of types of interest rates subject to government controls. Six categories of interest rates are considered for the purpose of this study. The six IRRs are: a fixed deposit rate, a ceiling on the deposit rate, a floor on the deposit rate, a fixed lending rate, a ceiling on the lending rate, and a floor on the lending rate. The controls are measured by dummies which take the value 1 if a control is present and 0 otherwise. The overall summary of these restrictions varies from 0.071 to 1.000 with a mean of 0.625, indicating that there were policies restricting interest rates in the banking system.

The third variable is capital account control. The Chin-Ito (2006) index is used to proxy this variable. The index is constructed based on the principal component of four variables: the presence of multiple exchange rates, restrictions on current account transactions, restrictions on capital account transactions, and variables that indicate the requirement of the surrender of export proceeds. The Chin-Ito index is there for the principal component of these four components which ranges from − 2.5 to 2.5. On the surface, the more closed the country is indicated by the lower the value of this index. However, this scale is normalized to vary in the range of 0 to 5 by subtracting the Chin-Ito index from 2.5 (i.e., 2.5-index). In this case the more closed the country is indicated by the higher value of this index. As indicated in Table 2, the index varies from 3.734 to 4.427 with a mean of 3.768, indicating that the country has been highly closed for the period covered in this study.

The legal reserve ratio (LRR) is the financial resource that commercial banks cannot lend out by discretion. This is a requirement determined by the NBE. This ratio is set by the NBE's directives with perpetual replacement. This ratio varies from 5 to 15%[5] with a mean of 0.062 as indicated in Table 2.

The share of the state sector (SSS) in total outstanding loans highlights the importance of the state sector in financing. The maximum value for SSS is set 1(100%) in the period if loans are entirely emanated from the state-owned banks, for instance for years from 1980 to 1985, and the minimum is set 0.08 (8%) in the year 2015. The maximum variation of 0.349 (35%) is observed for SSS with a mean of 0.617 (62%). This indicates that the importance of state banks in financing the economy is getting reduced due to the share of private banks in the banking industry of the country.

Directed lending (DL) is the mandatory instructions to banks to allocate a minimum amount of loans to specific

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[5] Reserve requirement-8th replacement Directive No. SBB/84/2022.

Table 3 Principal component factor analysis/correlation for FRI

Component	Eigen value	Difference	Proportion	Cumulative
comp1	3.9208	2.7338	0.6535	0.6535
comp2	1.1870	0.5143	0.1978	0.8513
comp3	0.6727	0.4903	0.1121	0.9634
comp4	0.1824	0.1574	0.0304	0.9938
comp5	0.0250	0.0130	0.0042	0.9980
comp6	0.0120		0.0020	1.0000
Component	Adjusted Eigen value		Unadjusted Eigen value	Estimated Bias
1	3.3176339		3.9207934	0.60316
2	0.83442759		1.1870277	0.3526

Stata output. Two factors retained based on minimum Eigen value of 1

Table 4 Rotated factor loadings (pattern matrix) and unique variances

Variable	Factor 1	Factor 2	Uniqueness	Communality
RDR	− 0.9712	0.0248	0.0561	0.9439
IRR	0.9857	0.0494	0.0259	0.9741
CAC	− 0.3436	0.7608	0.3032	0.6968
SSS	0.9618	− 0.0328	0.0739	0.9261
DL	0.3408	0.7773	0.2797	0.7203

Factor loadings are rotated and normalized by Orthogonal Varimax (Kaiser or Hair method)

Table 5 Diagnostic test results

Tests	Statistics	*p* Value
White's test for: Ho: homoskedasticity	41.00	0.4265
Ramsey RESET for Ho: model has no omitted variables	1.02	0.5088
Breusch–Godfrey LM test for H0: no serial correlation	1.546	0.2137
Model stability (CUSUM & CUSUMSQ)	Stable	

Source: Stata output

beneficiaries. The variable on DL is constructed to indicate the intensity of the program; it is set to 0 when there is no evidence of a directed credit program, 0.75 when the program covers up to 50% and to1 over 50%, respectively, of total bank credit. For example, there was a bond purchase requirement introduced in 2011 by NBE that forced private banks to use 27% of their new loan for government bond purchase with the justification that Private Banks' loan disbursement to long term projects was not more than 20%. The majority of loan was to short term (domestic & international trade) which can maximize profit of private banks. This policy is commonly known as the 27% rule. As indicated in Table 2 with a mean of 0.860 that varies from 0.500 to 1.000, Ethiopia banks were forced to allocate bank loans to purchase government bonds that mature in five years bellow market interest rates.

The only variable dropped from the construction of FRI is the legal reserve ratio (LRR) with the reason that its respective uniqueness exceeds 0.5. The rest six components are used to construct a single FRI using the PCA technique with the advantage that it deals with problems of both multicollinearity and over-parameterization [28]. Measure of sampling adequacy (MSA) values are expected to exceed 0.50 for both the overall test and each

individual variable; variables with values less than 0.50 should be omitted from the factor analysis one at a time, with the smallest one being omitted each time. Communality should be all above 0.5 and uniqueness below 0.5 [27]. All these tests have been conducted and found well above the standards. Results of Horn's Parallel analysis for principal components retain one component or factor. Hair instead uses unadjusted Eigen values and retains 2 factors (Table 3). This analysis proceeds with 2 factors in order only to replicate Hair's or Kaiser's results. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy is found to be 0.855, well above 0.5. The KMO test statistic value of greater than 0.5 indicates that the sample data selected can be used for factor analysis [40] (Table 4).

Diagnostic tests

It is typical to carry out several diagnostic (post-estimation) tests to uphold the model's effectiveness and the consistency of the estimated parameters. The results of tests for Heteroscedasticity, multicollinearity, normality, serial correlation, and model stability are presented in Table 5. The model has separately handled variables having potential for multicollinearity, such as lngdpc, DCP, and Z. Model stability tests were carried out by plotting

Table 6 ADF unit root test results at level and first difference

Variables	Level		First difference		Order of integration
	Test statistics	*p* Values	Test statistics	*p* Values	
PI	− 1.939	0.6342	− 6.251	0.000	I(1)
Lngdpc	− 1.493	0.8315	− 4.198	0.000	I(1)
OPEN	− 2.254	0.4597	− 5.325	0.000	I(1)
Inflation	− 4.871	0.0000	− 8.739	0.000	I(0)
FDI	− 2.038	0.5806	− 8.193	0.000	I(1)
FRI	− 2.434	0.3618	− 5.407	0.000	I(1)
PUI	− 1.041	0.9384	− 3.424	0.010	I(1)
GNS	− 1.237	0.6573	− 7.594	0.000	I(1)
GI	− 2.041	0.2690	− 6.579	0.000	I(1)
Z	− 1.778	0.7150	− 6.245	0.000	I(1)
Error	− 5.117	0.000	− 6.453	0.000	I(0)

Governance index (GI) has been computed using PCA from the six dimensions of world governance index. Z is a dummy variable created to capture structural break on the year 2011, a dummy = 1 after 2011, 0 otherwise. Estimate of governance based on perceptions on various indicators (ranges from approximately − 2.5 (weak) to 2.5 (strong) governance performance). Error is the residual estimated from robust OLS regression

Table 7 Johansen's cointegration test

No. of cointegration vectors	Trace test		Maximum Eigen value test	
	Statistics	5% critical value	Statistics	5% critical value
None (0)	238.09	156.00	59.58	51.42
At most (1)	178.51	124.24	53.66	45.28
At most (2)	124.85	94.15	42.67	39.37
At most (3)	82.18	68.52	40.18	33.46
At most (4)	41.99*	47.21	23.30	27.07
At most (5)	18.70	29.68	12.09	20.97
At most (6)	6.61	15.41	6.42	14.07
At most (7)	0.19	3.76	0.19	3.76

The null hypothesis for the number of cointegrating vectors (*r*) is that r = 0, r < = 1, r < = 2, r < = 3, r < = 4 and so on. Reject the null when statistics > 5% critical values, and accept the null when statistics < 5% critical values

CUSM and CUSMSQ, which both indicated that the estimated models are stable over the sample period. It is found that the CUSUM test is essentially a test for instability in the intercept and the CUSUM of squares test is essentially a test for instability in the variance of the regression error [55].

Empirical results and discussion

Unit root test for stationarity

The Augmented Dickey–Fuller (ADF) unit root test was conducted for all the time series used for the study. Table 6 shows the result of unit root tests using the ADF unit root test at levels and first difference. This test has two versions, one with an intercept and another with a trend. The null hypothesis of non-stationarity is performed at the 1% and the 5% significance levels. The ADF test result illustrates that all the data series are non-stationary at level except inflation. However, the result of the ADF test on the first difference strongly supports that all data series are stationary at the 1% or 5% significance levels. The ADF results show mixed order of integration of the variable series, I (1) and I (0).

Cointegration tests

There are numerous methods for determining whether a model has appropriate cointegration properties. Ahead of describing the preferred methods, it is better to follow some steps. Firstly, residuals from OLS estimates of the supposed long-run relationship can be used to detect cointegration. If the residuals are I (0),

or stationary, the model is cointegrated, and a valid long-run relationship exists between the variables. The ADF test result on the errors estimated from the robust OLS regression result shows that it is I (0), suggesting long-run relationship between the variables. Secondly, the Johansen cointegration test is applied, where the Schwartz information criterion is used to determine the lag length, and the result is found in Table 7. The trace and maximum Eigen value statistic identifies a significant cointegration relation at a 5% level of significance. Both statistics suggests that more than four cointegrated equations are existed in the model. In conclusion, this result indicates that a long-run cointegrating relationship exists between private investment and explanatory variables. Therefore, the prerequisites are well satisfied to proceed with the DOLS estimator.

As the long-run association among variables is prevailed with cointegration tests, the long-run DOLS model is estimated (Table 8). The DOLS results are the center of discussion, while SOLS's and ECM results are indicated just to visualize across models. Due to multicollinearity issue with lngdpc, DCP, FRI and Z, one can see that FRI enters insignificant while estimated with these variables (column2). However, when variables entered independently in the model, the result indicated that the effect of financial repression (FRI) on private investment in Ethiopia is negative and statistically significant (see columns 3 & 4). Results show that the government of Ethiopia has been using FR policies, including real deposit rates (RDR), interest rate restrictions (IRR), capital account controls (CAC), legal reserve ratios (LRR), shares of the state sector (SSS), and directed lending (DL), among others, as a way to reduce domestic debt and direct savings to priority uses. Ideally, these measures have been used with the

Table 8 SOLS and DOLS estimation results

Variable	SOLS Coef. (SE)	DOLS Coef. (SE)	DOLS Coef. (SE)	DOLS Coef. (SE)	DOLS Coef. (SE)	ECM Coef. (SE)
Lngdpc	3.508** (1.276)	3.508** (1.707)		5.32*** (1.765)	4.270** (1.677)	
OPEN	−0.154*** (0.054)	−0.154*** (0.070)	−0.199*** (0.066)	−0.249*** (0.068)	−0.273*** (0.071)	−0.189** (0.072)
FDI	107.21 (68.70)	107.21 (71.83)	158.83** (69.37)	218.67*** (70.48)	50.780** (66.998)	1.060 (84.65)
FRI	−4.076** (1.705)	−4.076 (2.554)	−5.513*** (1.761)	−8.789*** (1.348)		−4.983** (2.349)
DCP	0.066 (0.173)	0.066 (0.205)			0.304** (0.141)	
Z	10.583*** (2.085)	10.58*** (3.336)	12.51*** (3.072)		14.298*** (2.259)	7.00** (3.178)
GI	0.388 (0.500)	0.388 (0.633)	0.800 (0.618)	0.557 (0.702)	0.265 (0.524)	2.207** (0.996)
Inflation	−0.112** (0.042)	−0.112** (0.051)	−0.091* (0.051)	−0.117** (0.057)	−0.119*** (0.043)	−0.047 (0.045)
Error *						−826*** (0.179)
_cons	−14.259 (9.103)	−14.259 (11.40)	1.082 (7.40)	−30.34*** (8.979)	−19.465** (9.117)	0.369 (0.639)
No. of obs	41	41	41	41	41	40
R^2	0.92	0.90	0.90	0.88	0.90	0.61

*Error is the lagged residuals from the long-run OLS model used as a regressor. PUI & GNS are omitted from the model due to their high correlation between and with other variables in the model

assumption that to counteract the nation's weak economies, promote economic expansion, and lower unemployment. However, in reality, these policies have been utilized to take a sizable chunk of the financial system's resources and use them to fund the public sector at prices below market, which has historically resulted in substantial opportunity costs for private investors.

This result is supported by [13, 39, 51] that such engagement policies are never optimal because they crowd out productive investment by banks [12]. When FR results in negative real interest rates and decreases or settles current debts (public and private), it represents a transfer from creditors (savers) to borrowers [11, 45]. The FR framework of Ethiopia has contributed to the accumulation of significant macro-financial imbalances [13], the government has used it to manage its monetary and forex policy and finance significant infrastructure projects and state-owned enterprises (SOEs) [61], and the weak and ineffective state-dominated banking system was a major barrier to investment and subsequently to economic progress in Ethiopia.

The impact of financial development (FDI) on domestic private investment is the second significant factor that merits discussion. The results under column 2 are not trustworthy because there is a strong correlation between structural break (Z) and lngdpc (0.842), as well as between FRI and domestic credit to the private sector (DCP) (−0.909). If you look at the DOLS result (columns 3 and 4), you'll see that FDI has a positive and statistically significant impact on private investment in the nation. This indicates that a more accessible, efficient, and outward-looking financial system would generate domestic capital for the private sector. The result collaborates

the argument by Andersen and Tarp [6] that financial development can be expected to act as engine of growth in the development process in favor of a more cautious approach to financial sector reform.

Private investment in Ethiopia is positively impacted by per capita GDP and domestic credit to the private sector, both of which are statistically significant. The former shows that higher income nations are better equipped to devote funds to saving that would be diverted to the private sector in an open market. This capability is particularly important in light of the limitations of the capital markets and the apparent requirement to fund the majority of investment projects, at least in part, through domestic savings. For the latter, the results show that nations that have enabled the private sector to play a bigger part in the investment process can be successful in increasing general savings levels and, consequently, private investment. Both results are supported by [2, 22, 49, 59].

Trade openness (OPEN) is proven to have a negative and statistically significant impact. The outcome goes against neoclassical theory, which claims that trade openness has several advantages in terms of efficiency, technology transfer, economies of scale, and idea propagation through cross-cultural interaction [19]. Contrarily, the finding shows that competition resulting from trade openness may reduce investment returns and stifle innovation. While exports usually deal with highly uncertain foreign markets, imports compete with the underdeveloped domestic sector.

The effect of institutional quality as proxied by world governance index (GI) is found to be positive but insignificant in affecting private investment in Ethiopia. While

the effect of inflation is negative and significant across DOLS models estimated. This result indicates that inflation makes longer-term investment projects riskier, shorten the average maturity of commercial credit, and skew the informational value of comparable pricing. Besides, high inflation rates are also frequently viewed as a sign of macroeconomic instability and a nation's incapacity to manage macroeconomic policies, both of which have a negative impact on investments. The results are found consistent with [2, 7, 26] that Macroeconomic uncertainty exerts a negative influence on the investment climate in the private sector.

In order to identify potential structural breaks (Z) in the data for the year 2011, a dummy variable equal to 1 for the periods since 2011 and 0 otherwise was created. As anticipated, structural changes undertaken since 2011 have had a beneficial and considerable impact on private investment in Ethiopia through infrastructure development in the long-run. With the intention of transforming the country from an agriculture-led economy to an industrialization-led economy, and from rural to urban-based economic transformation, and to achieve its goal of becoming a middle-income country by 2025, the Ethiopian government continues to support the structural changes of the economy as outlined in the growth and transformation plan (GTP). Ethiopia's GTP1 (2010–2015) and GTP2 (2015–2020) (GTP2) have prioritized attaining the Millennium Development Goals, delivering broad-based development, and eliminating poverty [14]. Over the past ten years, significant public sector investment has been the primary engine of growth. About 70% of Ethiopia's public investment has a pro-poor theme, with a concentration on commercial agriculture and infrastructure in particular. The country has reportedly invested an estimated US$75 billion in infrastructure development, which is supported by the GTP II [3].

In 2018, the nation spent 39% of its GDP on road and rail building, machinery acquisitions, and land improvements. According to Deloitte's 2019 prediction, the country's gross fixed capital formation (GFCF) would reach 38.3% by 2023. Numerous jobs have been created as a result of the tremendous increase in building activity, which includes large infrastructure projects like new roads, trains, and hydroelectric facilities as well as major residential and commercial developments. The GTP has allegedly generated roughly 1.6 million jobs through small and medium-sized businesses since 2011. However, the private sector might provide considerably more in the future due to the nation's low production costs, which include manpower. Between 2011 and 2018, real urban earnings rose by about 7% on average. Rural per capita consumption increased by just 1% year on average between 2011 and 2016 [61], notwithstanding the

tremendous growth of the agriculture sector. Urban per capita consumption increased by 6% annually throughout the same time period. About 2% annually was the national average. Still, wage data tell only a minor part of the story as only one in 10 employed people work for wages. Ethiopia remains an economy in which a large supply of labor is competing for few jobs [47]. Thus, all these changes are believed to be the results of the structural changes made since 2011 in the GTP1 & GTP2.

Conclusion

Ethiopia's monetary and foreign exchange policy framework has relied on some standard FR tools. These FR policies can be expressed in terms of central bank financing of the government, a state-dominated banking sector, mandatory financing of priority projects and directed credit, administered interest rates, a captive domestic market for government debt, high liquidity and capital requirements, and strict foreign exchange controls, among others. Thus, this study empirically test the effects of such FR polices on the private investment of the country over the period 1980–2020. The DOLS estimation result revealed that FR policies negatively affect private investment in Ethiopia. This indicates that such policies were used to fund the public sector at prices below market, resulted in substantial opportunity costs for private investors by crowding-out productive investment by banks. Even though structural reforms implemented since 2011 have only slightly improved efficiency and competitiveness, Ethiopia's framework for managing its monetary and foreign exchange has led to the build-up of large macro-financial imbalances.

In order to address these imbalances, additional market-oriented macro-financial framework is urgently needed to strengthen the sector's role in mobilizing domestic credit and foreign exchange to their best use. Thus, the country has to do more to set up many of the requirements for a competitive private sector that might aid in the development of a vibrant industrial nation. One way to improve domestic resource mobilization, private sector competition, and economic efficiency is to lessen the crowding-out effect of the financial repression measures imposed by the government. The government will gain more from the following actions: gradually consolidating public finance (privatizing state-owned commercial banks); overhauling public financial institutions; issuing marketable government securities; introducing indirect instruments of monetary control; improving the coordination of fiscal and monetary policies; reducing the overvaluation of the birr (ETB); and enhancing the regulatory and supervisory capacity of the NBE to facilitate efficiency in the banking industry. Such monetary

and fiscal adjustments will enable the aggregate domestic price level to be stabilized by a suitable monetary policy decision without turning to direct price controls.

Abbreviations

FR   Financial repression index
REER   Real effective exchange rate
DOLS   Dynamic ordinary least square
SOLS   Static ordinary least square
ECM   Error correction model
SOEs   State-owned enterprises
NBE   National bank of Ethiopia
CBE   Commercial bank of Ethiopia
FRI   Financial repression index
GDP   Gross domestic product
FDI   Financial development index
CAC   Capital account control
GI   World governance index
MSA   Measure of sampling adequacy
GNS   Gross national saving
PUI   Public investment/government spending
CPI   Consumer price index
PCA   Principal component analysis

Availability of data and materials
The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

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Not applicable.

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Competing interests
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