

Addis Ababa University
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**The Impact of COVID-19 on the Performance of the
Financial Sector: The Case of Private Commercial Banks in
Ethiopia Thesis**

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ABSTRACT

The outbreak of a new strain of Coronavirus, now known as COVID-19, which has been classified as a global pandemic by the World Health Organization (WHO), has frightened the world. One aspect of the economy that is hit hard by the pandemic and its resultant outcome is the service sector. In Ethiopia, the financial sector faced a challenge by slowing the market, in particular by stalling its economic growth. This paper aims to examine the impact of covid-19 on the performance of the private commercial banking sector in Ethiopia concerning its key performance indicators. Mainly banking performance in return on investment, assets, and net interest margins. This study used DiD model to analyze the data obtained in the study. The DID analysis was employed to assess private banking sector growth in main indicators of performance before (2014-2018) and after Covid (2019-2021). The results indicate that the DiD estimation model shows that the pandemic affected ROA and ROE negatively. However, the impact was not statistically significant during the study period. The other factor is NIM. In this factor, although it was affected positively the level of significance is low. Thus, it can be concluded that the pandemic has not affected the performance of the private commercial banks during the study period in a meaningful way. But the government is recommended to highly follow up on the banking financial sector to sustain shocks in the economy. This will lead to a sustainable economic outcome and growth for the private financial sector.

Keywords: *Private Banks, Covid Impact, return on investment, return on assets*

ACRONYMS

NBE - National Bank of Ethiopia

MERS - Middle East Respiratory Syndrome

MSME - Micro, Small, and Medium-sized Enterprises

OECD - Organization for Economic Co-operation and Development

GDP - Gross Domestic Product

GTP - Growth and Transformation Plan

ROA - Return on Asset

ROE - Return on Equity

WB -World bank

WHO- World Health Organization

SARS - severe acute respiratory syndrome

UNDP - United Nations Development Programme

Chapter one: Introduction

1.1 Background of the study

The globe has been shocked by the outbreak of a brand-new strain of Coronavirus, now referred to as COVID-19, which has been categorized as a worldwide pandemic by the World Health Organization (WHO). Since the declaration of COVID-19 as a global pandemic on 11 March 2020, followed by the announcement of worldwide lockdowns, all financial and non-financial sectors have been in shock (Baig et al. 2021). This pandemic has affected countries all over the world. To control the spread, governments enacted mitigation strategies based on travel restrictions, lockdowns, social distancing, and shutdown of non-essential businesses (Demirgüç K. et al., 2021). However, the lockdowns hurt all macroeconomic indicators (e.g., unemployment rates, and inflation rates) and deteriorated the liquidity and stability of stock markets (Zhang et al. 2020).

The outbreak of COVID-19 triggered a huge financial shock wave and adversely affected the financial market. Financial institutions such as the banking sector have suffered an immediate exogenous shock (Elnahass, M. et al., 2021). Due to the slowdown in economic activity and the closure of businesses, businesses faced a liquidity crisis and were unable to repay bank debts. Small and medium businesses, in particular, were unable to survive for long before defaulting or having to renegotiate bank loans. The financial industry was put to hardship when a substantial number of enterprises were unable to repay their bank debts. The financial industry would have imploded if it had not been backed by an adequate strategy (Degye G. et al., 2020). This economic recession caused by COVID-19 threatens bank profitability, reduces bank income, and causes losses due to borrowers' inability to repay (Perkins, D. et al., 2021).

Since the 2008 financial crisis, the COVID-19 epidemic has posed the worst challenge to the worldwide economic system. The financial set-up is faced with the twin issue of maintaining financial resiliency while also maintaining the flow of funding to the particular economy. The COVID-19 shock has put a significant strain on the worldwide economic system (FSB, 2022).

Much as the virus is affecting many aspects of life, the primary victim seems to be the economy. Although economic gurus are still struggling to understand the channels and magnitude of the

impact of the virus on the global economy, it has become glaringly visible that the spread of the virus has put more pressure on the service sector, specifically the financial sector. This paper aims to analyze the impact of COVID-19 on the key performance indicators of the private commercial banking sector. In light of what might transpire in Ethiopia, this thesis will give some insights into the impact of the pandemic on the financial sector, specifically on the private banking industry.

1.2 Statement of the problem

The global COVID-19 epidemic is a singular disaster. The world's bounds and realities collide with the uncontrolled spread of human activity, and this is the strongest indication of what occurs when it does. Ethiopia, on the other hand, was exposed to considerable danger after contracting COVID-19. The macroeconomic and development situation was difficult, as evidenced by a slowing but still strong expansion, the risk of debt distress, low levels of domestic capital mobilization, high inflation, and high unemployment, particularly by low forex reserves, and significant pressure on the Birr's exchange rate (UNDP, 2020).

One aspect of the economy that is hit hard by the pandemic and its resultant outcome is the service sector. In Ethiopia, this added a considerable reduction in service sector earnings, growth, and jobs. Noting that the service sector contributes over 45% of GDP, the impact of such reductions on the larger economy will not be small. With a lesser magnitude, manufacturing has also been affected (Alemu, 2020).

The financial sector is assumed to face a challenge by slowing the market, in particular by stalling its economic growth. Much of the short-term portfolio financing of banks go to the merchandisesector. This remains one of the economicallybeneficialportions of their trade. As such, a slowdownwithin theoutside tradable segment of the economy puts weight on financialinstitutions. On the other hand, the expandingcost of living and higher healthcare costs will also mean lower savingsattending to the bankingsector. No question that this will include the pain the sector has been feeling from the liquidity crunch, generally caused by the incrediblyhighloan-to-assetratio (Alemu, 2020).

The National Bank of Ethiopia's (NBE's) injection of 15 billion birr into the financial system helped banks to reschedule loan maturities and payments with their customers. Nevertheless, this liquidity is unlikely to make its way into a large number of micro-, small-, and medium-sized

enterprises (MSMEs) that operate in the informal sector and account for much of employment and self-employment as these sectors do not use the banking sector. COVID-19 reduced Ethiopia's main sources of foreign exchange earnings such as exports of goods (e.g., flowers, textiles), services (e.g., tourism receipts), remittances, and foreign direct investment (FDI) (UNDP, 2020).

Banks play a crucial role in facilitating international trade, especially in developing countries. Exporter and remittance provide foreign currency for banks, which, in turn, facilitate the demand for foreign currency for importers. Banks also provide credit facilities with a higher discount rate for export to expand productivity to increase export earnings. This in turn affects the BOP of the country. As most of the foreign currency generated by commercial banks comes from these two main roots, the banks are expected to be impacted highly by the shortage of foreign currency.

The controlled float of the birr will be put under strain as forex flows decrease. However, the rate of depreciation may be higher depending on global and regional conditions and external account pressures. The drop in global commodity prices and overall worldwide demand is projected to reduce inflationary pressures that may arise as a result of the exchange rate depreciation, reducing but not removing the impact on the poor and vulnerable (UNDP, 2020). The current managed rate may come under considerable pressure with the chances of widening the gap between the official and parallel markets, a distinct possibility that will require careful monitoring and policy action.

Limited studies conducted on the issue, tried to identify the effect of COVID-19. Among these studies, Lelissa (2020) and Mesay (2021) studied the impact of COVID-19 on the Ethiopian private banking System. The findings of Lelissa (2020) showed that after Covid-19, the banking industry will be strengthened by the growth of new banking products such as E-commerce, digitalization, e-banking, and consulting services. The future will be dominated by the internet and digitalization. To accommodate such changes and speed up the recovery process, comprehensive reform and financial sector restructuring programs should be considered. Mesay (2021) mostly focused on the operational gaps and impacts the banking industry faced by Covid-19. The study indicated that the pandemic affected main banking operations such as deposit mobilization, foreign currency generation, loan disbursement, and collection (Alemayehu, 2021). The study concluded that Covid highly affected day-to-day operation activities which impacted

the income of private commercial banks. But all the literature lack impact of Covid on a key performance indicator (KPI) of private commercial banks. The studies also lack in capturing the impact of Covid-19 on the banking sector using the latest data. Most of the studies only have an impact up until 2020. To fill this gap, this paper aims to examine the impact of covid-19 on the performance of the private commercial banking sector in Ethiopia.

1.3 Research Objective

The research is aimed to examine the impact of COVID-19 on the performance of private commercial banks in Ethiopia.

1.4 Research question

- How does covid impact the performance of the banking sector in Ethiopia?
- How does Covid-19 affect the Key Performance indicators of private commercial banks in Ethiopia?
- What products and services of the banking sector were affected by the pandemic?

1.5 Significance of the study

This study is relevant to the government in the sense that, it provides inputs for a policy that will redress the impact of COVID on the financial sector performance. The study is also relevant to the banking industry participants as it shows the true magnitude of the impact of Covid-19 on the banking sector's ability to perform more and the bank's earnings. Academically the study fills some gaps that exist in the understanding of the financial industry's linkage through the impact of Covid-19 that hindered the movement of service sectors, especially the banking sector.

1.6 Scope and limitation of the study

In Ethiopia, there are currently twenty-one commercial banks, from which a survey of sixteen had been chosen. All of the banks chosen were Ethiopian private commercial banks that have served for more than five years. Banks like Hijra bank, Zemez, and Sinqee bank were omitted. Assessing the selected banks will capture the contribution of the private sector in the financial sector. Apart from peer banks, they have the lion's share of deposit mobilization and accessibility throughout the country. The long-term effects were not included in this analysis due to the short period allotted to the research in assessing COVID-19's impact including data collection from the

field. However, the researcher will try to make some predictions based on the results of the study.

1.7 Organization of the study.

There are Five chapters in this study. The first chapter makes up the concept relevance and main research questions of this study. The literature review chapter is the second chapter. Theoretical and empirical literatures are examined in this chapter. The method will be explained in the third chapter. The fourth chapter discusses the finding and its implication. The fifth chapter has a summary of findings and recommendations.

Chapter two: Literature review

2.1 Theoretical literature reviews

2.1.1 Banking sector and related theories

Because banks play such an important role in a country's financial stability, most governments regulate them heavily. The majority of nations have established a fractional reserve banking system, in which banks keep liquid assets equivalent to only a part of their current obligations. Banking as we know it today began in the 14th century in the rich towns of Renaissance Italy, but it was in many respects a continuation of ideas and conceptions of credit and lending that originated in the ancient world. As a result, the banking system plays an important role in the daily lives of individual households as well as the global economy (Alemayehu, 2021). There are three primary banking theories. Each theory are discussed in the following paragraphs.

The financial intermediation theory of banking: The financial intermediation theory of banking, among others, is the prevalent theory today. It claims that banks are nothing more than financial intermediaries, similar to other non-bank financial institutions, in that they raise deposits and lend them out (Alemayehu, 2021). Banks have been receiving deposits from consumers and lending to businesses in need of money. Insurance, particularly maritime insurance, has a long history as well. Financial markets, on the other hand, have just lately become significant, mainly in a few nations, principally the United Kingdom and the United States. Even there, banks and insurance firms have played a significant role in the translation of family savings into real-estate investments (Franklin Allen, Anthony M. Santomero, 2011).

These theories of intermediation are based on resource allocation models based on perfect and full markets, implying that frictions such as transaction costs and asymmetric knowledge are crucial to understanding intermediation. Many researchers like Gurley and Shaw (1960), have emphasized the importance of transaction costs. Fixed asset evaluation expenses, for example, provide intermediaries an advantage over individuals since they may be pooled. Similarly, trade expenses allow intermediaries to diversify more easily than individuals (Franklin Allen, Anthony M. Santomero, 2011).

Credit creation banking Theory: - Whilst most textbooks discuss the money multiplier theory of credit creation, there is limited consideration within academic textbooks of the credit creation theory of banking. However, the Bank of England recently issued a paper that recognizes the credit creation theory of banking as a useful theory for understanding the process of money creation (Ryan-Collins, 2011).

Individual banks may generate money, according to the credit creation theory of banking, and banks don't just lend out deposits. As a result of bank lending, the bank produces bank deposits. As a result, a bank's ability to create money is not limited by its deposit-taking operations, and bank lending generates fresh purchasing power that did not exist before. Because bank loans (the asset side of the balance sheet) and client deposits are reduced as a result of debt repayment, money is destroyed. The requirement for banks to stay profitable restricts their lending activities. Interest collected on loans exceeds interest charges on bank obligations, resulting in bank profitability (which includes the interest paid on money deposited at the bank, interest received by bank bondholders, and dividends to bank shareholders). The difference between interest collected on bank loans and the bank's cost of capital is then used to pay the bank's cost

provisions for bad and doubtful debts, as well as operational costs, leaving bank profit. Rapid growth in bank lending will necessitate a reduction in the interest rate offered to borrowers, lowering bank profitability. A bank must also ensure that it has sufficient provisions and capital to cover unanticipated losses arising from bad and doubtful debts, whilst also meeting regulatory requirements (Maurice Starkey, 2018).

2.1.2 key performance indicators in the banking sector

According to the performance literature, assessing performance is an essential component of every organization, whether private or public. As a result, a performance measurement system shows whether or not the company is on pace to meet its objectives. Organizational and personnel performance are generally evaluated using performance metrics.

Roberts (2004) referenced in BOUWENS (2007), organizations gravitate toward organizational structures in which business unit managers have power over operations and strategy to encourage speedy and relevant decision-making. According to the firm's organizational architecture, several performance indicators are thought to play varied and unique functions in evaluating the success

of business unit managers. The majority of banks in each of these countries have implemented branch organizational systems. As a result, how branch performance is regulated and measured is crucial.

The issue of appropriate performance measures is thus crucial to consider, not only because it can affect banking firms' commercial success, but also because, in the current economic climate, many banking firms will be looking for appropriate information about their internal activities or processes to help them make sound decisions that are in line with their owners' interests.

Various kinds of literature use different bank performance proxy measurements. Most banking literature, such as Rao & Tekeste (2012), and Athanasoglou, et al., (2006), used two or all of the three alternative measures (ROA, ROE, and NIM) to investigate the factors that influence the bank's performance. All three traditional indicators of profitability are examined in this study using annual accounting data, which is identical to the method used by (Ameur and Mhiri, 2013). Each metric examines a different area of bank profitability (Athanasoglou, et al., 2006).

ROA is one of the major ratios that indicate the profitability of a bank and it has emerged as the key ratio for the evaluation of bank profitability and has become the most common measure of bank profitability in the empirical literature Rao & Tekeste (2012). It measures the ability of a bank's management to generate income by utilizing the company assets although it may be misleading due to off-balance-sheet activities (Athanasoglou, 2006).

The other financial ratio to measure the bank performance is ROE which reflects how much profit a bank earned compared to the total amount of shareholder equity invested or found on the balance sheet and it measures how effectively bank management is using shareholders' funds. The ROE is defined as the ratio of net profits to total equity. A business that has a high return on equity is more likely to be capable of generating cash internally. Thus, the higher the ROE the more effective the management in utilizing the shareholder's capital and the better the company is in terms of profit generation. ROE is the product of ROA and assets-to-equity ratio (equity multiplier that measures financial leverage). Essentially the ROE–ROA relationship clearly illustrates the fundamental tradeoff that banks face between risk and return, whereas the equity multiplier reflects the leverage or financing policies, i.e. the debt-equity proportion that the bank management used to fund the bank (KASSA, 2013).

Finally, the NIM variable focuses on the profit earned on interest activities. It is defined as the net interest income divided by total earning assets which contained Deposits with foreign Banks, Treasury Bills, Other Investments/bonds, Sundry Debtors & Other debit balances, and Total Loans Advances. It measures the difference between the interest income generated by banks and the amount of interest paid on borrowed funds, relative to the amount of their (interest-earning) assets. It means that NIM measures the gap between the interest income the bank receives on loans and securities and the interest cost of its borrowed funds concerning the average amount of the assets on which earned income is generated in that period. While the ROA measures the profit earned on assets and reflects how well bank management uses the bank's real investment resources, the NIM focuses on the profit earned on lending, investing, and funding activities. It reflects the cost of bank intermediation services and the efficiency of the bank (KASSA, 2013).

Additionally, other performance indicators like efficiency ratio, loan-to-deposit ratio, earning asset yield, revenue, and expense. The efficiency ratio is a ratio of non-interest expenses divided by revenue. This shows how well the bank's managers control their overhead (or back office) expenses. Loans/Deposits Ratio (LDR) expressed as a percentage, LDR is used to assess a bank's liquidity by comparing a bank's total loans to its total deposits for the same period. If the ratio is too high, it means that the bank may not have enough liquidity to cover any unforeseen fund requirements. Earning asset yield is a popular financial solvency ratio that compares interest income to its earning assets. The yield on earning assets indicates how well assets are performing by looking at how much income they bring in. Revenue is all incoming cash flow (White, 2022). For banks, you might break down your total revenue by deposit interest, loan interest, service fees, and transaction fees. Expenses are all costs incurred during bank operations. Expenses are usually tracked separately in two categories: interest and non-interest.

A KPI provides the most important performance information that allows organizations or their stakeholders to evaluate whether or not they are on track. It reduces the complex nature of organizational performance to a small number of important indicators, making it easier to understand for employees (Sutoyo. A, 2011). In the banking sector, there are key major operational performance indicators. Those are deposits, foreign currency, outstanding loans, NPL, and customer base. These indicators are used to measure and monitor the banking operation that is planned and monitored. This key element helps with achieving the banks'

profitability and sustainability of the business. These KPIs also help with the banks' share in the market.

2.1.3 Concept of the pandemic

The phrase pandemic is derived from the Greek phrase 'pandemos,' which translates to "everyone." Demos refer back to the public. Everyone is known as Pan. According to Dr. Mike Ryan, 'pandemos' is a concept wherein it's miles believed that the entire world's populace could be uncovered to this ailment and that a share of them could come to be ill (Howard, 2020). Pandemics are large-scale outbreaks of infectious infection that can reason fundamental economic, social, and political upheaval at the same time as additionally growing infection and mortality throughout a massive geographic area. Evidence suggests that pandemics have come to be much more likely during the last century because of improved worldwide tour and integration, urbanization, land use changes, and growing exploitation of the herbal environment (Jones et al., 2008). These tendencies in all likelihood will keep and could intensify. Significant coverage interest has targeted the want to become aware of and restrict rising outbreaks that would result in pandemics and to make bigger and preserve funding to construct preparedness and fitness capacity (Smolensk et al., 2003).

The worldwide community has made development towards getting ready for and mitigating the effects of pandemics. The 2003 excessive acute respiration syndrome (SARS) pandemic and developing issues approximately the hazard posed by avian influenza led many nations to plot pandemic plans (Achon et al., 2005). Delayed reporting of early SARS instances additionally led the World Health Assembly to update the International Health Regulations (IHR) to compel all World Health Organization member states to satisfy particular requirements for detecting, reporting on, and responding to outbreaks (WHO, 2015). The framework placed into location through the up-to-date IHR contributed to a different coordinated international reaction throughout the 2009 influenza pandemic (R., 2009). International donors additionally have started to put money into enhancing preparedness thru delicate requirements and investments for constructing fitness capacity (Wolicki et al., 2016).

Despite these advancements, global pandemic preparation still has considerable gaps and problems. Progress toward achieving the IHR has been inconsistent, with several nations failing to achieve fundamental compliance standards (Fischer J E, Katz R., 2013). Multiple outbreaks,

most notably the Ebola epidemic in West Africa in 2014, have shown deficiencies in disease identification, basic treatment, contact tracing, quarantine and isolation measures, and preparations beyond the health sector, including global coordination and response mobilization (Moon et al., 2015). These gaps are particularly obvious in resource-restrained settings and feature posed demanding situations at some point of noticeably localized epidemics, with dire implications for what may also appear at some point of a full-fledged worldwide pandemic (Madhav, 2017).

2.1.2 Theoretical concept of impact assessment

The methodologies suited for impact assessment must be determined by two factors: first, what the impact assessment is attempting to achieve, and second, the data and other resources available. The assessment of long-term and/or substantial changes brought about by a development intervention or sequence of initiatives is known as impact assessment. It may be done with a variety of tools, techniques, and approaches. Impact assessments are always more concerned with change and paths to change than with activities or deliverables (Simister, 2017).

The meaning of impact evaluation differs depending on how the impact is defined. For example, some define impact narrowly, only including long-term changes in the lives of targeted beneficiaries. Others use wider definitions that also include changes in areas such as policies or capacities. However, there is generally broad agreement that an impact evaluation involves a few features that distinguish it from other kinds of evaluation. An impact evaluation would normally be expected to cover all of them (Stern, 2015).

Ultimately, an impact evaluation should be undertaken when there is a clear need for the findings and a clear plan for how to use those findings, and when it is judged that the extra costs are matched by the potential benefits. An impact evaluation should not be undertaken when the purposes could be served by quicker or cheaper alternatives. Impact evaluations should therefore be reserved for interventions where they are most likely to be useful (Rogers, 2012).

2.1.3 Approaches to Impact Assessment

There is no single method that can be used for all impact evaluations. The most common methodologies can be roughly categorized into four types. It's worth noting, though, that there's typically a lot of overlap between these four categories. Furthermore, many impact evaluations combine several of the categories.

2.2 Empirical Literature Review

2.2.1 Covid and the global banking sector

Governments used mitigation methods based on social distance, national quarantines, and the closure of non-essential enterprises to slow the spread of the new COVID-19 (Borio, 2020). The economic slowdown hit the business sector hard, forcing it to hunt for funds to meet operational costs as a result of the revenue deficit. The financial sector, especially banks, is likely to play a critical role in absorbing the shock by providing much-needed capital (Acharya et al., 2020). Central banks and governments implemented a wide range of policy measures in response to these unusual conditions. While some measures aimed to reduce the sharp tightening of financial conditions in the short term, others aimed to support the flow of credit to businesses, either through direct credit market intervention (e.g., government-sponsored credit lines) or indirect credit market intervention (e.g., government-sponsored credit lines and liability guarantees) or by relaxing banks' constraints on the use of capital buffers (Asli et al., 2020).

Countries all around the world have responded with unprecedented, coordinated policy responses such as aggressive and quick responses, yet there is a legacy getting established for fiscal policy actions that resulted in larger deficits and public debt in emerging financial markets. Further unorthodox monetary policy responses have included a backup for financial markets as well as ensuring credit availability to families and enterprises in developed nations. Developing countries and countries with emerging capital markets are also cutting rates. Other regulatory measures taken are to support the flow of credit to the economy, mitigate operational and financial risks for the banking system, and increase operational capacity to respond to the short financial stability priorities (OECD, 2020).

From the measure taken to reduce the impact, the monetary policy has been shown to lower financial tensions and help financial stability in all markets. The negative impact of the policy response on the banking sector is also seen in the interest rates. The banks must have lower longer interest rates that impact the income and profitability of the banks. Some incentive like credit guarantee has helped banks in burden sharing. This will dramatically decrease the burden of income loss. This still hinders banks in lack of visibility of financial health as the regulatory organs cover it (OECD, 2020).

When it comes to the impact faced by early Covid, the cost-income ratio of banks in the emerging market was slightly better than in the developed markets. The emerging market has anticipated higher losses from loan provision compared to the developed market. The profitability of banks in an emerging market has been measured to be much higher compared to developed markets. Also in recent data, the profit of these developed nations has declined. Customer deposits have increased in most countries, both developed markets and emerging markets. Despite the loan guarantees put in place by governments in numerous nations, deposits have increased significantly faster than loans in every case. Since December 2019, liquid assets, particularly cash, have been hoarded, bucking a trend that began last year (OECD, 2020).

In conclusion, the developed markets have sped up the recognition of loan-loss provisions in the first half of 2020 in anticipation of the expected deterioration of economic activity due to the COVID crisis. On the other hand, emerging markets have shown a sluggish recognition of loan-loss provisions so far. The rise in nonperforming loans (NPLs) is unavoidable, and banks in these nations may be unprepared. There will be significant hurdles ahead (OECD, 2020).

2.2.2 Covid Vs. Ethiopian banking sector

The COVID-19 epidemic is wreaking havoc on the world's social and economic systems. Between the first reported case in December 2019 and 10 August 2020, the virus infected over 20 million people and killed over 730,000 people throughout the world (WHO, 2020). Countries have implemented varying degrees of reaction measures, including limits on people and activities' mobility, to prevent the virus from spreading further and to limit the pandemic's potential long-term economic effects. While these restrictions are likely to slow the virus' transmission, they are also predicted to have severe direct and indirect economic consequences. As a result, the global economy is witnessing an unprecedented slump, as reaction actions, such as partial or complete economic shutdowns, harm both local and global value chains at the same time. Ethiopia, like the rest of the world, is suffering from COVID-19's humanitarian and economic consequences. In the absence of policy measures, the Ethiopian economy is anticipated to lose between 2.2 and 2.7 percent of its annual GDP through the three external effect channels during the 3-month slowdown, relative to a no-COVID environment. With the same degree of direct influence on the channels studied, these effects are expected to rise linearly as the duration of the shock increases. If the pandemic-related disruptions persist for six months, the GDP cost

of the epidemic may climb to between 4.3 and 5.5 percent. Given the original GDP growth forecast for the Ethiopian economy for 2020 of 6.3 percent, yearly growth for the Ethiopian economy in 2020 is expected to be 6.3 percent which will remain under shock (Emerta Et al., 2020).

The banking industry is one of the most heavily impacted industries by the epidemic. The banking industry has been enjoying a profitable banking market that readily converted to profitability and earnings for its shareholders thanks to regulatory protection, a well-functioning economy, and the highest bank-to-population ratios that have lasted for more than two decades. However, the industry, like other company ventures and economy-wide scenarios, is more likely to be impacted by COVID-19 unless early corrective actions are implemented. This is because banking is a delicate business that is likely to be influenced by the economy's success as well as the well-being of other sectors.

However, similar to other business undertakings and economy-wide scenarios, this is likely to be influenced by the economy's performance as well as the health of other industries. Furthermore, the two variables (asset quality and liquidity issues), which are essential in determining profitability, have ramifications for the banking industry's long-term viability. The pressure on the banking sector's performance will not be confined to these two reasons but will extend to disturbing all banking revenue streams (Lelissa, 2020).

Banks have a major role in the economic activity of every country through the provision of financial services. Macroeconomic variables affect the performance of commercial banks in a specific country, in addition to banks' influence on economic activity. Inflation has a variety of effects on bank profitability, and its impact on profitability can be good or negative. If inflation is not anticipated, banks may be sluggish to change their interest rates, which can have a negative or positive impact on bank profitability. If, on the other hand, inflation is expected, banks may be able to change their interest rates in response, resulting in revenues growing faster than costs. Despite this, the coefficient estimates of inflation in this study indicated a negative relationship between the profitability of Ethiopian private commercial banks (Tefera, 2014).

But none of the research discusses how Covid has affected a private commercial bank's key performance indicator (KPI). The analyses also fall short of accurately measuring Covid-19's

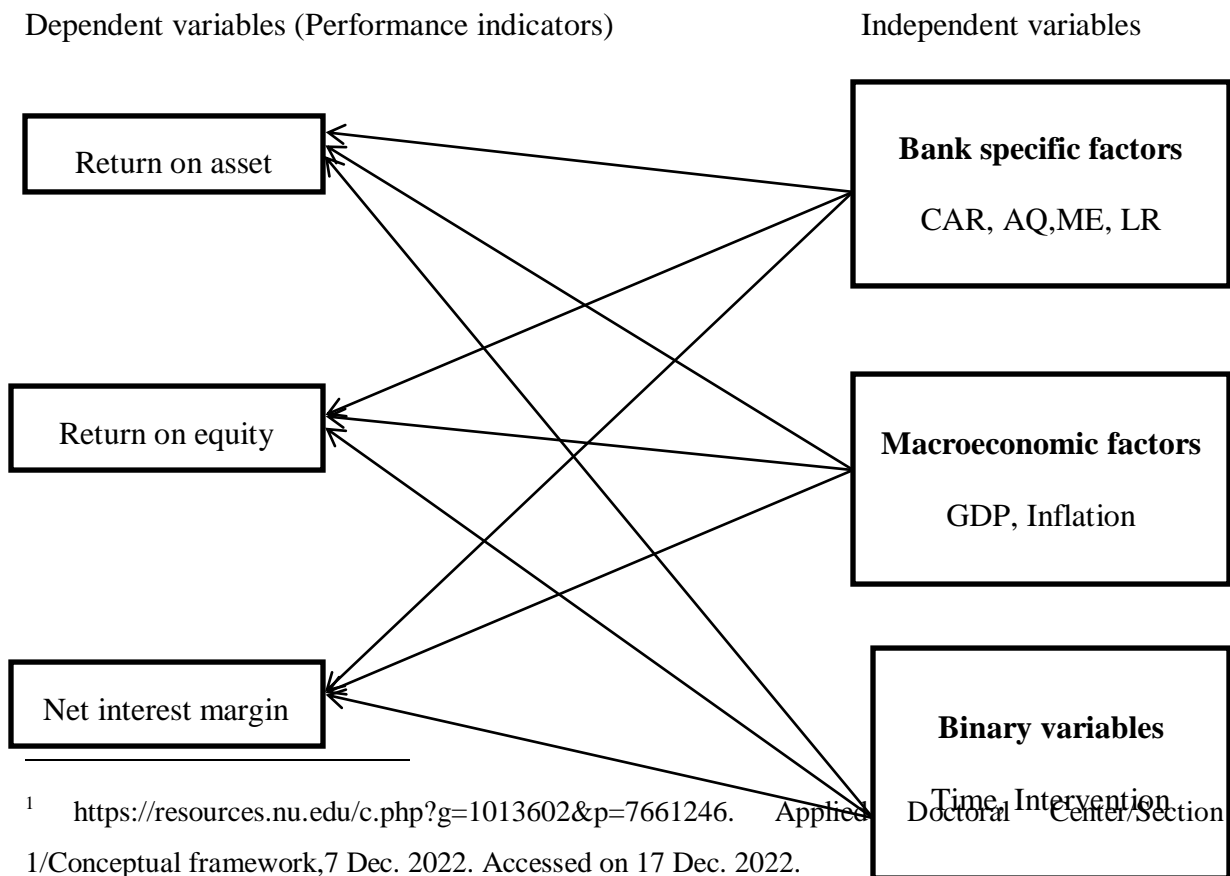
effects on the banking industry using the most recent data. Most studies only have an effect till 2020. This research seeks to close this gap by analyzing how the performance of Ethiopia's private commercial banking industry has been affected by COVID-19.

2.3 Conceptual Framework

Imenda (2014) stated that a conceptual framework is a syncretization of interrelated components and variables which help in solving a real-world problem. It is the final lens used for viewing the deductive resolution of an identified issue (Imenda, 2014 cited in The Applied Doctoral Center, 2022).¹

Our conceptual framework shows the relation between the dependent variables (Return on asset (ROA), Return on equity (ROE), and Net interest margin (NIM)) and the independent variables (Capital adequacy ratio (CAR), Asset quality (AQ), Management efficiency (ME), Liquidity ratio (LR), Gross domestic product (GDP), and Inflation).

Figure 1. Conceptual Framework



¹ <https://resources.nu.edu/c.php?g=1013602&p=7661246>. Applied Doctoral Center/Section 1/Conceptual framework, 7 Dec. 2022. Accessed on 17 Dec. 2022.

Chapter Three: Methodology

3.1 Introduction

This section presents the research design, sources of data, methods of data presentation, and analysis. This research used qualitative and quantitative approaches to address the research questions.

3.2 Research approach

This study employs a qualitative and quantitative research methodology. As pointed out by Daniel (2016) the two methods are different in the sense that each has its unique ways of gathering and analyzing data. They are tools used to achieve the same goal with different techniques and procedures, even though they have different strengths and logic. Therefore, the study employed both approaches to take advantage of their strength and logic.

3.3 Research design

The study employed a Quasi-experimental research design as well as Predictive analysis to assess the effect of the pandemic on the banking industry. The experimental analysis was used to assess the cause and treatment of the impact of covid in the private commercial bank sector of Ethiopia. The data was used to show the trend development in the banking sector before the pandemic. Panel data of these banks were collected from sixteen banks representing 88% of banks for the period between the 2017 and 2021 fiscal year were collected. To assess the performance of banks before covid, the period from 17-2018 was assessed. The year 2019 was included as after pandemic since the global economy was impacted in that year². The outcome of the globally impact economy highly affects trade facilitation which impacts the performance of banks in foreign currency earning, thus in income and profitability. To assess the impact of the pandemic, the performance of banks from the years 2019 and 2021 was used in the analysis process.

² The data for 2019 was include as it affected the banking sector of Ethiopia half the fiscal year.

3.4 Population and Sampling method

There are about 16 private commercial banks and two public commercial banks that give service in Ethiopia currently. However, new banks have joined the industry. For this study, the target population is all private commercial banks in Ethiopia. But the public commercial banks and Private commercial banks established after the pandemic are omitted to assess the contribution of the private sector to the financial sector.

3.5 Source of data and Data collection

Data collection plays a very crucial role in statistical analysis. In this research, secondary data will be used to assess the impact of Covid-19 on private commercial banks in Ethiopia. Data used in the study was collected from the respective publicly disclosed annual reports of sixteen commercial banks namely Abay Bank, Abyssinia Bank, Addis International Bank, Awash Bank, Birhan International Bank, Buna International Bank, Commercial Bank of Ethiopia, Cooperative Bank of Oromia, Debub Global Bank, Dashen bank, Enat bank, Lion International Bank, Nib International Bank, Oromia International Bank, United Bank, Wegagen Bank, and Zemen Bank. Furthermore, data on macroeconomic variables, i.e. real growth rate of gross domestic product and the inflation rate is obtained from the annual report of the National Bank of Ethiopia.

3.6 Analysis method

This study focuses on the impact assessment of Covid-19 on private commercial banks in Ethiopia. Hence, the study will use the Difference-in-Differences model. DID is one of the most frequently used methods in impact evaluation studies. The method has an intuitive appeal and has been widely used in economics, public policy, health research, management, and other fields (Anders et al., 2019). Taking this under consideration the researcher employed this econometric analysis method as it is fit for impact assessment of the financial sector.

3.7 Estimation technique

The approach used for the empirical study to identify the key performance indicators in private commercial banks in Ethiopia is introduced in this part. Accordingly, there is a need to estimate a relationship of the following form using the panel data consisting of sixteen banks' data across a period from 2017 to 2021. To examine the impact of the pandemic on bank performance the researcher applied Abadie & Cattaneo (2018) and Imbens & Wooldridge (2007) approaches to

DID. To evaluate the effect of the treatment, therefore, the need to compare distinct units receiving the different levels of the treatment. Such a comparison can involve different physical units or the same physical unit at different times (Imbens & Wooldridge, 2009). Abadie and Cattaneo (2018) have specified the difference-in-difference for a panel data model with only two time periods as follows:

$$Y_{it} = W_{it}\tau_{it} + \mu_i + \delta_t + \varepsilon_{it}, \tag{1}$$

where only Y_{it} and W_{it} are observed. This equation describes potential outcomes which can be indexed as follows.

$$\begin{aligned} Y_{0it} &= \mu_i + \delta_t + \varepsilon_{it}, \\ Y_{1it} &= \tau_{it} + \mu_i + \delta_t + \varepsilon_{it}. \end{aligned} \tag{2}$$

$$\text{Then, } \tau_{it} = Y_{1it} - Y_{0it}$$

Period $t = 0$ is the pretreatment period before the treatment is available, so $W_{i0} = 0$ for all i . Period $t = 1$ is the posttreatment period; δ_t is a time effect, common across units, and μ_i is treated as a time-invariant confounder. Further, ε_{it} and W_{it} are assumed to be unrelated.

Thus, $E[\varepsilon_{it}|W_{it}] = E[\varepsilon_{it}]$ and $E[\Delta\varepsilon_{i1}|W_{it}] = E[\Delta\varepsilon_{i1}]$. So, $\Delta\varepsilon_{i1} = \varepsilon_{i1} - \varepsilon_{i0}$. Accordingly,

$$E[Y_{i1}|W_{i1} = 1] = E[\tau_{i1}|W_{i1} = 1] + E[\mu_i|W_{i1} = 1] + \delta_1 + E[\varepsilon_{i1}]$$

$$E[Y_{i0}|W_{i1} = 1] = E[\mu_i|W_{i1} = 1] + \delta_0 + E[\varepsilon_{i0}]$$

$$E[Y_{i1}|W_{i1} = 0] = E[\mu_i|W_{i1} = 0] + \delta_1 + E[\varepsilon_{i1}]$$

$$E[Y_{i0}|W_{i1} = 0] = E[\mu_i|W_{i1} = 0] + \delta_0 + E[\varepsilon_{i0}].$$

In this model, the effect of the unobserved confounders (μ_i and δ_t) on the average of the outcome variable (Y_{it}) is additive and constant (does not change in time). Thus,

$$\begin{aligned} \tau_{ATET} &= E[\tau_{i1}|W_{i1} = 1] \\ &= [E[Y_{i1}|W_{i1} = 1] - E[Y_{i1}|W_{i1} = 0]] - [E[Y_{i0}|W_{i1} = 1] - E[Y_{i0}|W_{i1} = 0]] \\ &= [E[Y_{i1}|W_{i1} = 1] - E[Y_{i1}|W_{i1} = 0]]. \end{aligned} \tag{3}$$

The τ_{ATET} in this model is for the posttreatment period, $t = 1$. It is the average treatment effect on the treated.

In a panel data regression (that is, in a setting with repeated pre- and posttreatment observations for the same units), the right-hand side of Equation (3) is equal to the regression coefficient on W_{it} in a regression of Y_{it} on W_{it} and a constant.

Imbens and Wooldridge (2007) have also provided a similar functional form for panel data with two time periods. For instance, when $w_{i1} = 0$ for all i , no units researcher exposed to the treatment in the initial period. Then the OLS estimator is:

$$\hat{\tau} = \Delta \bar{y}_{treat} - \Delta \bar{y}_{control} \quad (4)$$

which is a difference-in-differences estimate.

Following the above procedures, our model is specified as follows:

$$Y = \beta_0 + \beta_1 \text{Time} + \beta_2 \text{Intervention} + \beta_3 \text{Time} * \text{Intervention} + \beta_n \text{Covariates} + \varepsilon \quad (5)$$

$$Y_{it} = \beta_0 + \beta_1 t + \beta_2 I_{it} + \beta_3 t I_{it} + \beta_4 \text{car}_{it} + \beta_5 \text{assq}_{it} + \beta_6 \text{mteff}_{it} + \beta_7 \text{liq}_{it} + \beta_8 \text{rgdpg}_{it} + \beta_7 \text{inf}_{it} + \varepsilon_{it} \quad (6)$$

Where Y_{it} = Performance of individual banks over a certain period representing Return on Asset(ROA), Return on Equity(roe), or Net Interest Margin(nim).

I_{it} = Intervention which is a binary variable indicating the occurrence of the pandemic(Covid-19), i.e. 1 if it occurs, and 0 otherwise, $I \in \{0, 1\}$

t = Time periods before and after the pandemic, i.e. 1 for periods during and after the pandemic, and 0 otherwise, $t \in \{0, 1\}$

car_{it} = capital adequacy ratio of individual banks during a given period.

assq_{it} = asset quality of individual banks during a given time.

mteff_{it} = management efficiency of individual banks during a given period.

liq_{it} = liquidity ratio of individual banks during a given time.

rgdpg = real GDP growth.

π_t = annual inflation rate.

β_s = unknown parameters to be estimated. Where β_0 indicates a constant term, β_1 indicates treatment group-specific effect (to account for average permanent differences between treatment and control), β_2 indicates the time trend common to control (CBE) and treatment (private Commercial banks) groups, and β_3 indicates the true effect of treatment.

ε_{it} = unobservable characteristics of individual banks over the period. It is independent of the group indicator (I) and other covariates, including the time indicator (t). It has the same distribution over time with a mean zero. This implies that the performance of private commercial banks would have followed the same time trend as the Commercial Bank of Ethiopia had the pandemic not occurred.

In equation (6) the coefficient β_3 on the interaction between the post-pandemic treatment variable (I_{i1}) and time ($t = 0, 1$) gives the average difference-in-difference effect of the pandemic. In addition to this interaction term, the variables I_{i1} and t are included separately to pick up any separate mean effects of time as well as the effect of being affected versus not being affected.

The regression function is:

$$E(y_{it}) = \begin{cases} \beta_0 & \text{Time}=0, \text{ Intervention}=0 \\ \beta_0 + \beta_2 & \text{Time}=0, \text{ Intervention}=1 \\ \beta_0 + \beta_1 & \text{Time}=1, \text{ Intervention}=0 \\ \beta_0 + \beta_1 + \beta_2 + \beta_3 & \text{Time}=1, \text{ Intervention}=1 \end{cases}$$

Thus,

$$\beta_3 = [(\beta_0 + \beta_1 + \beta_2 + \beta_3) - (\beta_0 + \beta_1)] - [(\beta_0 + \beta_2) - \beta_0]$$

For such a model the differences-in-differences (abbreviated as D-in-D, DD, or DID) estimator of the treatment effect ($\hat{\beta}_3$) is estimated as follows (See Carter et al.2011 for detail):

$$\beta_{3hat} = [(b_0+b_1+b_2+b_3)-(b_0+b_1)]-[(b_0+b_2)-b_0] \tag{7}$$

Or the differences-in-differences estimator can be estimated using equation (3).

Furthermore, it has been assumed that compared to the private commercial banks, the pandemic had no impact on the performance of the Commercial Bank of Ethiopia. Hence, we have two groups-the private banks (the treatment group) and the Commercial Bank of Ethiopia (the control group). It is well known that the Commercial Bank of Ethiopia has been one of the strongest and leading banks in the country. It is also one of the banks that have shown a sustainable and steady growth in business. But to take this bank as a control Group an independent T-test was conducted to test if the treatment group (private commercial banks) and CBE (the control group have a difference).

Thus, for the t-test, the hypothesis developed is presented as follows.

H₀ = There is no significant difference between CBE and Private commercial banks

H₁ = There is a significant difference between CBE and Private commercial banks

Table 1. Independent sample T-test

		Levene's Test for Equality of Variances		t-test for Equality of Means (95% Confidence Interval)				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
treatment	Equal variances assumed	1.0151	0.0211	-0.024	253	0.0465	-2.327003162	6.3171
	Equal variances not assumed			-0.0211	11.835	0.049	-2.327003162	7.1781

As seen in the above table, data from the sample shows that, if the null hypothesis is true there is only 0.5% probability of obtaining an average difference of -2.327003162 points between the two groups. This probability is smaller than the significance level of 5% , therefore the null hypothesis is rejected and the alternative hypothesis is accepted. From this we can conclude that CBE as a control group for this study.

3.7.1 Description of variables and measurement

The literature (See for example Rahel& Maru, 2015; Ongore&Gemechu, 2013; Tesfaye, 2014; Nguyen et al., 2020) has identified the following variables.

3.7.1 *Dependent variables*

Return on Assets (ROA):It measures the ability of a bank’s management to generate income by utilizing the company assets. ROA indicates how much net income is generated per monetary unit of assets. The higher the ratio, the more profitable is the bank. In case of a decreasing trend of the ratio, it can be said that the bank has some difficulties in obtaining incomes, and an increasing trend signifies good results, but in conditions of excessive risk assumed by the bank. It is a ratio of net profit to the total asset.

Return on Equity (ROE): It reflects how much profit a bank earned compared to the total amount of shareholder equity invested or found on the balance sheet and it measures how effectively bank management is using shareholders’ funds. The ROE is defined as the ratio of net profits to total equity.

Net Interest Margin (NIM): It is a measure of the difference between the interest income generated by banks and the amount of interest paid out to their lenders (for example, deposits), relative to the amount of their (interest-earning) asset. It is defined as the net interest income divided by total earning assets.It is usually expressed as a percentage of what the financial institution earns on loans in a specific period and other assets minus the interest paid on borrowed funds divided by the average amount of the assets on which it earned income in that period (the average earning assets).
$$NIM = \frac{\text{Interest income} - \text{Interest expense}}{\text{Average earning assets} = \frac{\text{Total loans}}{2}}$$

3.7.2 Independent variables

Determinants of bank performance are grouped into two: bank-specific and macroeconomic factors. Bank-specific factors are capital adequacy, asset quality, management efficiency, and liquidity. These components are used to reflect the financial performance, operating soundness, and regulatory compliance of financial institutions (Ferrouhi, 2014).

Capital adequacy (CAR):

Capital adequacy indicates the level of banks' compliance with regulations regarding the minimum capital reserve amount (Al-Najjar & Assous, 2021). The capital adequacy ratio explains the internal strength of the bank to endure losses. It has a direct effect on the performance of banks (Sangmi and Nazir, 2010). Based on the literature, it was proxied by the paid-up capital-to-asset ratio. Since the ratio is a measure of capital strength, having a higher ratio will have a favorable impact on bank performance.

Asset quality(AQ)

Asset quality is one of the most critical areas in determining the overall condition of a bank. The primary factor affecting overall asset quality is the quality of the loan portfolio and the credit administration program. Loans typically comprise a majority of a bank's assets and carry the greatest amount of risk to their capital³. Various authors measure asset quality using different measures. For instance, non-performing loan ratios are used by Ongore&Gemechu (2013) and Nguyen et al. (2020) have used the lending to total assets ratio. Based on the availability of data the researcher employed the latter one. High asset quality is expected to have a positive impact on bank performance.

Management efficiency (ME)

According to the International, Compliance Association management efficiency indicates how efficiently a bank is managed to guarantee its growth and profitability.⁴ One of the ratios that are used to measure management efficiency is the operating profit-to-income ratio. Higher management efficiency implies higher bank performance. Some authors like Alem (2019)

³ Available at: www.fdic.gov/manual/section3-1.

⁴ www.int-comp.org

measured management efficiency by employing the total loans to total deposit ratio. In this study, the operating profit-to-income ratio as a measure of management efficiency was used.

Liquidity (LR)

Liquidity refers to the ability of the bank to fulfill its obligations, mainly to depositors (Nguyen et al, 2020). Like the other determinants of bank profitability, it has various indicators. For instance, customer deposit to total asset, total loan to customer deposits, cash to deposit ratio, and a current asset to current liability are the most common ratios. In this research, liquidity is measured as a ratio between total loans to customer deposits. If this ratio is lower the bank will face difficulty in meeting payments at the right time. It is expected that liquidity will have a positive impact on bank performance.

Macroeconomic factors

The macroeconomic factors impacting the private commercial banks of Ethiopia will be discussed below.

Gross domestic product (GDP)

It is a comprehensive measure of economic activity in a given country over a certain period and is measured at current market prices. It shows a monetary measure of the final goods and services produced in Ethiopia.

Inflation

It is the rate of increase in prices over a given period. It is measured by the consumer price index.

Chapter Four: Results and Discussion

4.1 Descriptive statistics

The performance of the banks concerning the profitability indicators and other covariates from the 2017 to 2021 period is presented in the following table.

Table 2. Summary of descriptive statistics for private commercial banks

Variables	Obs	Mean	Std. Dev.	Min	Max
Dependent					
Return on asset(ROA)	80	3.15744	0.84457	0.64507	5.39747
		9	33	39	1
Return on equity(ROE)	80	36.8489	12.0468	8.14564	76.2652
		3	2	2	
Net interest margin(NIM)	80	15.8188	2.82969	8.32653	23.8452
		3	5		7
Independent					
Capital adequacy ratio(CAR)	80	9.25734	3.31876	4.62727	17.7815
		7	3	8	
Asset quality(assq)	80	56.4410	7.03715	38.1646	72.3359
		3	5	2	6
Management efficiency(mteff)	80	29.0721	6.57147	5.21462	46.5321
		6	4	2	2
Liquidity(liq)	80	72.0078	8.47409	51.0618	98.7734
		2	9	5	5
Real GDP growth(rgdpg)	80	7.84	1.55063	6.1	10.1
			1		
Inflation(inf)	80	14.94	4.82004	7.4	20.2
			3		

As can be seen from table 1 the mean value of return on the asset over the five years is approximately 3.2%. Furthermore, its maximum and minimum values were 5.4% and 0.65% respectively with a standard deviation of 0.8%. The average ROA of commercial banks in

Ethiopia is higher than U.S. banks. The ROA for the U.S. banks in 2019 was less than 1.35%.⁵ The mean value of return on equity over the five years is 36.8% with maximum and minimum values of 76.3% and 8.15% respectively and a standard deviation of 12.0%. The ROE of commercial banks in Ethiopia is extremely high compared to global banking. The ratio for global banking was only 7%-8% (See McKinsey's Review,2021). The mean value for the net interest margin over the five years is 15.8 with maximum and minimum values of 23.8% and 8.3% respectively and a standard deviation of 2.8%. A report by the Federal Reserve Bank of St. Louis (2022) shows that the average NIM for US banks for the last 4 years (2017-2020) was less than 4%.

The table also indicates the descriptive statistics of bank-specific factors. The mean value of the capital adequacy ratio of the banks for the study period was 9.3% while the maximum and the minimum values were 17.8% and 4.6% respectively with a standard deviation of 3.3%. This shows that the CAR of private commercial banks is slightly higher than the regulatory requirement by the National Bank of Ethiopia. The mean value of asset quality of the banks for the study period was 56.4% while the maximum and the minimum values were 72.3% and 38.2% respectively with a standard deviation of 7.0. This indicates that there is still room for lending since there is an excess asset to lend and commercial banks are well capitalized. The mean value of management efficiency for the study period was 29.1% while the maximum and the minimum values were 46.5% and 5.2% respectively with a standard deviation of 6.6%. Finally, the mean value of liquidity over the years was 72.0% while the maximum and the minimum values were 98.8% and 51.1% respectively with a standard deviation of 8.5%.

External factors have also been considered. Accordingly, descriptive statistics for macroeconomic variables are presented in table 1. The table indicates that the mean value of real gross domestic product growth over the years was 7.8% while the maximum and the minimum values were 10.1% and 6.1% respectively with a standard deviation of 1.6%. Furthermore, the mean value of the inflation rate over the years was 14.94% while the maximum and the minimum values were 20.2% and 7.4% respectively with a standard deviation of 4.8%.

The researcher has also tried to analyze the general trends in the mean value of variables using various graphs. Figure 2 shows that the mean value for the ROA remains almost constant over

⁵ www.statista.com/statistics/2/(Accessesed on Nov.,27/2022).

the years whereas the trend for ROE is somewhat mixed. It ascends to the year 2019 and descends in the year 2020, to only move upwards in the year 2021. The NIM has followed a different pattern than the two ratios. Its zigzag pattern makes it unique from the two ratios.

Figure 2. Trends in ROA, ROE, and NIM (%)

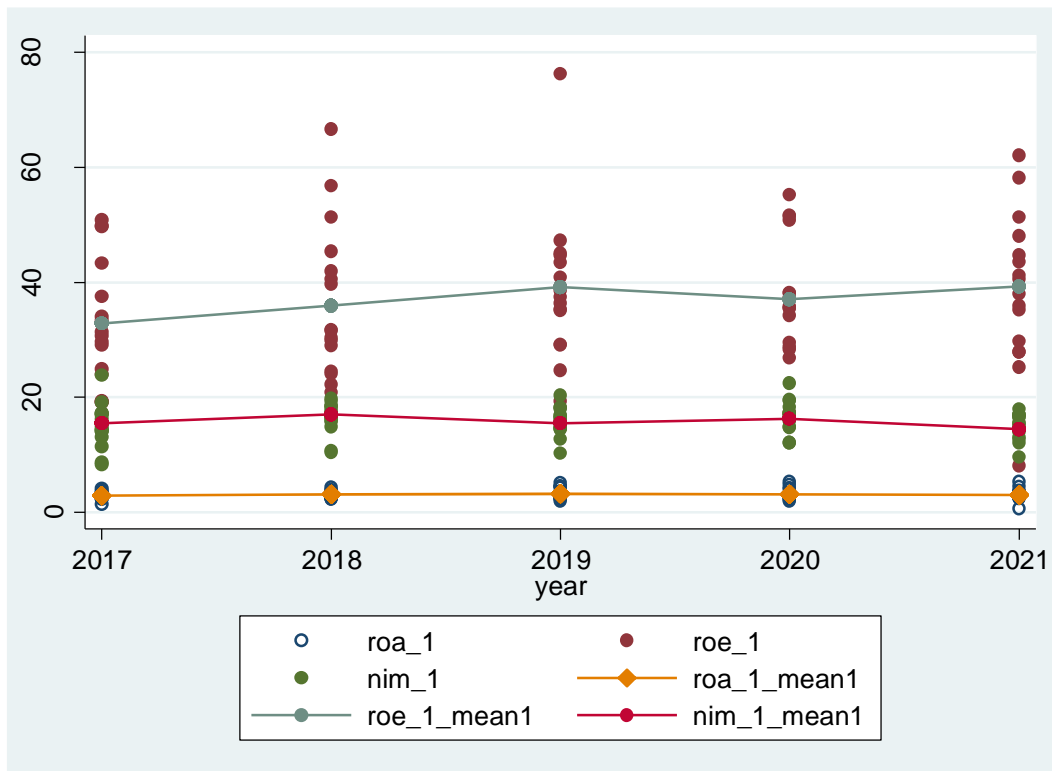
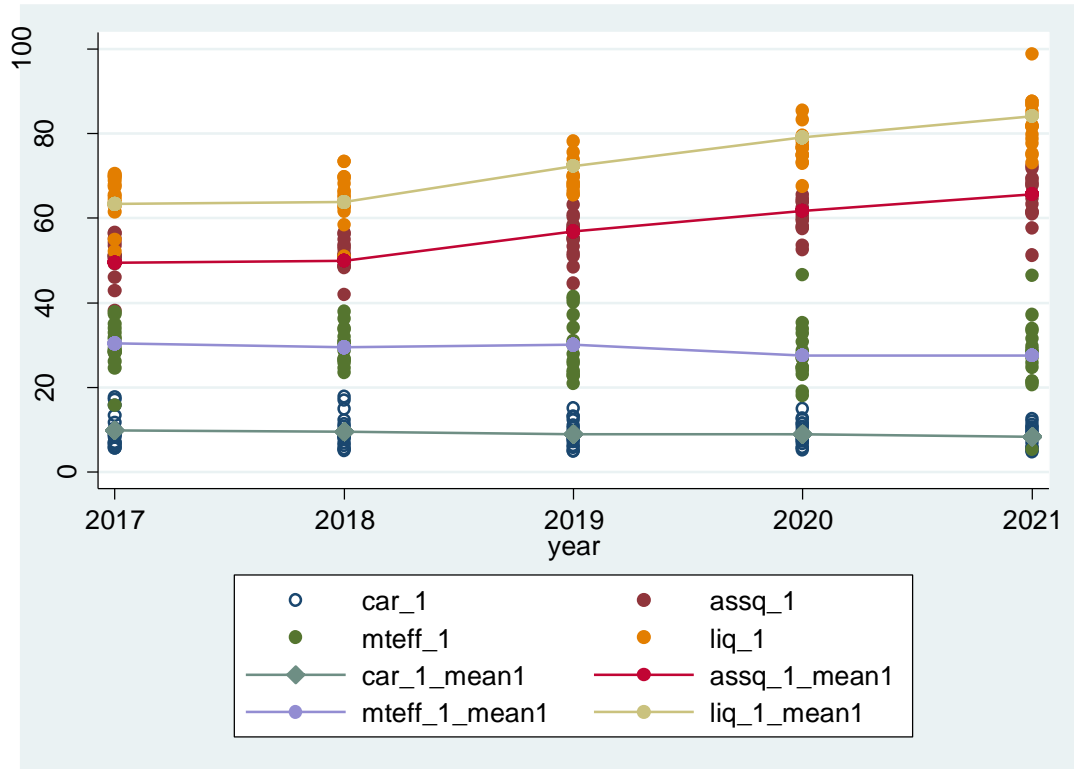


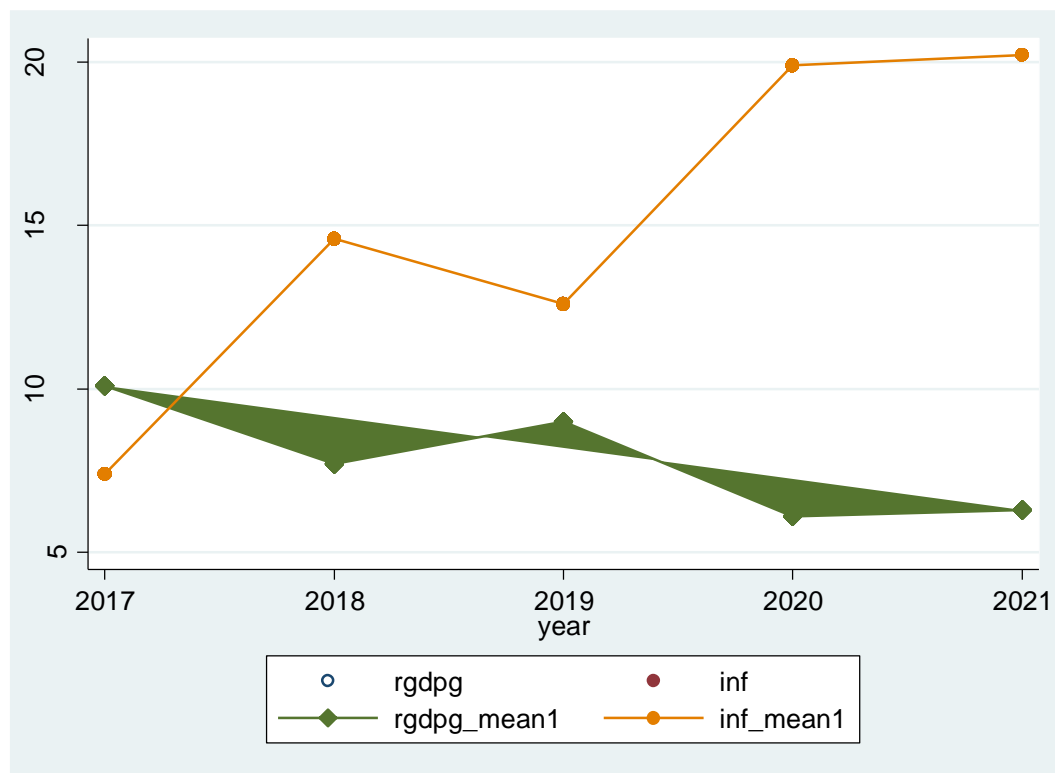
Figure 3. Trends in capital adequacy, asset quality, management efficiency, and liquidity (%).



From figure 3, it can be observed that the mean value of the capital adequacy ratio for the banks has been almost decreasing. For two consecutive years (i.e., 2018 and 2019) it declines, and it remains constant in 2020 just before lowering down further in 2021. The mean for asset quality has been going upward over the years and reached its climax in 2021. Management efficiency has remained constant for the first three consecutive years and decreased in 2020. In 2021 no management efficiency change was registered compared to the previous period. The graph also indicates that liquidity has been increasing continuously over the study period.

Macroeconomic trends are presented in figure 4. Generally, real GDP growth has been decreasing for the first two consecutive years. It again increases in 2019, though lower than the initial period. After 2019 it descends again and increases only marginally in 2021.

Figure 4. Trends in real GDP growth and inflation rate (%).



The trend for inflation was generally upward. It only decreases in 2019. However, the growth rate for this period was higher than the initial period.

4.2 Econometric results

The econometric results are discussed in the following three tables. Separate estimations are made for the three performance figures, namely, ROA, ROE, and NIM.

Table 3. Regression results for DiD analysis with covariates (Dependent variable is Return on asset)

Variables	Coef.	Robust Std. Err.	t	P>t	[95% Conf.Interval]	
Time	0.1403227	0.2487374	0.56	0.574	-0.3551876	0.635833
Intervention	0.9028837	0.1550842	5.82	0.000*	0.5939402	1.211827
Intervention*Time	-0.1978661	0.2357212	-0.84	0.404	-0.6674468	0.2717145
Capital adequacy ratio	0.0517081	0.0172118	3.00	0.004**	0.0174203	0.0859958
Asset quality	-0.0325142	0.0186965	-1.74	0.086***	-0.0697597	0.0047312
Management	0.1074942	0.0036243	29.66	0.000*	0.1002741	0.1147142

efficiency						
Liquidity	0.0269642	0.0137541	1.96	0.054***	-0.0004354	0.0543638
Real GDP growth	0.2784639	0.0916878	3.04	0.003**	0.0958124	0.4611155
Inflation	0.1272354	0.030429	4.18	0.000*	0.0666178	0.187853
_constant	-5.516736	1.0958	-5.03	0.000*	-7.699681	-3.33379

Coefficients with *, **, and *** are significant at p<1%, p<5% and p<10% significance levels respectively.

Table 2 indicates that the pandemic affects the return on assets of private commercial banks negatively. On average the return on assets decreases nearly by 0.2% due to the pandemic after 2019. The effect of the interaction term(time*intervention) is calculated using equation (7).⁶ Alternatively, the net effect can be calculated by taking the partial effect of the intervention on return on assets. Thus, the net effect of the intervention is the difference between the partial effects of the two time periods, which is -0.1978661.⁷ However, the impact is statistically insignificant. So, it can be concluded that the pandemic does not affect private commercial banks has reduced their return on assets. It can also observe that estimated mean difference in ROA between the private banks and CBE before the pandemic was almost 0.9% (Annex 5 for data on CBE). This difference that existed before the pandemic was statistically significant at less than a 1% significance level. Furthermore, the expected mean change in ROA had there not been the pandemic would have been approximately 0.14% and the effect is statistically insignificant at any of the commonly used significance levels. Commonly used significance levels are 1%, 5%, and 10%.

The table also indicates that all the bank-specific factors had a significant impact on the ROA of the private commercial banks. Capital adequacy ratio, management efficiency, and liquidity had a favorable impact on ROA after controlling other variables implying that banks with higher capital adequacy, better management efficiency, and better liquidity perform well. They are all significant at less than 1%, 1%, and 10% significance levels. A one percent increase in the CAR,

$$\begin{aligned} \hat{\beta}_{3\text{nat}} &= [(b_0+b_1+b_2+b_3)-(b_0+b_1)]-[(b_0+b_2)-b_0] \\ &= [(-5.516736+0.1403227+0.9028837+-0.1978661)-(-5.516736+0.1403227)] - [(-5.516736+0.9028837)-(-5.516736)] \\ &= [(-4.6713957)-(-5.3764133)]-[(-0.9028837)] \\ &= 0.7050176-0.9028837 \\ &= -0.1978661 \end{aligned}$$

$${}^7\partial\text{roa}/\partial I = \beta_2 + \beta_3 t = 0.9028837 + (-0.1978661 * 0) = 0.9028837 \text{ for } t=0(\text{pre-intervention})$$

$$\partial\text{roa}/\partial I = \beta_2 + \beta_3 t = 0.9028837 + (-0.1978661 * 1) = 0.7050176 \text{ for } t=1(\text{post-intervention})$$

$$\text{Net effect} = 0.7050176 - 0.9028837 = -0.1978661$$

ME, and LR increases the ROA by 0.05%, 0.11%, and 0.03% respectively. However, asset quality harms the ratio at less than a 10% significance level. The asset quality which is an indicator of credit risk affects the performance of banks negatively showing Ethiopian commercial banks are highly sensitive to delinquent loans. Similar results are reported by Ongore and Gemechu (2013) for bank-specific factors' impact on ROA. However, despite the positive relationship between liquidity and ROA, the impact was not statistically significant. The results for CAR and LR are also consistent with the findings of Rahel and Maru,2015; Tesfaye (2014); Nguyen et. al (2020), and Alshatti (2016).

Macroeconomic indicators had a very strong influence on the ROA. Real GDP growth and inflation positively affected ROA. As the economy expanded the demand for banking services, especially, the loan also increases making banks profitable and the return from assets becomes higher. Furthermore, the high inflation rate that has been registered in Ethiopia seems to increase their revenue more than their cost. A 1% increase in real GDP growth increases ROA by approximately 0.28% while inflation increases the ratio by approximately 0.13%. A similar result is reported by Ranajee (2018), Tesfaye (2014) also found a similar result for inflation, however, real GDP growth had no significant impact on their findings. The results of the impact of macroeconomic variables contradict that of Ongore and Gemechu (2013).

From the F-statistic it can be concluded that all the variables used in our regression are jointly statistically significant at less than a 1% significance level.

Table 4. Regression results for return on equity (roe)

Variables	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]	
Time	0.9403248	5.009992	0.19	0.852	-9.040092	10.92074
Intervention	11.77507	1.875761	6.28	0.000*	8.038363	15.51178
Intervention*Time	-4.433235	4.271825	-1.04	0.303	-12.94315	4.076678
Capital adequacy ratio	-3.033056	0.2346692	-12.92	0.000**	-3.500541	-2.565571
Asset quality	-0.3072863	0.2367103	-1.30	0.198	-0.7788374	0.1642647
Management efficiency	1.265043	0.1038374	12.18	0.000*	1.058188	1.471898
Liquidity	0.3736547	0.1541922	2.42	0.018**	0.0664881	0.6808213
Real GDP growth	0.3062146	1.938851	0.16	0.875	-3.556175	4.168604
Inflation	0.5539959	0.6125809	0.90	0.369	-0.6663279	1.77432

_constant	-2.468388	24.33435	-0.10	0.919	-50.9449	46.00812
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Coefficients with *, **, and *** are significant at p<1%, p<5% and p<10% significance levels respectively.

Table 3 indicates that the pandemic affects the return on equity of private commercial banks negatively. On average the return on equity decreases nearly by 4.4% due to the pandemic after 2019. The author followed the same procedure as in footnotes 3 and 4. Thus, the net effect of the intervention is the difference between the partial effects of the two time periods, which is -4.4%. However, the impact is statistically insignificant. So, we cannot conclude that the pandemic that affects private commercial banks has reduced their return on equity. It can also observe that the estimated mean difference in ROE between the private banks and CBE before the pandemic was almost 11.8%. This difference that existed before the pandemic was statistically significant at less than a 1% significance level. Furthermore, the expected mean change in ROE had there not been the pandemic would have been approximately 0.9 % and the effect is statistically insignificant at any of the commonly used significance levels.

The table also indicates that all the bank-specific factors, except asset quality, had a significant impact on the ROE of the private commercial banks. Capital adequacy ratio has an unfavorable impact on the ROE of banks at less than a 1% significance level. This may imply that commercial banks in Ethiopia are investing in safer assets, such as lower-risk loans or securities. A similar result is reported by Ongore and Gemechu(2013). However, conflicting results are reported by Rahel and Maru,2015; Nguyen, et. al,2020; and Alshatti,2016). Management efficiency and liquidity had a favorable impact on ROE after controlling other variables. Banks with efficient management and sufficient liquidity utilize shareholders' capital well. They are both significant at less than 1%, and 5% significance levels respectively. Similar results are reported by Ongore and Gemechu(2013) and Rahel and Maru(2015). Furthermore, consistent results were reported for liquidity by Ongore and Gemechu(2013), Rahel and Maru(2015), and Alshatti(2016). A 1% percent increase in the CAR and AQ decreases the ROE by 3% and 0.3% respectively in this study. As the asset quality which is expressed as lending to an asset increases the quality of the asset declines which in turn makes commercial banks perform poorly. Consistent results for AQ were reported by Ongore and Gemechu(2013) and Alshatti(2016) but a contradictory report is reported by Nguyen et. al(2020). However, management efficiency and liquidity increase approximately by 1.3% and 0.4% respectively in this study.

Despite their positive impact, macroeconomic indicators had a very weak and statistically insignificant influence on the ROE at any of the commonly used significance levels. Whenever the economic activity expands default risks decline to make banks more profitable. However, the insignificance impact may be due to the inability of the economy to trigger more profitable lending and the tight monetary policy introduced by the National Bank of Ethiopia. The positive impact of inflation could be due to the increased income of banks as a result of the higher general price level registered for the last five years. A 1% increase in real GDP growth increases ROE by approximately 0.3% while inflation increases the ratio by approximately 0.6%. But contradictory results are reported by Ongore and Gemechu(2013).

From the F-statistic it can be concluded that all the variables used in this regression are jointly statistically significant at less than a 1% significance level.

Table 5. Regression results for net interest margin ()

Variables	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]	
Time	-8.599939	5.456415	-1.58	0.119	-19.46733	2.267453
Intervention	-2.140136	3.186202	-0.67	0.504	-8.486006	4.205735
Intervention*Time	7.878827	4.588074	1.72	0.090***	-1.259115	17.01677
Capital adequacy ratio	-0.2439419	0.1261316	-1.93	0.057***	-4.951548	.007271
Asset quality	-0.1165676	0.1104999	-1.05	0.295	-0.3366471	0.1035119
Management efficiency	0.0244157	0.0607906	0.40	0.689	-0.0966594	0.1454908
rgdpg	-1.464441	1.386944	-1.06	0.294	-4.226779	1.297897
inf	-0.2634158	0.4937366	-0.53	0.595	-1.246778	.719946
_cons	41.79169	16.0813	2.60	0.011	9.763012	73.82037

Table 4 indicates that the pandemic affects the net interest margin of private commercial banks positively. On average the net NIM increases nearly by 7.9% due to the pandemic after 2019. The impact is statistically significant at a 10% significance level. So, we can conclude that the pandemic that affects private commercial banks has increased their NIM. We can also observe that the estimated mean difference in NIM between the private banks and CBE before the pandemic was almost -2.1%. Nevertheless, the difference that existed before the pandemic was statistically insignificant at any of the common significance levels. Furthermore, the expected

mean change in NIM had there not been the pandemic would have been approximated -at 8.6% but the effect is statistically insignificant at any of the commonly used significance levels.

The table also indicates that all the bank-specific factors except capital adequacy had an insignificant impact on the NIM of the private commercial banks at any of the commonly used significance levels. Except for management efficiency, both bank-specific factors CAR and AQ, have an unfavorable impact on NIM after controlling other variables. A one percent increase in the CAR and AQ decreases the NIM by 0.24% and 0.11% respectively. However, ME increases NIM by 0.02%. Similar results were found for AQ and ME by Ongore and Gemechu(2014). However, contradictory results are reported for CAR by Ongore and Gemechu(2014), Rahel and Maru(2015), Nguyen et al. (2020), and Alshatti(2016).

Despite their negative impact, macroeconomic indicators had a very weak and statistically insignificant influence on the NIM at any of the commonly used significance levels. Ongore and Gemechu(2013) have also reported similar results. A 1% increase in real GDP growth reduces NIM by approximately 1.5% while inflation reduces the ratio by approximately 0.26%.

From the F-statistic we can conclude that all the variables used in our regression are jointly statistically significant at less than a 1% significance level.

4.3 post-estimation and diagnostic tests

Post estimation

The DiD methodology assumes parallel trends, also called common trends. In the words of Lechner (2011), this assumption is the defining assumption of the DiD approach.

“It states that the differences in the expected potential non-treatment outcomes over time are unrelated to belonging to the treated or control group in the post-treatment period implying that if the treated had not been subjected to the treatment, both subpopulations defined by $D=1$ and $D=0$ would have experienced the same time trends” *ibid.*

Luedicke(2022) explains that the trends are the same between the treatment and control groups before the intervention[treatment] date and that they would be the same past this date if there had not been an intervention.

It is a common practice to test the parallel assumption that has been made in the indifference-in-difference estimation. Since the econometric results are based on this parallel trend assumption, the author will try to test this assumption.

However, from a practical point of view, it is not possible to directly test this assumption because we do not know what would have happened if there was no pandemic. A common method to indirectly test this assumption is to check whether the trends before the treatment are the same, or at least similar (See Lechner, 2011; Perrignon, 2020; and Luedicke, 2022). Thus, to test the parallel trends assumption for the banking sector in Ethiopia the author has followed the approaches suggested by Lechner, 2011; Perrignon,2020; and Luedicke,2022.

Perrignon(2020) has used graphical and hypothesis testing methods to test the parallel trends. Following the procedure, the researcher has tried to test this assumption. First, the assumption is tested on the first model (ROA). The scattered plot and regression methods are presented as follows.

Figure 5. Raw data by year for treated (blue) and controls (red)-ROA

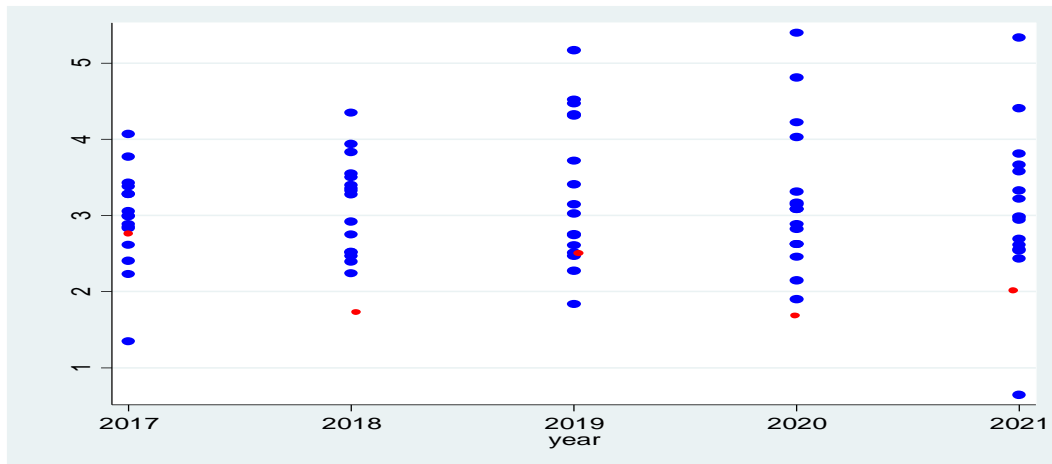


Table 6. Testing parallel trends- Regression.

Source	SS	df	MS	Number of obs =	68
Model	4.72140 3	3	1.573801	F(3,64) =	2.48
Residual	40.6947	64	0.635855	Pr>F =	0.0694

Total	45.4161	67	0.677852	R-squared =	0.104
				Adj R-squared =	0.062
				Root MSE =	0.7974
ROA	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
year	-0.2373468	0.3566103	-0.67	0.508	-0.949758 0.4750642
intervention	-677.8416	741.9715	-0.91	0.364	-2160.1 804.4168
intervention*year	0.3363028	0.3675855	0.91	0.364	-0.398034 1.070639
_cons	481.2683	719.8181	0.67	0.506	-956.7336 1919.27

Figure 6. Graph model using predictions

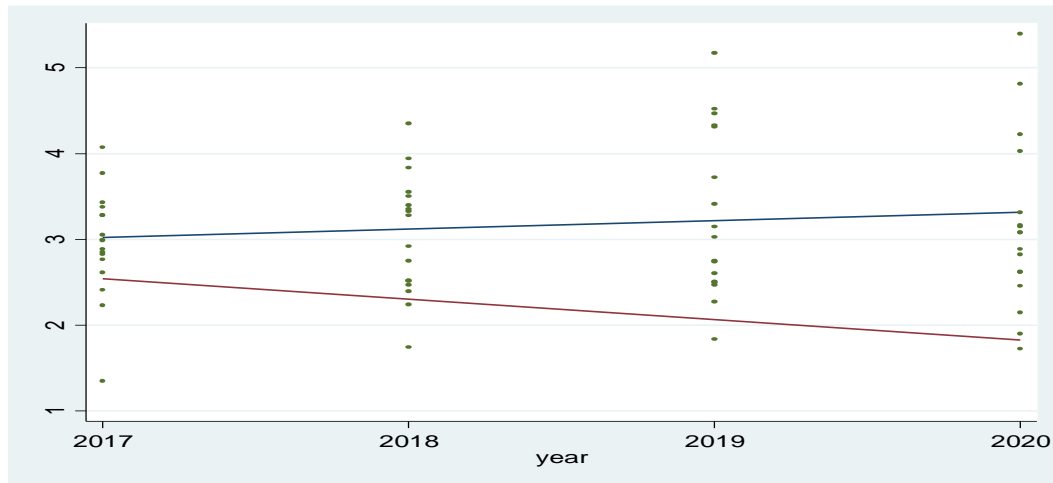


Table 7. Test parallel trends – adjusted

Source	SS	df	MS	Number of obs =	68
Model	43.51296	9	4.834773	F(9,58) =	147.34
Residual	1.90314	58	0.032813	Pr>F =	0.0000
Total	45.4161	67	0.677852	R-squared =	0.9581
				Adj R-squared =	0.9516

				Root MSE	=	0.18114	
ROA	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]		
year	0.2063849	0.1941087	1.06	0.292	-	0.1821658	0.5949357
intervention	184.9904	263.0795	0.70	0.485	-	-341.6205	711.6012
intervention*year	0.0911805	0.1303437	-0.70	0.487	-	0.3520917	0.1697307
capital adequacy ratio	0.0224405	0.0113161	1.98	0.052	-	-0.000211	0.0450921
asset quality	0.0536782	0.0119328	-4.50	0.000	-	0.0775642	0.0297922
management efficiency	0.1120681	0.0040036	27.99	0.000	-	0.1040541	0.1200822
liquidity	0.0386304	0.0087	4.44	0.000	-	0.0212155	0.0560454
real GDP growth	0.1798951	0.200837	0.90	0.374	-	0.2221239	0.581914
inflation	0.0762855	0.0871001	0.88	0.385	-	0.0980643	0.2506354
_cons	-420.1486	389.7272	-1.08	0.285	-	-1200.272	359.9751

Table 5 and table 6 show that the parallel trends assumption is not violated. Since $p=0.36$ in table 5 and $p=0.49$ in table 6, we fail to reject the null hypothesis (Parallel trends) which implies that the trend is indeed statistically parallel. Hence, the results which are obtained in the regression are valid.

The scattered plot and regression methods for ROE are presented as follows.

Figure 7. Raw data by year for treated (blue) and controls (red)-ROE

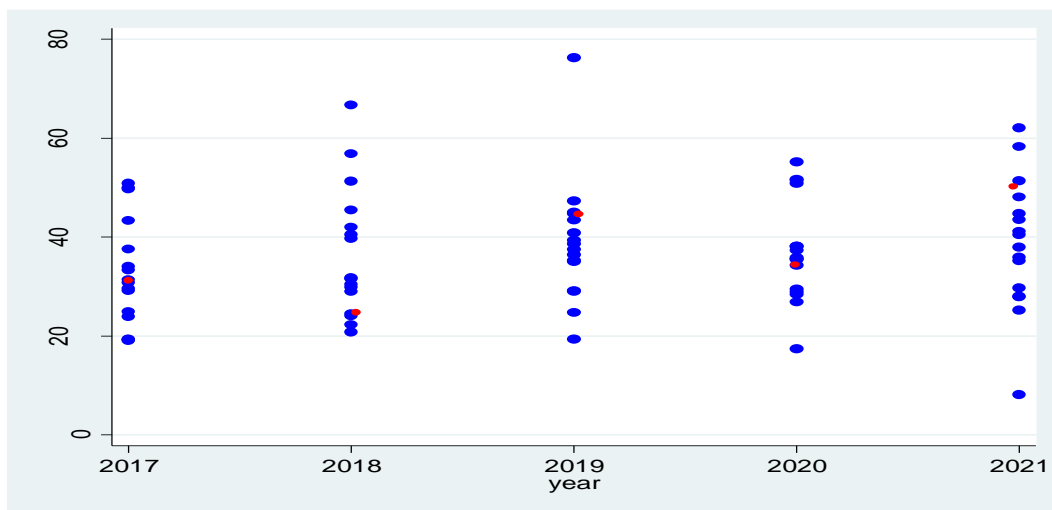


Table 8. Testing parallel trends-two periods

Source	SS	df	MS	Number of obs =	34	
Model	161.447	3	53.81568	F(3,30) =	0.47	
Residual	3410.351	30	113.6784	Pr>F =	0.7031	
Total	3571.798	33	108.2363	R-squared =	0.0452	
				Adj R-squared =	-0.0503	
				Root MSE =	10.662	
ROE	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
the year 2020	3.811749	15.07835	0.25	0.802	-	34.60586
intervention	1.631242	10.99014	0.15	0.883	-	24.07611
intervention*year	0.4833003	15.54241	0.03	0.975	-	32.22514
_cons	31.26075	10.66201	2.93	0.006	9.486028	53.03547

Figure 8. Adjusted predictions

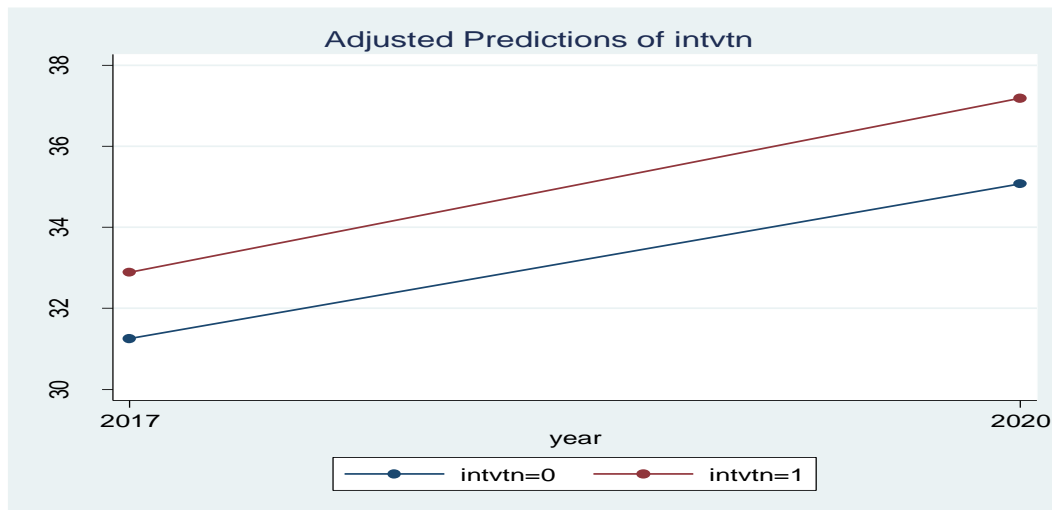


Table 7 shows that the parallel trends assumption is not violated. Since $p=0.98$, we fail to reject the null hypothesis (Parallel trends) which implies that the trend is indeed statistically parallel. Figure 8 also shows the parallel trends that existed between the two periods. Hence, the results which are obtained in the regression are valid.

Finally, the scattered plot and regression methods for NIM are presented as follows.

Figure 9. Raw data by year for treated (blue) and controls (red)-NIM

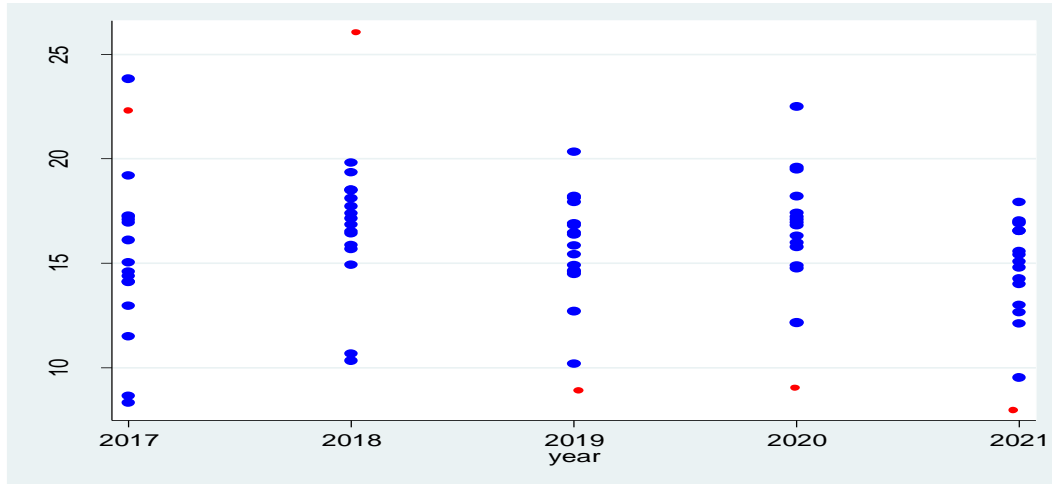


Table 9. Testing parallel trends-two periods

Source	SS	df	MS	Number of obs =	34	
Model	107.5027	3	35.834225	F(3,30)	=	3.34
Residual	321.8518	30	10.728394	Pr> F	=	0.0323
Total	429.3545	33	13.010742	R-squared	=	0.2504
				Adj R-squared	=	0.1754
				Root MSE	=	3.2754
NIM	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
the year 2020	13.13562	4.632147	-2.84	0.008	22.59573	-3.675512
intervention	7.233488	3.376228	-2.14	0.040	14.12867	-0.3383092
intervention*year 2020 1	14.76309	4.774708	3.09	0.004	5.01183	24.51434
_cons	22.32463	3.275423	6.82	0.000	15.63532	29.01393

Figure 10. Adjusted predictions of intervention

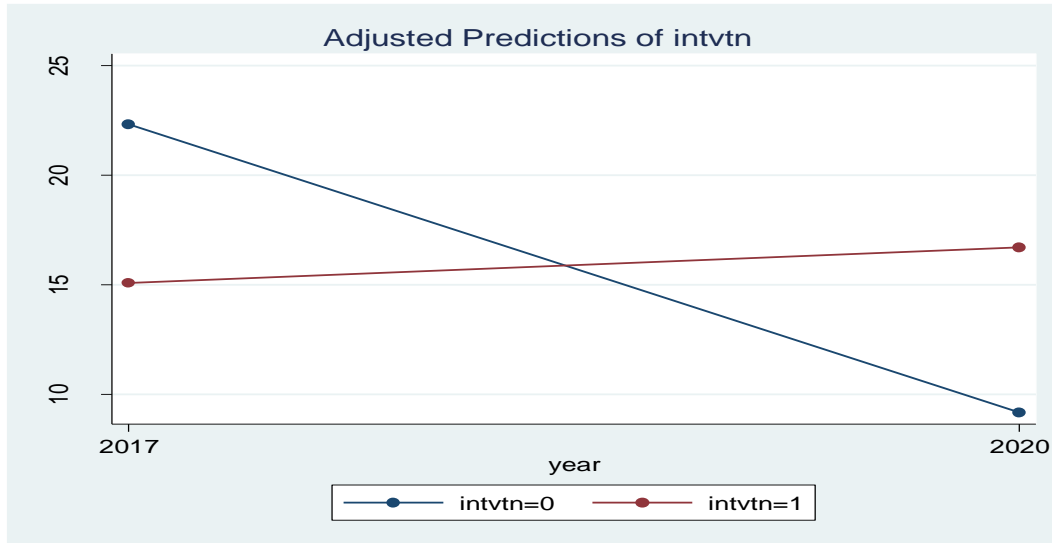


Table 10. Testing parallel trends - more periods.

Source	SS	df	MS	Number of obs =	68	
Model	175.9831	3	58.66103	F(3,64) =	6.22	
Residual	603.6495	64	9.432024	Pr> F =	0.0009	
Total	779.6326	67	11.63631	R-square =	0.2257	
				Adj R-squared =	0.1894	
				Root MSE =	3.0712	
NIM	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
year	-5.659834	1.373464	-4.12	0.0000	-0.9497578	0.4750642
intervention	-12285.05	2857.661	-4.3	0.0000	-2160.1	804.4168
intervention*year	6.085937	1.415735	4.3	0.0000	-0.3980337	1.070639
_cons	11441.01	2772.339	4.13	0.0000	-956.7336	1919.27

Figure 11. Graph model using predictions

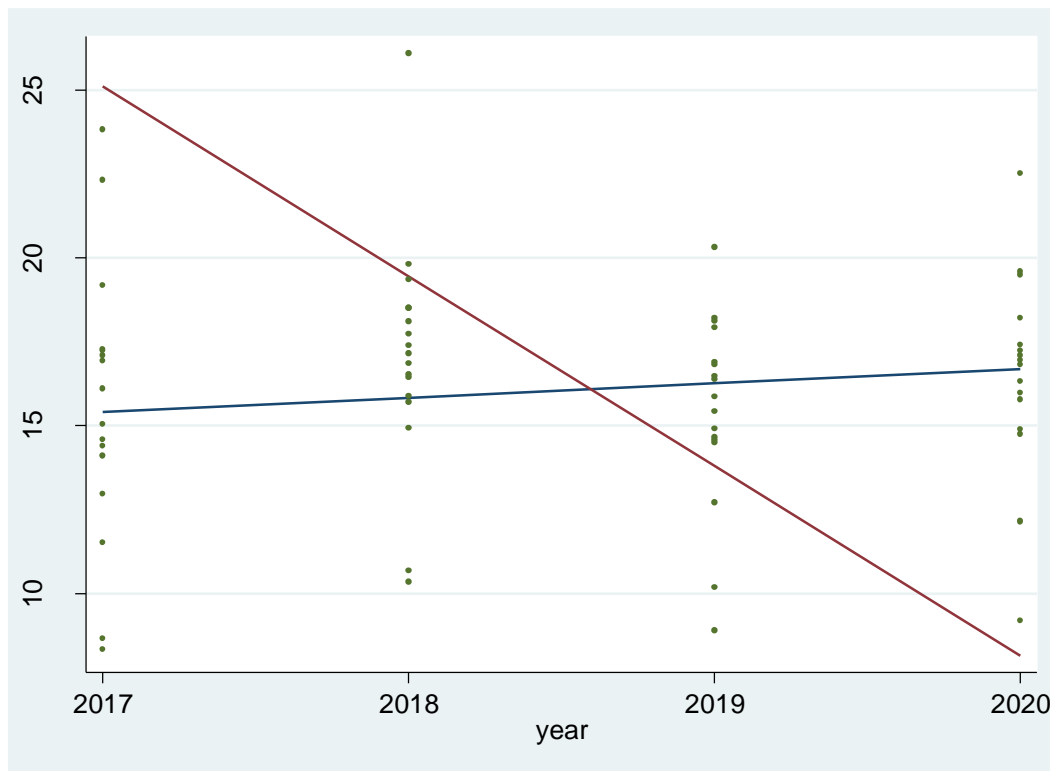


Table 11. Test of the parallel trend with covariates

Source	SS	df	MS	Number of obs =	68	
Model	242.6144	9	26.95716	F(9,58) =	2.91	
Residual	537.0182	58	9.258934	Pr> F =	0.0065	
Total	779.6326	67	11.63631	R-squared =	0.3112	
				Adj R-squared =	0.2043	
				Root MSE =	3.0428	
NIM	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
year	-7.401894	3.26065	-2.27	0.027	-13.92879	0.8749946
intervention	-12549.66	4419.226	-2.84	0.006	-21395.7	-3703.619
intervention*year	6.21762	2.189521	2.84	0.006	1.834817	10.60042
capital adequacy ratio	0.3451516	0.1900879	-1.82	0.075	0.7256538	0.0353506
asset quality	0.2027597	0.2004471	-1.01	0.316	0.6039982	0.1984788
management efficiency	0.0443494	0.0672526	0.66	0.512	0.0902712	0.17897
liquidity	0.13805	0.1461432	0.94	0.349	0.1544874	0.4305875
real GDP growth	1.285229	3.373672	0.38	0.705	-5.46791	8.038368

inflation	0.8555058	1.463113	0.58	0.561	-2.073234	3.784245
_cons	14937.34	6546.661	2.28	0.026	1832.78	28041.91

Tables 8, 9, and 10 show that the parallel trends assumption is violated. Since $p=0.004$, 0.000 , and 0.006 in tables 8, 9, and 10 respectively, since our data on NIM do not demonstrate statistically significant patterns, we reject the null hypothesis (similar trends). The figure also shows the intersecting trends that existed in all periods. Hence, the results which are obtained in the regression may not be valid.

Diagnostic tests

Normality test-Kernel density

Figure 12. Kernel density estimate (ROA).

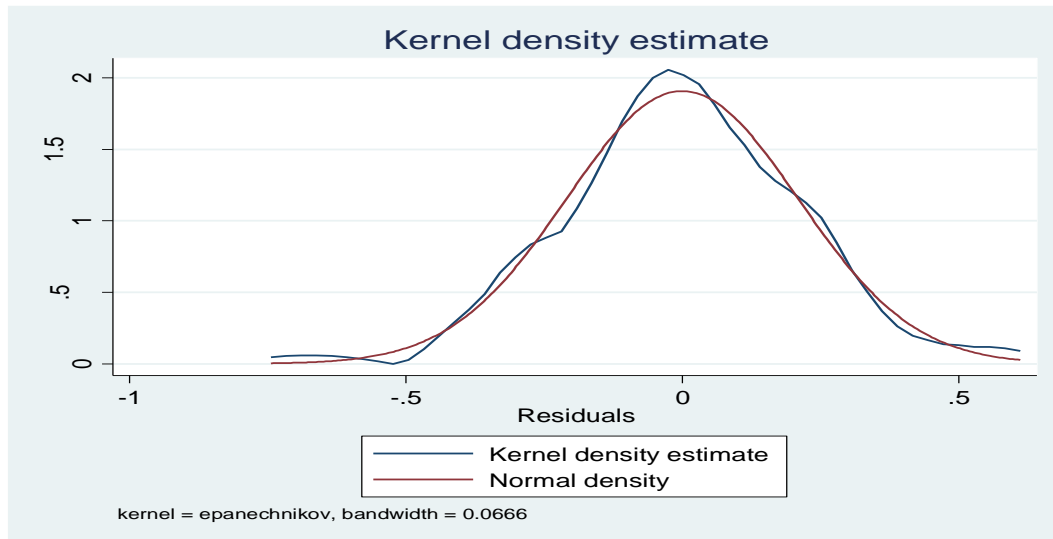


Figure 13. Kernel density estimate (ROE).

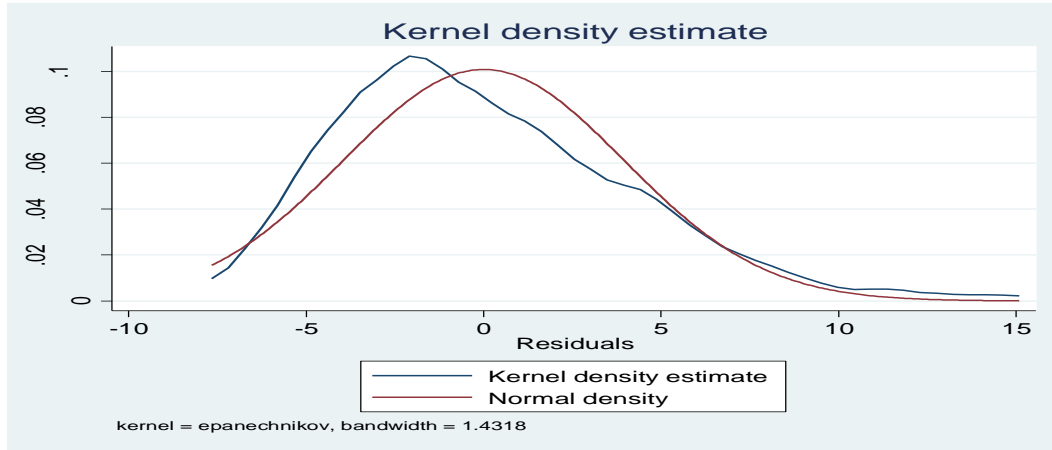
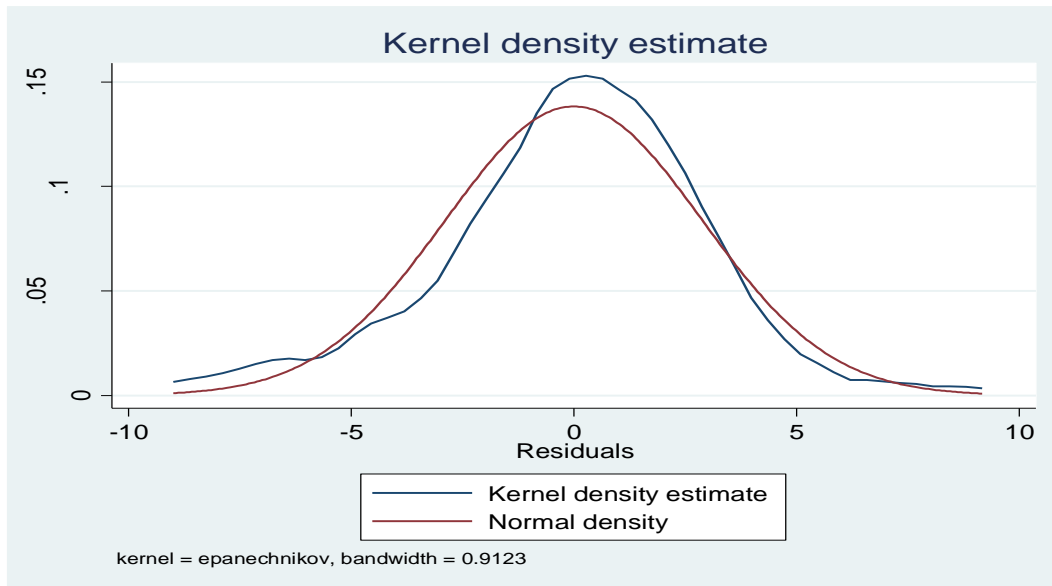


Figure 14. Kernel density estimate (ROE).



From the above graphs, we can accept that the residuals from the three models are close to a normal distribution.

Chapter Five: Conclusion and Recommendation

5.1 Conclusion

The Covid-19 epidemic has affected several industries, including the agricultural, industrial, and service sectors. Additionally, the epidemic has had a variety of effects on Ethiopia's economy. One of the industries that are believed to be impacted by the pandemic is the banking industry. Using data from commercial banks and the National bank of Ethiopia we tried to investigate the impact that the pandemic might have on the performance of private commercial banks in Ethiopia. Following the literature, we measure the performance of commercial banks using three ratios: ROA, ROE, and NIM. Furthermore, we have identified four banks specific factors (KPI) and two macroeconomic indicators as covariates. To analyze the impact of the pandemic we applied the difference-in-differences (DiD) methodology to our panel data as this methodology was a different approach in measuring the impact of covid in private commercial banks of Ethiopia. In this methodology, private commercial banks are considered as the treatment group (the group which might have been impacted by the pandemic) and the state bank-Commercial Bank of Ethiopia-as our control group. The DiD estimation model shows that the pandemic affected ROA and ROE negatively. However, the impact was not statistically significant during the study period. The other bank performance measure that we analyzed was the NIM. Although impacted positively, the pandemic's impact was not statistically significant. Hence, we can conclude that the pandemic has not affected the performance of the private commercial banks during the study period in a meaningful way. Various explanations could be provided for the robust performance of the banks during the pandemic. The first reason is that the Government of Ethiopia has supported the banking industry with a bail-out measure that directly pumped liquidity to the banks. This measure might have helped them to endure the negative consequences of the pandemic that arise in terms of weaker economic activities (for example investors were struggling to repay their loans to the banks on time) which ultimately affects loan disbursement, collection, and deposit mobilization. From the results, we also observe that the treatment group and the control group's initial conditions were different, hence, adding the other covariates to our regression was relevant.

Our result also shows that ROA was significantly affected by both bank-specific and macroeconomic factors. All covariates except AQ have a favorable impact on the performance ratio of the banks. On the other hand, only two of the bank-specific covariates (CAR&AQ) affect ROE negatively with AQ having an insignificant effect, whereas, ME, and LR impact the performance measure positively. However, despite their positive impact, both macroeconomic variables did not affect the ratio in a significant manner. Finally, all the covariates except ME harm NIM. Nevertheless, all covariates did not have a significant impact on the ratio.

Based on our findings we recommend that the government should continue its support in ejecting money to the banking industry to mitigate the negative impact of such shocks on the economy. The government should also follow sound macroeconomic policies to bring economic stability. Banks should also give special emphasis to their management efficiency to improve their performance.

5.2 Policy Implication

Based on the above finding, the following recommendation is given.

- The government should continue its support in releasing money of the banking industry to mitigate the negative impact of such shocks on the economy.
- The government should also follow up and develop macroeconomic policies that can enhance the development of the banking sector.
- Private commercial banks should give special emphasis to their management efficiency to improve their performance by improving the leadership quality of the company.

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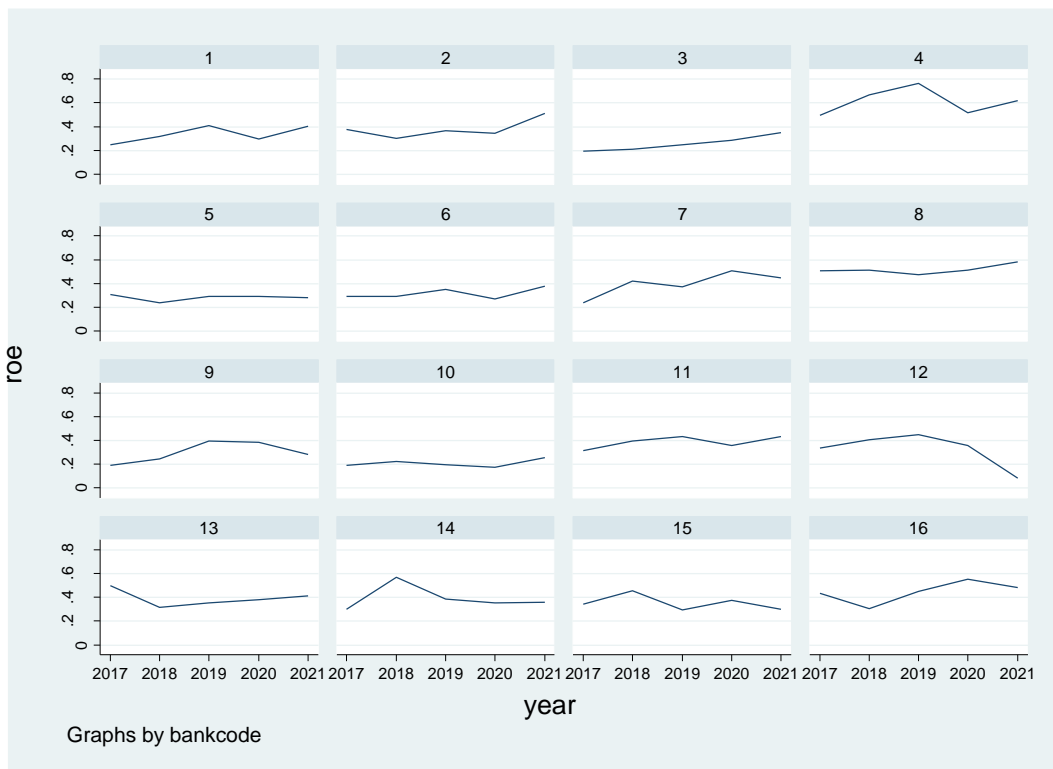
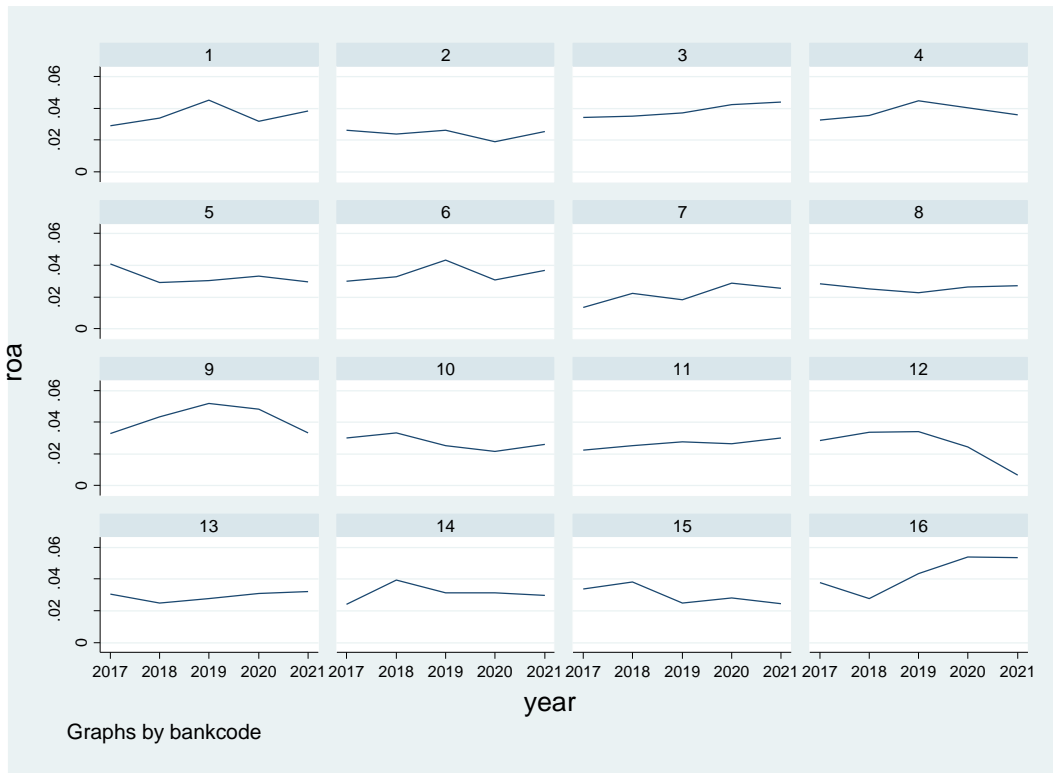
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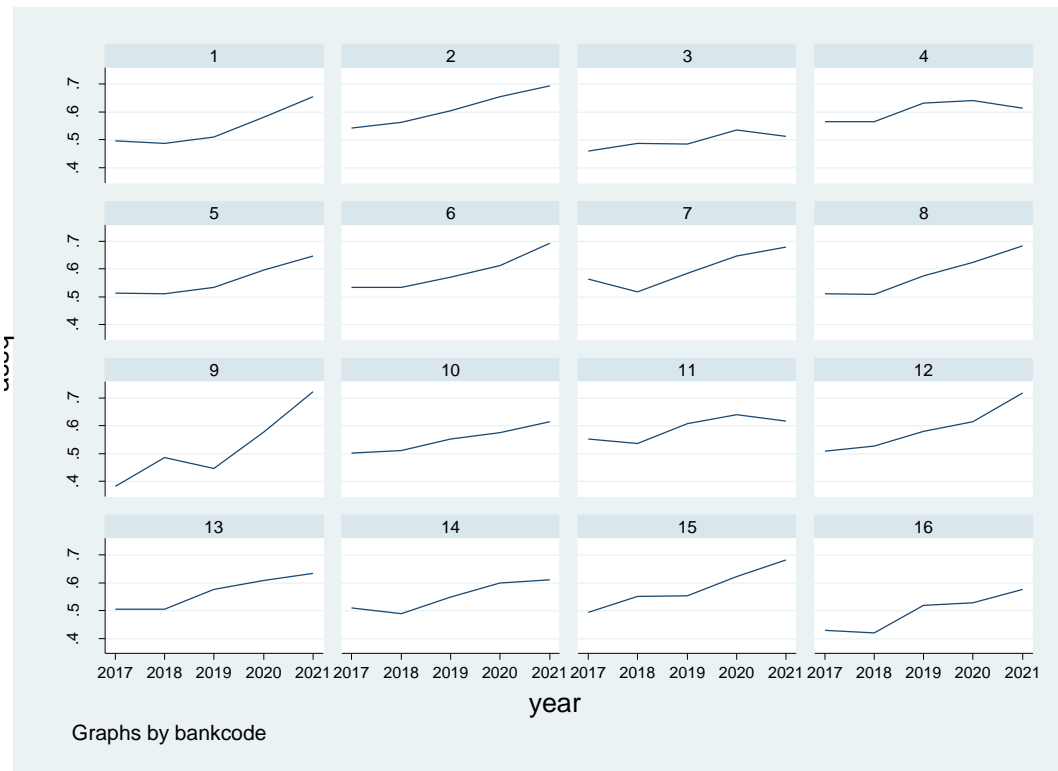
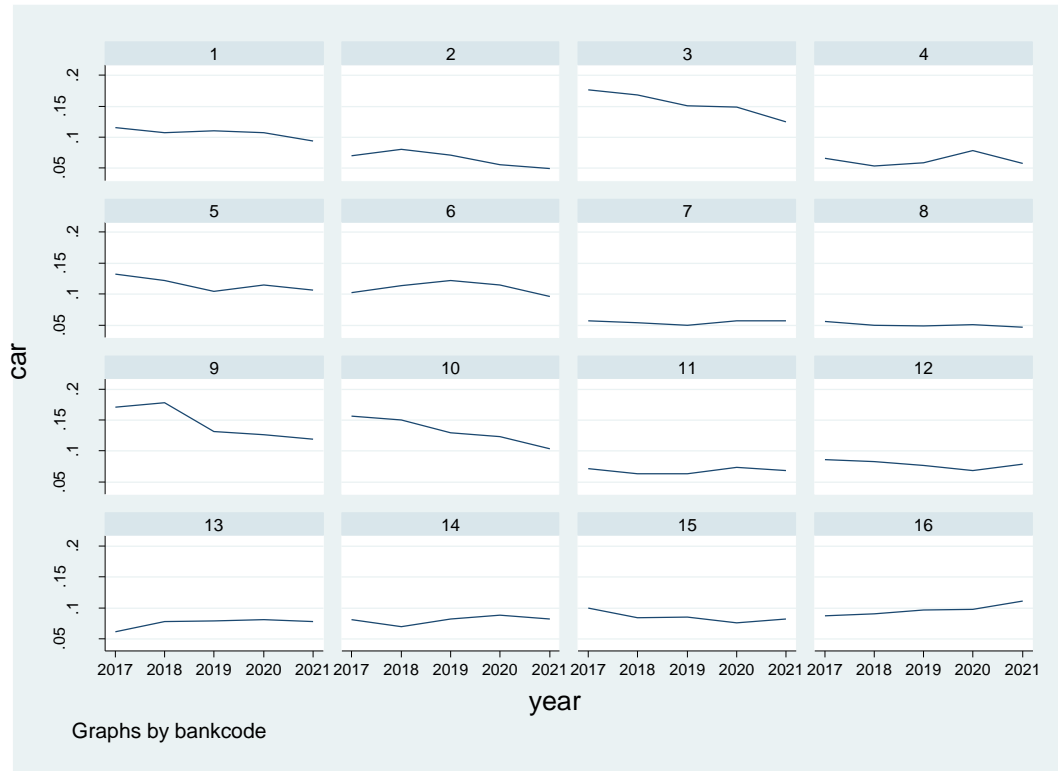
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Annex

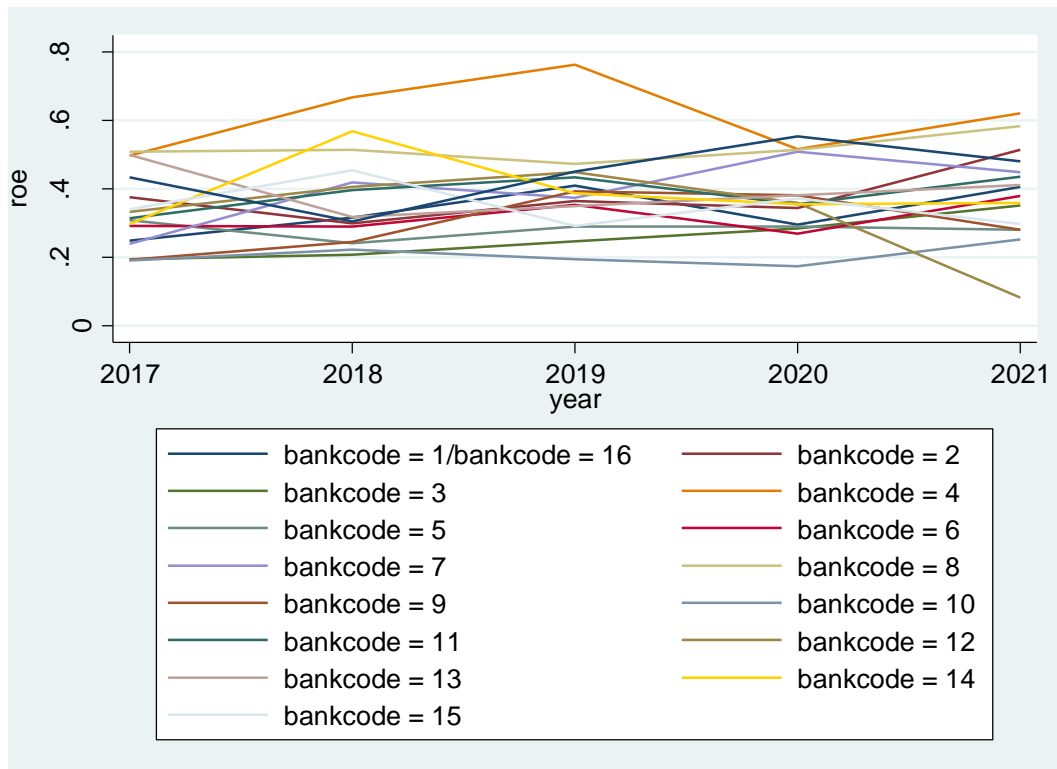
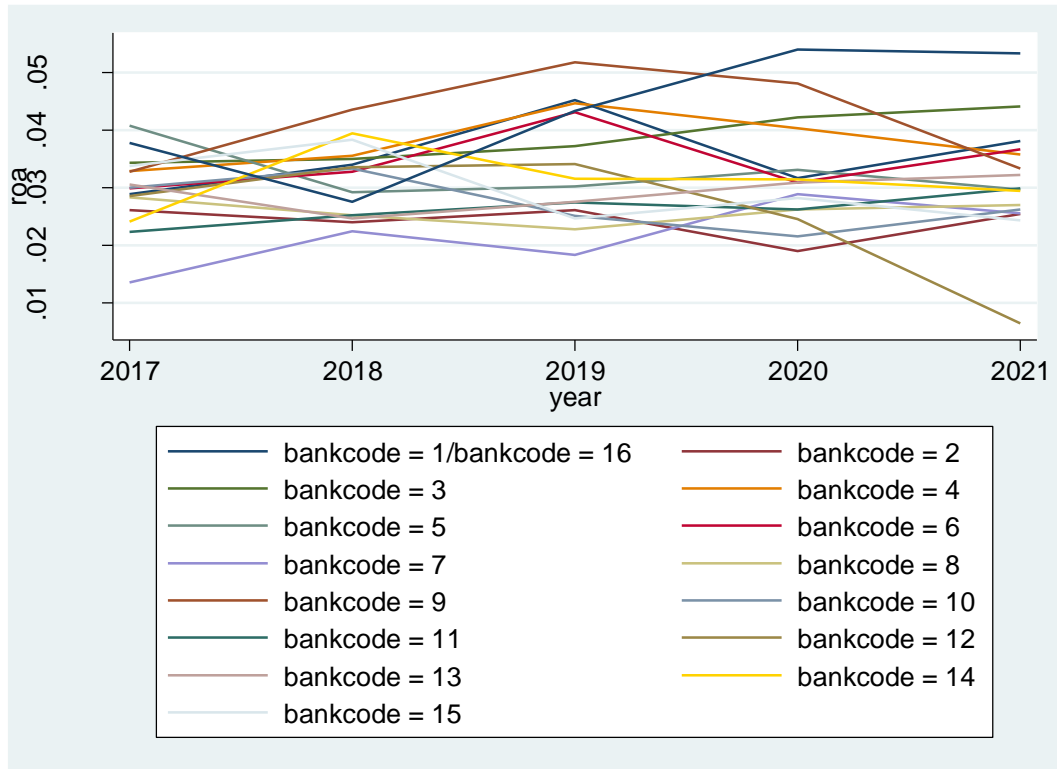
Annex 1. Individual bank's performance

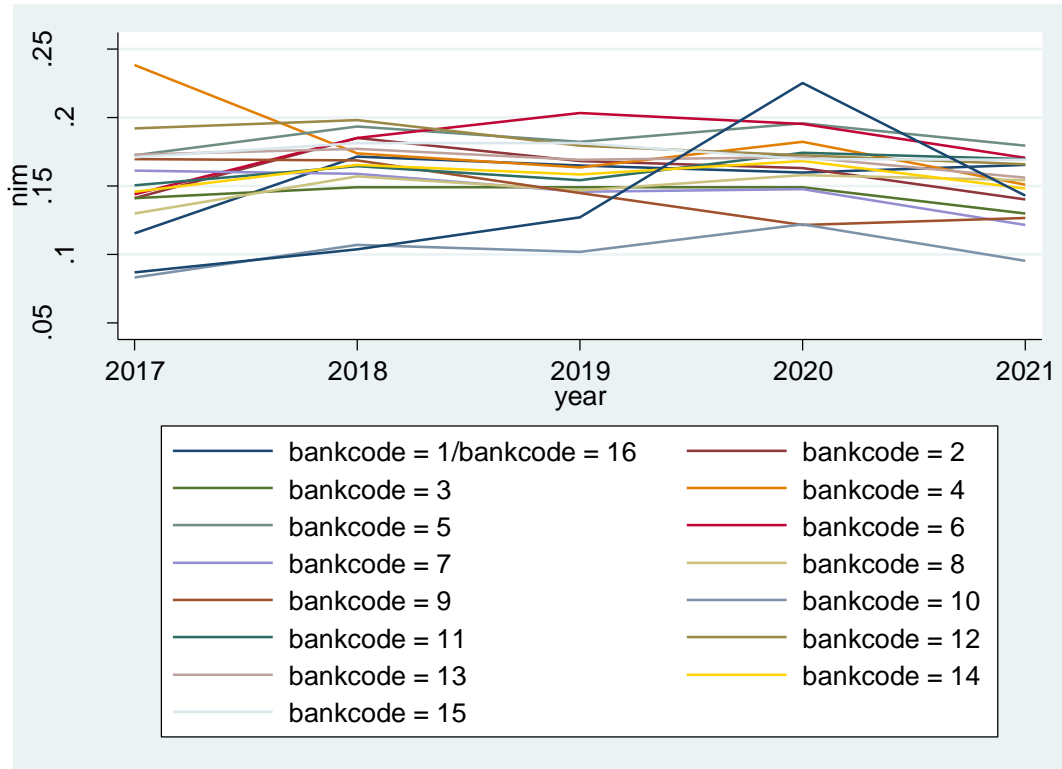


Annex 2. Individual bank’s internal factors

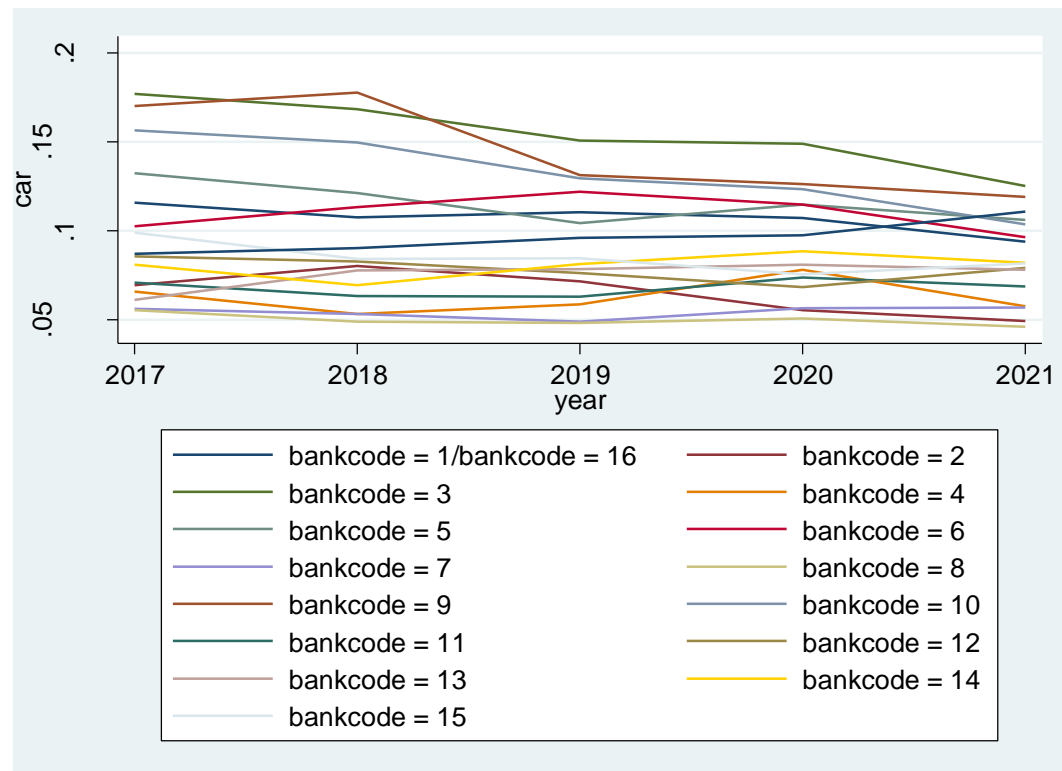


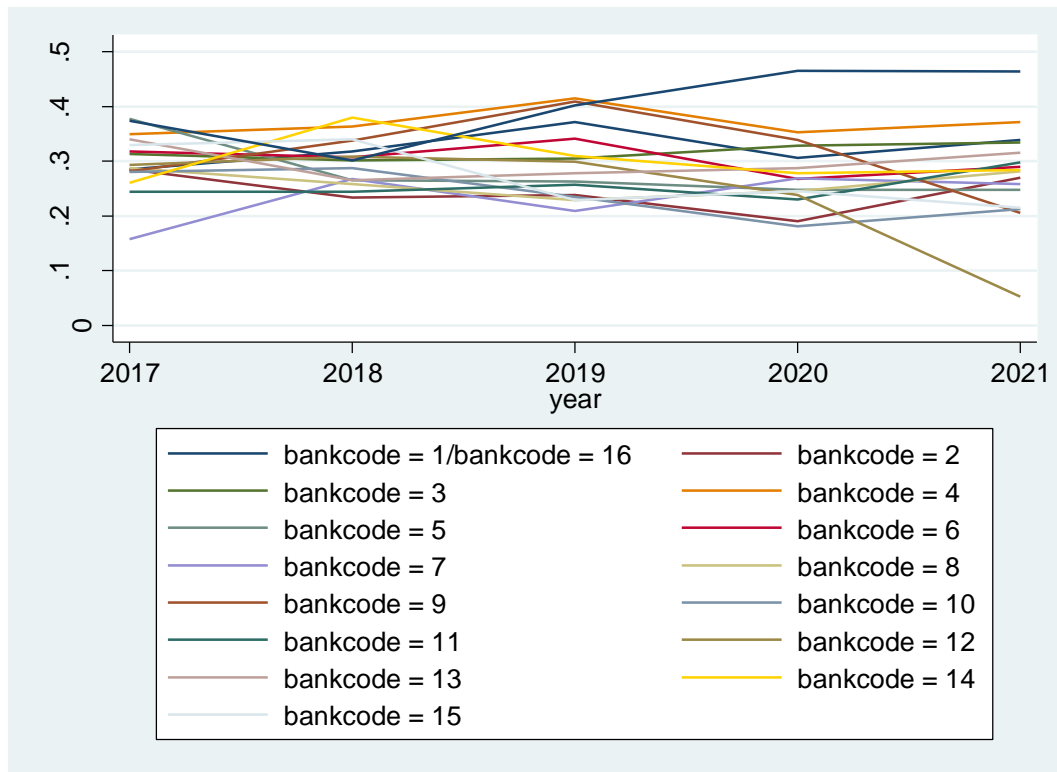
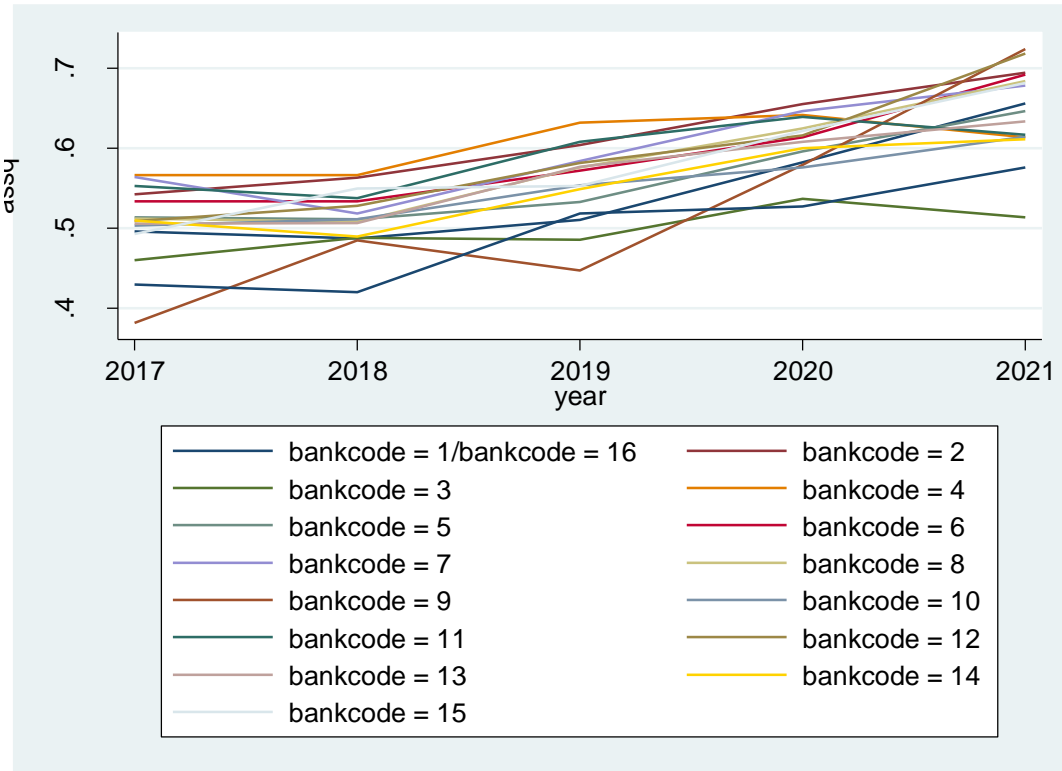
Annex 3. Graph summary for performance indicators

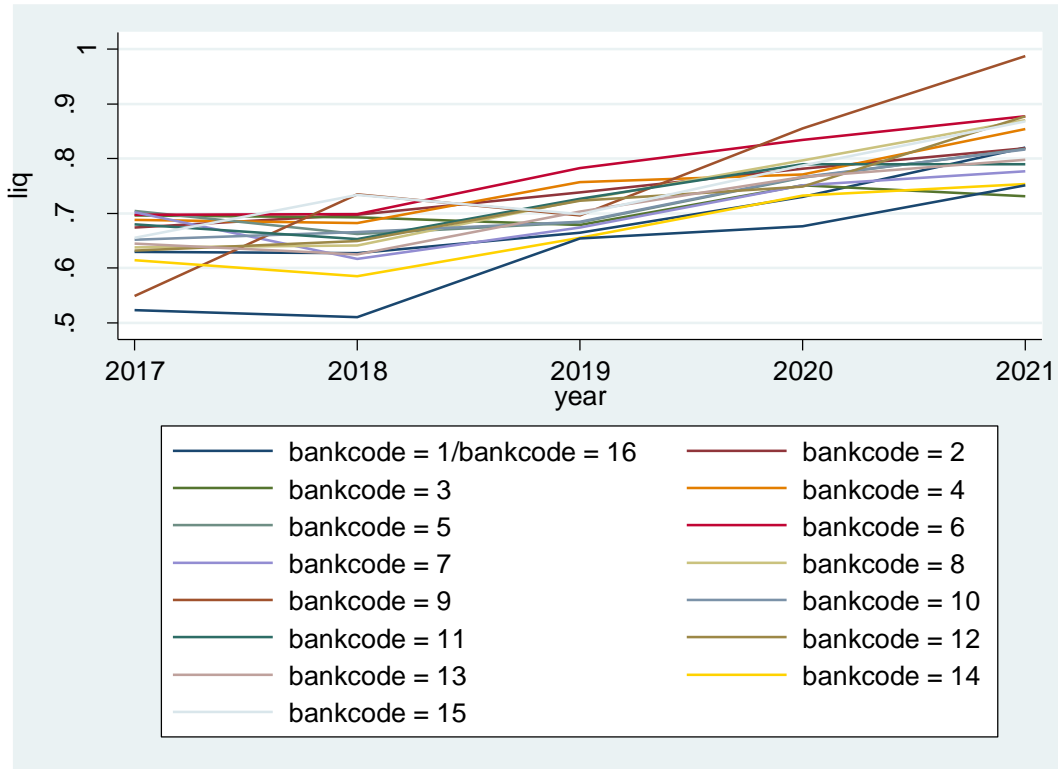




Annex 4. Graph summary for bank-specific factors



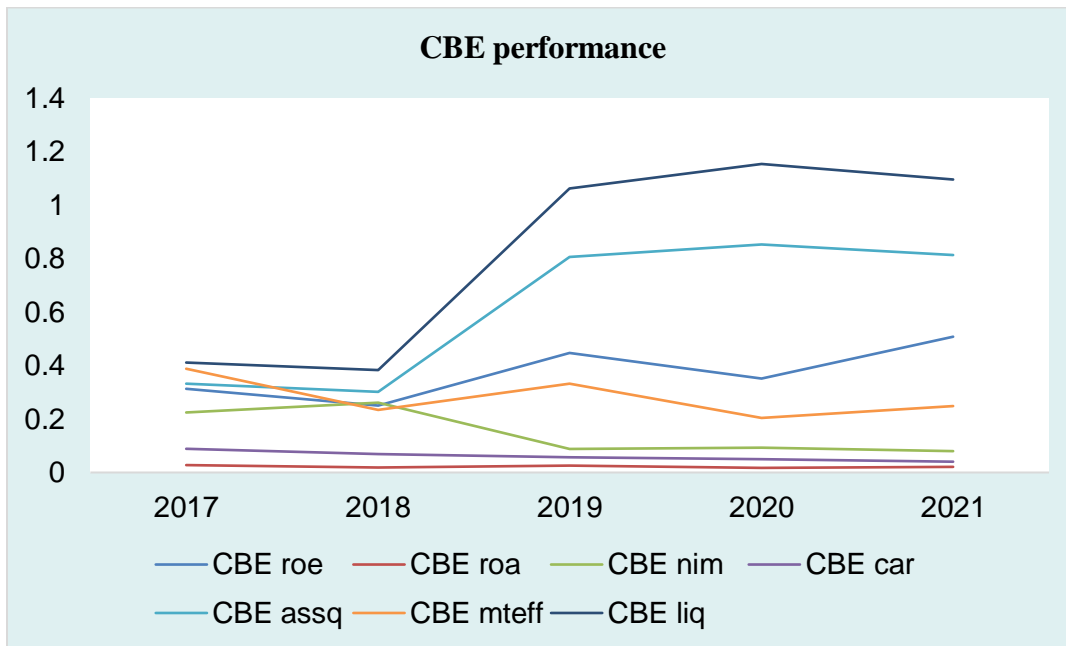




Note: Bank code and its representation (Treatment group)

Bank	Bank code
Abay	1
Abyssinia	2
Addis	3
Awash	4
Birhan	5
Bunna	6
Cooperative BO	7
Dashen	8
Dehub	9
Enat	10
Hibret	11
Lion	12
Nib	13
Oromia	14
Wegagen	15
Zemen	16

Annex 5. Data of CBE (Control Group)



Data Sources

Annual reports of all the private commercial banks

Commercial Bank of Ethiopia. (2020/21). Annual Report.

National Bank of Ethiopia. (2020/21). Annual Report.