INSTITUT DE FINANCEMENT ET DE DÉVELOPPEMENT DU MAGHREB ARABE

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End of Studies Project

Topic :

The Impact of Financial Inclusion on the Financial Performance of Algerian Banks

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DEDICATION

This work is for my mother that has always provided me with love and support and has been with me through every hardship.

It is for my father who left me too early and who would've been very proud to have witnessed it.

To my one and only friend that is the reason I was given this opportunity, Nora. And the person that made this whole experience bearable Nabila. And to my brothers Abdou, Mohammed, Hamza, and Redha and every member of my family that has supported me throughout this experience especially Fayrouz and also little baby Amir for being reason of my joy.

To everyone who believed in me and is happy to see me succeed in life.

SUMMARY

LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
ATM	Automatic Teller Machine
CAR	Capital Adequacy Ratio
ES	Efficient Structure
EVA	Economic Value Added
FINDEX	Financial Inclusion Index
IM	Interest Margin
MP	Market Power Theory
MVA	Market Value Added
NIM	Net Interest Margin
RAROC	Risk-Adjusted Return On Capital
ROA	Return On Assets
ROAA	Return on Average Assets
ROAE	Return on Average Equity
ROE	Return On Equity
SCP	Structure-Conduct-Performance Theory
SMEs	Small and Medium Enterprises

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ABSTRACT

This study investigates the relationship between financial inclusion and banks' financial performance in Algeria using annual data of 17 active banks from 2014 to 2021. Financial performance is measured by Return on Assets (ROA) and Interest Margin (IM) of these banks. To ensure the robustness of our results, we calculated the Financial Inclusion Index (Findex) for each bank as well as three separate dimensions of the Findex. These are the Access Index, the Use Index, and the Depth Index. We found a significant impact of financial inclusion on performance when measured by ROA and IM, although our study displays different results when considering the effect of Findex separately. The results show there is a negative impact of financial inclusion on the financial performance of Algerian banks

Keywords: Financial Inclusion, Financial Performance, Algeria banks, Findex, Panel Data

RÉSUMÉ

Cette étude examine la relation entre l'inclusion financière et la performance financière des banques en Algérie en utilisant les données annuelles de 17 banques actives de 2014 à 2021. La performance financière est mesurée par le rendement des actifs (ROA) et la marge d'intérêt (IM) de ces banques. Pour assurer la robustesse de nos résultats, nous avons calculé l'indice d'inclusion financière (Findex) pour chaque banque ainsi que trois dimensions distinctes du Findex. Il s'agit de l'indice d'accès, de l'indice d'utilisation, et de l'indice de profondeur. Nous avons trouvé un impact significatif de l'inclusion financière sur la performance lorsqu'elle est mesurée par le ROA et le IM, bien que notre étude affiche des résultats différents lorsqu'on considère l'effet du Findex séparément. Les résultats montrent qu'il y a un impact négatif de l'inclusion financière sur la performance financière des banques algériennes.

Mots clés: Inclusion Financière, Performance Financière, Banques Algériennes, Findex, Données de panel

General Introduction

General Introduction

Banks have been repeatedly proven to be one of the most important pillars of every economy. This is more the case in emerging countries such as Algeria. Banks are responsible first and foremost for creating a strong basis and ground that allows a sustainable and healthy economic growth. They are implied in several areas starting with their main mission of being an intermediate between economic agents with clashing financial needs. But as a result of the many changes occurring in their environment, banks started progressively taking on other important roles and their position in the financial sector has been further highlighted.

In Algeria, the banking system is considered the most important component of the financial sector and it helps in every aspect of the economy. The finical market in Algeria remains very underdeveloped and banks face little to no competition from other similar sectors. Hence, the banking sector is most responsible for providing inclusive access to various financial services in order to allow the contribution of all businesses and individuals to the economy.

Similar to other central banks around the world and following the many encouragements given by the World Bank, the Central Bank of Algeria has also stressed on the importance of providing inclusive financial services to all categories of the population. Financial Inclusion not only enhances financial development but also makes a positive impact on people's lives by reducing inequality, poverty and bettering living conditions in general by providing safe and effective financial services. This will boost investments, the creation of more businesses and providing more job opportunities for the disadvantaged. Formerly excluded or marginalized people will from now on play part in the dynamics of the financial and economic sector and help achieve prosperity within the country.

Not only banks, but the system in general aims to maintain a very well performing banking system given its importance within the economy. Many academicians cared to study the financial performance of banks in order to provide information to different parties. One of them being banks' management that often relies on such information in their process of decision making as it is in the interest of the bank to select and invest in fields that are profitable and that positively impact their financial performance.

Financial Inclusion is a factor that is directly related to banks' financial performance, as it often calls for different kinds of investments and efforts from the bank in order to reach

new portions of the population that can eventually become clients responsible for parts of the bank's profits by using the different products and services offered by the latter. For this specific reason, it is important to assess the impact of financial inclusion on the financial performance of banks.

Problem Statement:

This study aims to study the relationship between financial inclusion and financial performance of Algerian Banks, the fundamental question to this research is as follows:

What is the role of Financial Inclusion in determining the financial performance of Algerian banks?

Guiding research questions:

-How do different dimensions of financial inclusion influence banks' profitability?

-Does financial inclusion influence banks' income?

-What are the other factors affecting Algerian banks' profitability?

Hypotheses:

- There exists an insignificant impact of Financial Inclusion on the financial performance of Algerian banks.
- There exists a significant impact of Financial Inclusion on financial performance of Algerian banks
- There exists a positive impact of financial inclusion on the financial performance of Algerian banks.
- There exists a negative impact of financial inclusion on the financial performance of Algerian banks.

Significance of the study:

This study will allow a better understating of the Algerian banking sector and its dynamics. It will help further the understating of the concept of financial inclusion and its effects on the banking sector and the economy in general.

The findings of the study can also serve banks' management and be beneficial for their decision-making process. in addition, it can be a baseline for other academicians or students willing to make more exhaustive studies on this specific topic or others related to it.

Motivation of the research:

Financial inclusion is a matter that is currently pushed to the front by the world bank as well as many central banks as it has been proved to give a boost to the economy. In Algeria, the banking sector plays a major role in raising the levels of financial inclusion. in 2020, during the covid -19 pandemic we started seeing banks developing their digital and electronic services at a faster rate in order to reach more clients. This led us to question whether there is a relation between financial inclusion and bank profitability and how is financial inclusion impacting the financial performance of banks.

Construction of the study:

This study is composed of three (03) chapters. The first chapter explains the financial performance of banks. It talks about the different theories of banking performance as well as financial performance measures and determinants. The second chapter is dedicated to financial inclusion and its relation with banks' financial performance, it introduces the different concepts related to it and also discusses its determinants as well as its different measures. The third and final chapter contains an analysis of the Algerian banking sector as well as the empirical study. This study chose to use panel data regression along with empirical tests to examine if financial inclusion influences bank profitability.

Chapter One: Financial Performance of Banks

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Introduction

Researchers have been interested in the study and analysis of banks' financial performance for many decades. This is due to the fact that many parties are concerned about banks' performance and their profitability. Investors have to inspect banks' performance to guarantee the return on their investments. Regulating bodies also need information about banks' financial performance as it not only helps ensuring that regulations and norms set by the authorities are being respected, but it also guarantees the good health of the institution as well as the safety of its depositors. But most importantly, banks' management are the most concerned about its performance and every aspect that might be affecting it, as they always aim to find ways to improve the performance of the bank, hence, a throughout analysis of the bank's financial performance is a necessary basis for their future decision making.

This diversity in the needs and interests of different parties is reason for the abundance of both theoretical and empirical research on banks' financial performance. Literature provides studies on different aspects relating to banks' financial performance such as its different measures and determinants.

Through this chapter, we aim to cover the most important concepts related to the financial performance of banks. The first section contains a theoretical background of the topic. The second section lists the different measures of financial performance in banks. And the third section deals with the different factors and determinants of a bank's financial performance.

Section One: Theoretical Background of Banking Performance

To understand the conceptual framework of this study and justify the choice of variables as well as the interpretations given to certain phenomena and results. It is necessary to go through the literature treating the different theoretical aspects of financial performance in banks. As results and interpretations differ among several authors and studies, explaining bank's financial performance has become a delicate matter. This section will ease the understating of the different theories and outcomes and will be of use in deciding on a framework for this study and selecting a way that seems most suitable to explain the financial performance of banks.

The section starts by highlighting the key points of banking performance' literature. It then presents the major theories of banking performance introduced and used by different authors and academicians. Finally, it explains the concept of profit maximization in banking institutions.

1.1 History of banking performance

The investigation of the financial performance of commercial banks has been brought to the interest of researchers in the the1940s during the period of the great depression (Ongore, 2013). Academic research has since then sought ways to explain and measure the performance of banks.

A more structured and organized study of banking performance started in the late 1980s due to The Banking Crisis of the 1980s and early 1990s which witnessed the failure of more than 1,600 banks. During this period, the banking sector experienced major transformations in its environment. After the introduction of Structural Adjustment Programs (SAP) in the late 1980s, and the application of Market Power (MP) and Efficiency Structure (ES) theories (Athanasoglou et al, 2005), more countries started reducing the regulations directed to banks and the government involvement by giving banks more freedom and flexibility, i.e.: in establishing interest rates. Moreover, many countries opened the doors for foreign investments allowing foreign banks to join the sector in the form of subsidiaries and branches (Ismi, 2004).

These new reforms raised the interest of researchers that wanted to analyze the effects of this evolving environment. Their main focus was on the deregulation of the sector and its

effects on the profitability and the performance of banks. This resulted in more structured studies and investigations in the field of financial performance.

- **Regulation of banks:**

The poor performance of the banking sector will undoubtedly lead to crises and failures of banks. This by default puts the banks' clients at risk and could affect the entire country's economy, and by contagion, it may result in a global financial crisis as it was the case for the 2007 crisis in the USA.

After the reoccurrence of many incidents and crises that had serious repercussions on the financial sectors and economies of several countries. Governments and central banks understood the need of establishing regulations in the banking sector in order to maintain a sound and healthy financial and banking system, avoid crises, and protect the depositors of banks.

In 1974, The Basel Committee on Banking Supervision, widely known as the Basel Committee was created. BASEL committee is considered to be the primary and global prudential regulation setter for banks. It was established to enhance financial stability, improve the performance of the banking sector, and standardize banking practices all over the world. The BASEL committee, and through its different publications, sets rules, recommendations, and guidelines for the practices of banks.

In 1998, the first set of regulations issued by the Basel committee, Basel I was introduced. It is the first Basel accord and it defined the minimum capital requirements for financial institutions. The primary goal of Basel I was minimizing credit risk. Thus, the Accord suggests that all banks keep a minimum ratio of capital to risk-weighted assets of 8%. This accord received a lot of criticism as it only took in consideration one type of risk (credit risk) and would later on evolve to include other forms of risk such as operational risk and liquidity risk and introduce upgraded and in-depth regulations for banks and the banking sector.

Consequently, Basel II was published in 2004, it contained three pillars, the first one expanding the minimum requirements of capital set in Basel I, the second putting an emphasis on regulatory supervision, and the third on Market discipline. However, Basel II still had weaknesses that emerged during the subprime mortgage meltdown and the Great Recession of 2008 when it became clear that Basel II underestimated the risks involved in current banking practices and that the financial system was overleveraged and undercapitalized.

In response to the 2007-2008 crisis, Basel III was introduced in 2009 to improve the regulation, supervision, and risk management of the banking sector. Most importantly, it introduced leverage and liquidity measures. This is because the main cause of the crisis was the high levels of leverage in banks and their low levels of liquidity.

Bringing up the Basel accords while talking about bank's performance is necessary because Basel accords, and other norms and regulations, have a big part in shaping banks as they are today. They influence their capital structure and also put limits to their risk appetite. The norms usually encourage banking institutions to increase their capital levels and choose less risky investments and assets. Hence, these capital and management requirements are affecting the structure and the decision making in banks and, consequently, affecting its performance.

1.2 Theories of banking performance

Many approaches were developed and used in empirical literature to explain and understand performance in the banking sector as an attempt to measure and understand the different factors affecting it such as: competition, concentration, efficiency, productivity, and profitability (Bikker and Bos, 2005). The most known theories are: Efficient Structure (ES) Theory, The Market Power (MP) Theory, and The Balanced Portfolio Theory.

2.2.1 Efficient Structure (ES) Theory:

The Efficient Structure Hypothesis postulates that there is a linkage between bank profitability and internal factors. It posits that banks earn high profits because they are more efficient than others. According to ES theory, market concentration is not a random event but rather the result of the superior efficiency of the leading firms. Firms possessing a comparative advantage in production become large and obtain a high market share and, as a consequence, the market becomes more concentrated. (Demsetz, 1973).

There are also two distinct approaches within the ES theory; the X-efficiency and Scale–efficiency hypothesis.

- *X-efficiency approach:*

According to this approach, the more profitable banks are the more efficient, because they manage to operate at lower costs. This will allow them to expand their client basis and their market shares, eventually leading to higher levels of market concentration.

- *The scale approach:*

This approach postulates that larger firms can lower their costs profiting off economies of scale. This enables them to acquire more market shares, resulting in a higher concentration of the market, allowing them to become more profitable.

2.2.2 The Market Power (MP) Theory:

The MP theory states that the performance of a bank is influenced by the market structure of the industry. This hypothesis suggests that firms with a large market share can earn monopolistic profits and win against their competitors.

There are also two distinct approaches within the MP theory; the Structure-Conduct-Performance (SCP) and the Relative Market Power hypothesis (RMP).

- *The SCP approach:*

According to this approach, the level of concentration in the banking market gives the bank more Market power, resulting in a raise in their profitability. Banks in more concentrated markets are most likely to make "abnormal profits" by their ability to lower deposit rates and to charge higher loan rates as a result of collusive (explicit or tacit) or monopolistic reasons, than firms operating in less concentrated markets, irrespective of their efficiency (Tregenna, 2009).

- *The RMP hypothesis:*

Unlike the SCP, the RMP hypothesis posits that bank profitability is influenced by market share. It assumes that only large banks with differentiated products can influence prices and increase profits. They can exercise market power and earn non-competitive profits.

2.2.3 Balanced Portfolio Theory:

Another theory that adds a new dimension to explaining banks' financial performance is the Balanced Portfolio Theory BPM. It states that the portfolio composition of the bank as well as its profit and the return to the shareholders, is the result of the decisions made by the management and the overall policy decisions. According to it, portfolio and asset diversification and getting desired optimum portfolio composition for a bank is bound to the decisions taken by the bank management. Further, the ability to obtain maximum profits depends on the feasible set of assets and liabilities determined by the management and the

unit costs incurred by the bank for producing each component of assets (Nzongang and Atemnkeng, 2006).

1.3 The concept of profit maximization

A key assumption in literature is that banks are profit-maximizing entities (Bikker and Bos, 2005). Profit is the ultimate goal of commercial banks, thus all the strategies designed and activities performed are meant to realize this grand objective (Ongore and Kusa 2013). It is in the interest of their shareholders to maximize their profits guaranteeing them a good return on investment. The economic theory introduces profit maximization as an equivalent to cost minimization given a perfectly competitive situation. This however, is not the case in practice, as by the effect of many other factors that will be explained below, banks will seek to maximize their profits without necessarily searching for cost minimization. This is dependent on the bank's management and strategies as they can choose different inputs and outputs at different price levels depending on the following factors:

1.3.1 Risk and diversification:

Different banks have different attitudes towards risk. Some banks might be ready to support higher levels of risk in order to obtain better return, while others will be more risk averse and choose investing is secure assets only. Therefore, shareholders will have to adjust their expected profits and the costs they will have to support according to the amount of risk they're willing to take. Banks should also pay great attention to the diversification of their portfolios. Some banks are not well diversified and are extremely risk-averse. This will affect their opportunity to profit from the high-risk high-return investments.

This type of attitude and decision is solely dependent on the bank's management and shareholders as they have different risk-return preferences. Literature has attempted to introduce variables explaining the bank's risk attitude but it is still very difficult to understand, measure, and describe the exact bank preference towards risk.

1.3.2 Incentive structures:

Diamond (1984) states that just like other firms, banks may also suffer from moral hazards and other incentive problems. While searching for profit maximization and cost minimization, one major problem that banks face is the principal agent theory. Shareholders do not have access to complete information held by the managers. Therefore, they have to

find ways to monitor and penalize managers and minimize the effects of this principal-agent problem. This may generate additional costs such as audit costs.

A vast amount of literature exhibited ways of minimizing the negative effects of the principal-agent problems such as: pecuniary and non-pecuniary incentives and yardstick competition. Price and non-price competition…etc. another way of reducing these effects is by using signaling devices such as ratings. Hence, these problems can be minimized and controlled and only remain problematic if the principal (a stakeholder) is unable to insure himself against excessive risk-taking tendencies of the agent.

1.3.3 Imperfect competition:

Banks' performance is affected by the changing environment in which they operate and the behavior of their competitors. Hence, we have to take into consideration market power while discussing dimensions of bank profit maximization. Banks are bound to the behavior of their competitors.

A bank that detains bigger market power will have more freedom in deciding on the prices of the products and services they offer. Meanwhile, a bank that does not have that big of market power, will have to align with the competition or at least offer competitive prices. This Imperfect competition leads to a situation where profits are maximized at a level of production where average costs are no longer minimized. It can therefore be used to explain changes in profitability over time and between banks.

1.3.4 Different use of inputs and outputs:

If a bank has a better transformation process and a better cost management overall it may be able to produce at lower costs and achieve higher profits than other banks. Managers should allocate their resources accordingly to minimize costs and maximize profits. On the longer term, all banks have to operate efficiently in order to survive.

Another consideration of bank profit maximization, consequently, concerns efficiency. Efficiency plays an important role in explaining the forces behind bank performance. In addition, it can help measure and interpret banking performance.

Section Two: Measures of Financial Performance

A study of literature has shown that many tools have been used as a measure of financial performance, these measures are important tools of financial analysis, providing information about bank performance. The commonly used measures are profitability measures like: Return on Asset (ROA), Return on Equity (ROE), and Net Interest Margin (NIM). These are considered traditional measures. Other measures were also introduced and used in literature such as economic measures like Economic Value-Added (EVA), and Market Value Added (MVA), and Risk-based measures such as Risk-Adjusted Return on Capital RAROC, among many others.

In this section, we will divide the measures into three categories, starting with traditionally used performance measures such as ROE, ROA, and NIM, and then the Value-based measures; EVA and MVA and finally risk Risk-Adjusted Performance Measures focusing on RAROC.

2.1 Traditional measures of performance

These measures are widely used and are usually of a financial or an accounting nature. They have advantages such as being easy to calculate, being grounded on historical data and accounting, hence the relevant information for their calculation is available in financial statements. Their main aim is to assist analysts when choosing different investment options.

2.1.1 Return On Assets (ROA):

ROA is a major ratio that indicates the profitability of a bank. It indicates the relation between the latter and the total assets of the bank. It describes how well the bank is utilizing the assets at its disposal in order to generate profit. In other words; how efficiently the resources are being used and managed to generate income (Khrawish, 2011). Thus, a higher ROA shows that the company is more efficient in using its resources (Wen, 2010).

It is calculated by dividing the net income of a bank by its total assets:

$$ROA = Net\ income/Total\ Assets$$

ROA is typically considered the most suitable ratio for assessing the performance of a bank (Sinkey, 1998). This measure of bank profitability is particularly relevant when comparing operational efficiencies across banks. A higher ROA shows that the company is

more efficient in using its resources (Ongore, 2013). Banks' assets consist of loans, investments, cash, and physical assets such as buildings, land, and equipment. ROA helps measure how the bank is using these different assets in order to generate profit. This means that a bank aims for a high ROA ratio indicating it is using its assets effectively in order to generate earnings. This is a good way to see how well a bank has done compared with previous years or to management's expectation. It is also used to compare the bank with other banks in the sector.

There have been critics brought to ROA and its accuracy as a measure of profitability in banks. ROA might be biased due to off-balance-sheet activities. Moreover, Rates of return on total assets do not show how well the bank is performing for its owners. Thus, bankers and bank stockholders look closely at other indicators instead such as ROE.

2.1.2 Return On Equity (ROE):

ROE is one of the most important Ratios when it comes to measuring banks' profitability. It refers to how much a company earns and its ability to generate profits through utilizing the equity invested by shareholders. Thus, ROE tells us how much the shareholders are earning on their investments.

This ratio is calculated by dividing a bank's net income by its equity:

$$\boldsymbol{ROE = Net\ Income/Equity}$$

ROE is an internal performance measure of shareholder value. The higher the ROE the better the company is in terms of profit generation. ROE reflects how effectively a bank management is using shareholders' funds whether to improve the return earning or to keep the bank in a good position. Thus, it can be deduced from the above statement that the better the ROE the more effective the management is in utilizing the shareholders capital.

Even though ROE is the most well-known performance indicator, widely used by market participants. It does not escape from critics that ROE has exposed banks to higher unexpected risk levels and opened the door to a shorter-term oriented approach. The financial crisis of 2007-2008 has shown how ROE failed to discriminate the best performing banks from others in terms of sustainability of their results. It is a short-term indicator and must be interpreted as a snapshot of the current health of institutions. It does not take into account the institution's long-term strategy or the long-term damages that could be caused by a crisis.

2.1.3 Net Interest Margin (NIM):

Another method of measuring bank performance is the net interest margin (NIM). NIM is a measure of the difference between the interest income generated by banks and the amount of interest paid out to their lenders, relative to the amount of their assets. NIM measures the gap between the interest income the bank receives on loans and securities and interest cost of its borrowed funds. It reflects the cost of bank intermediation services and the efficiency of the bank.

NIM is usually expressed as a percentage of what the bank earns from interest received on loans minus the interest paid on deposits or borrowed funds divided by its total assets. It is calculated as follows:

$$\boldsymbol{NIM = (Interest\ recieved - interest\ paid)/Total\ Assets}$$

Commercial banks main activity, as well as its first source of income is collecting deposits and giving loans to individuals and businesses. NIM is interesting because it measures the proportion of earnings drawn to the bank through its main activity which is intermediation. The higher the net interest margin, the higher the bank's profit and the more stable the bank is. Thus, it is one of the key measures of bank profitability. However, a higher net interest margin could reflect riskier lending practices associated with substantial loan loss provisions (Khrawish, 2011).

NIM is also used as a tool to measure how well the assets and liability management (ALM) is within the bank. If the bank is able to raise funds with liabilities that have low interest costs and is able to acquire assets with high interest income, the net interest margin will be high, and the bank is likely to be highly profitable. If the interest cost of its liabilities rises relative to the interest earned on its assets, the net interest margin will fall, and bank profitability will suffer (Frederick, 2014).

The use of NIM can be questioned for banks that focus more on activities other than lending and collecting deposits, which is the case for most banks now with the emergence of universal banks. NIM will be a less accurate measure for this type of bank because it doesn’t take in consideration profits made off the banks’ other investments as well as different commissions.

2.1.4 Limitations of traditional measures:

These measures although widely used, still lack in many areas and do have a number of limitations that push towards developing and using other measures.

One of the main critics addressed to these measures is that the data representing the basis of their calculations is obtained from accounting results that makes their accuracy a bit debatable given the fact that accountants can use alternative calculation methods, and are also bound to regulations that can change over time. A second critic is that these profitability measures use the net income of the bank which does not necessarily reflect the cash flows. Moreover, these measures do not include the time value of money in their calculation and do not take in consideration many important factors such as operational risk and the opportunity cost of equity.

2.2 Value-based measures

The management's main task is to focus on value creation for the shareholder. Before the 1980s, only a few companies gave importance to this concept. But in 1986 managers started to become aware of the importance of the topic of value creation for their companies[1]. As more interest was raised on this topic; new value-based performance assessment measures emerged.

2.2.1 Economic Value Added (EVA):

EVA is a quite popular measure used by companies to assess economic value; it calculates the wealth generated by a bank after taking into account the cost of the capital employed. This measure derives from the concept of residual profit, since its purpose is to ascertain whether the return carried out by the investor is enough to compensate the underlying investment and risk. Including a cost for the use of equity capital is what sets EVA apart from more popular measures of bank performance, such as ROA, ROE, and NIM which do not consider the cost of capital employed.

Its calculation is obtained by subtracting cost of capital (both equity and liability) from net operating results of taxes. A positive value of EVA indicates value creation; however, a negative value indicates value destruction.

[1] Following the publication of the book "Creating Shareholder Value" in 1986

EVA has many advantages to present, first, its implementation in companies is easy and its interpretations are easily understood by managers. EVA also allows the analysis of the company as a whole or in sections. EVA is designed to offer managers better information and motivation to make decisions that will create greater shareholder wealth.

2.2.2 Market Value Added (MVA):

MVA is a natural evolution of the EVA concept. MVA is defined as the difference between the market value of the company (both equity value and debt value) and the total value of invested capital (equity and debt accounting value). According to Uyemura (1996) MVA is a definitive and cumulative measure of value creation. MVA is seen as definitive because it measures the difference between the initial capital invested and the value to be received when selling shares in the market. However, two distinct scenarios may occur: either the market value is higher than the invested capital, which implies a positive MVA; or the market value is lower than the invested capital, which in this case implies a negative MVA. MVA is also seen as a cumulative measure for expressing the assessment made by a market in a given point in time of the past performance, as well as of future expectations.

2.3 Risk-adjusted performance measures

After Basel II, institutions were authorized to develop internal assessment methods of their financial risks. The Value at Risk (VaR) methodology has thus been developed, and served as a basis for the development of Risk-Adjusted Performance Measures (RAPM), which have been increasingly accepted and growing in importance. These measures aim to establish a ratio between risk-adjusted profitability and risk-adjusted capital or economic capital. Some of the performance assessment measures that were previously addressed are able to calculate an estimate of the generated value for the shareholder, thus overcoming a few limitations of traditional indicators. However, such measures do not provide enough information on risk. Therefore, by using risk-adjusted performance assessment measures, the institution can make decisions on a different level while always maintaining the concept of value creation for the shareholder.

There are many risk-adjusted performance assessment measures that derive from RAROC, such as Return on Risk-Adjusted Capital (RORAC) and Risk-Adjusted Return on Risk-Adjusted Capital (RARORAC). But we will focus on the study of Risk-Adjusted Return On Capital (RAROC) in this paper.

2.3.1 Risk-Adjusted Return On Capital (RAROC):

RAROC was first developed in the 1970s by a group of workers of "Bankers Trust". RAROC aims to measure the bank's loan portfolio risk, as well as to assess the amount of equity needed to limit the exposure of depositors to a given probability of loss. RAROC is currently seen as a measure assisting the process of decision-making in institutions at a financial level, and its main objective is ensuring that the return of operations is in accordance with the assumed risk. RAROC can be used to achieve several goals, such as: a more efficient capital allocation; performance assessment of the various operations; determining different spreads for credit operations according to expected losses, and comparing profitability of several business segments. It is calculated as follows:

$$RAROC = \frac{Risk\ Adjusted\ Return}{Economic\ Capital}$$

Section Three: Determinants of Financial Performance

A bank is a complex organization that operates in an evaluative and unstable environment both internally and externally. On an internal level, a bank has a complex structure as it is different from any other organization, a bank's asset quality, its management, as well as many other components represent the internal environment of a bank. On the external level, a bank is also bound to many regulations and laws put in place by authorities. Furthermore, it is part of a bigger economic environment which puts it under the influence of the changes of macroeconomic variables.

Any changes of this external and internal environment can significantly influence the bank and its performance. These changes can be influenced by many factors both internally and externally.

In this section, we will exhibit the different determinants of financial performance recognized through literature. These determinants will be categorized into "bank specific determinants" and "external determinants".

3.1 Bank specific determinants

The internal factors are bank specific variables which influence the performance of the bank. These factors are usually within the scope of the bank to manipulate and they differ from bank to bank. Banks that perform well are normally characterized by good management

of internal factors and these are the factors that can be manipulated by the management of the firm for better and improved performance. This has resulted in the identification of various internal factors that influence performance.

3.1.1 Size:

The size of a bank is a very significant determinant of its performance. The size of a bank is usually measured by the size of its assets or its total deposits and it affects its profitability as it directly or indirectly impacts a few aspects of the bank. The SCP theory previously presented in this study postulates that relative size of a firm expands its market power and as a result, its profits. However, the effect of a bank's size on profitability is not settled in the literature as different studies regarding bank size concluded mixed empirical results.

The first relationship between the size of a bank and its profitability can be expressed through the economies of scale (Goddard et al, 2004). This allows them to provide services at lower costs, bigger banks have a lower cost of raising capital and this cost is significantly reduced the bigger the bank is.

A second relationship would be that big sized banks have easier possibilities of expanding geographically (Goddard et al, 2004) to more interesting regions where competition is significantly lower, this will allow them to increase their customer base leading to more customer deposits. These deposits will increase the lending capacity of the bank thus increasing its profit margins.

Another relationship between size and profitability (Ongore and Kusa, 2013) is in regards of the banks' ability to make large investments in technology and cost reducing factors that will increase the banks efficiency and automatically attract more customers. Bigger banks also have the privilege to easily profit off strategic partnerships that can possibly improve its financial performance.

3.1.2 Capital Adequacy:

Capital is one of the factors that have a complex relationship with banks' performance. It is delicate for a bank to find an optimal capital structure and ratios as the effects of capital structure can be both positive and negative for banks' performance.

Low levels of equity will result in high levels of ROE, thus if we're measuring performance by ROE, banks with lower levels of equity are better performing. The level of capital is limited by prudential regulation thus, banks will have to maintain a minimum level of equity.

However, Banks with higher levels of equity have lower level of risks. Equity and risk are absolutely interlinked because the banks' risk appetite influences its choices of capital structure. Higher levels of equity also give banks the opportunity to grow their capital through loans, leading to more investments and helping the bank expand. In contrast, debt can generate extra costs to the bank, thus, deciding on a bank's capital structure is very complicated.

The adequacy of capital is judged on the basis of capital adequacy ratio (CAR). CAR shows the internal strength of the bank to withstand losses during crisis. Capital adequacy ratio is directly proportional to the resilience of the bank to a situation of crisis or unexpected changes. It has also a direct effect on the profitability of banks by determining its expansion to risky but profitable ventures or areas (Sangmi and Nazir, 2010). Capital adequacy is a reflection of the inner strength of a bank, which would put it in good position during the times of crisis. Capital adequacy may have a bearing on the overall performance of a bank, like opening of new branches, fresh lending in high risk but profitable areas, manpower recruitment and diversification of business through subsidiaries or through specially designated branches.

In practice, many researches have tested the effects of capital on banks' performance. Staikouras and Wood (2003) findings support the existence of a positive link between a greater equity and financial performance among EU commercial banks. Abreu and Mendes (2001), Goddard et al. (2004) both claim that that there is a positive impact of the equity level of a commercial bank on the financial performance of that bank.

3.1.3 Liquidity:

Another important decision, that managers of commercial banks take, is in relation with liquidity management. The importance of liquidity goes beyond the individual bank as a liquidity shortfall at an individual bank can have systemic repercussions and cause damage to the entire banking and financial system**.** High liquidity and having enough liquid and easy to liquidate assets can be seen as positive or negative to banking performance depending on the interpretation. There is no doubt that insufficient liquidity can be the reason of failure of many

banks. If banks do not have enough liquidity to complete their day-to-day operations and answer their clients' needs and withdrawals, they will be put in a critical situation. The best proof is the 2008 financial crisis that was mainly due to problems of liquidity in banks. Maintaining sufficient levels of liquidity has since then been very important to banks and it pushed the Basel committee to add additional measures and regulations that would cover the risk of liquidity in banks.

Having high levels of liquidity also allow banks to carry out smoothly their basic functions of lending money and responding to cash withdrawals. However, having too many liquid assets can become an opportunity cost to the bank where they could be generating more profits by using these assets and transforming them into profit generating investments instead of letting them create additional costs.

3.1.4 Management efficiency:

Management efficiency is one of the key internal factors that determine banks' performance (Cekrezi, 2015). Management efficiency can be expressed qualitatively through subjective evaluation of management systems, organizational discipline, control systems, quality of staff, and others. These qualitative factors appear to be an important determinant of profitability. However, these variables are very hard to observe and measure as they require a deep evaluation and understanding of each bank individually. This complexity in measure has led academicians to the use of financial ratios as a proxy to express management efficiency.

Some of the ratios used to measure management efficiency are Operating Profit to Income Ratio, Cost to Income Ratio, and the ratio of Costs to Total Assets. The most used Ratio is cost to income ratio. it is used as a proxy for banks' operational efficiency or expense management. The cost to income ratio is considered as an explanatory variable since it shows how a bank's management is operationally cost efficient in managing the affairs of the bank, which will eventually have an impact on the bank's profitability.

3.2 External determinants

Those factors which are beyond the management's control are referred to as external or macroeconomic factors and these factors are related to the industry and macroeconomic factors. The external determinants are variables that are not related to bank management but reflect the economic and legal environment that affects the operation and performance of financial institutions.

3.2.1 GDP:

Gross Domestic Product is defined as the market value of goods and services produced within a selected geographic area (usually a country) in a selected interval of time (often a year). This has become the standard by which we measure the size and health of a country.

The assumption that GDP variations influence a bank's financial performance is justified by the fact that GDP growth indicates growth of the economy as well as growth in investments and businesses overall. This is suspected to influence banks as a bank's primary role is financing new investments and being a support to the growth of the economy. Hence, economic growth heavily relies on the existence of a strong and effective banking system. Moreover, positive and high GDP rates can hint to an economic prosperity, meaning that induvial are more likely to have funds they would like to invest or use. The bank in this case plays the role of an intermediate and help circulate these funds in the economy, resulting in more activities for the bank.

This reasoning means that GDP growth is suspected to positively influence bank's performance as a result of growth in their activities and opportunities.

3.2.2 Inflation rate:

Inflation refers to the rate at which the prices of goods and services increase in a specific time period. It is considered one of the big macroeconomic challenges to every country as every central bank has the responsibility of putting measures and monetary policies that help keep the inflation rates under control.

Inflation rates can influence a bank's financial performance both directly and indirectly. High inflation rates translate in a decrease of the real value of money, thus discouraging investments and savings. It can also have an indirect effect as it is a defining component of interest rates, exchange rates, economic growth, unemployment, as well as many other macroeconomic variables.

However, according to khan et al.2001, inflation does not only have a negative effect, they state that there is a threshold level of inflation below which inflation has a positive effect on financial depth, but above which the effect turns negative. This depends on how efficient the central bank and banks in general are in predicting inflation rates beforehand and putting in place measures that allow for its negative effects to fade or be under control.

We conclude that inflation is expected to have a significant impact on banks' financial performance but the direction of the impact differs according to the sector, the environment and the time period.

3.2.3 Market structure:

Many previous studies (e.g.: Molyneux and Thronton in 1992 and Berger in 1995) have made evident the existence of a relationship between market structure and a bank's financial performance.

Market structure has two main elements, namely market concentration and market share. The market concentration is defined as market mastery by one or several companies (banks) in an industry, while the market share is defined as the size of the market demand that the company (bank) can serve.

The Structure-Conduct-Performance (SCP) hypothesis and the Efficient Structure (ES) hypothesis are two competing hypotheses used to explain the relationship between market structure and banks' performance.

The SCP or collusion hypothesis is a traditional hypothesis established by Bain (1951). It claims that market structure influences banks performance (firms in general) through pricing and investment policies where in a more concentrated market, less favorable prices are set to clients such as high interest rates on loans and lower deposit remuneration. This comes as a result of imperfect competition on the market.

The ES hypothesis, is following the works of Demsetz (1973), this hypothesis postulates that market concentration is not a random event but rather the result of the superior efficiency of the leading firms. Firms possessing a comparative advantage in production become large and obtain a high market share and, as a consequence, the market becomes more concentrated.

Conclusion

Profit is the ultimate goal of commercial banks. All the strategies designed and activities performed thereof are meant to realize this grand objective. However, this does not mean that commercial banks have no other goals. Banks could also have additional social and economic goals. However, the intention of this study is related to the first objective, profitability. We will be considering that the bank is a profit generating entity and link its financial performance to its profitability.

A better understanding of banks' environment and different measures and determinants of bank's financial performance will certainly serve in selecting the accurate and most suitable variables for further parts of this study.

Chapter Two: Financial Inclusion as a Determinant of Banks' Financial Performance

CHATER TWO: Financial Inclusion as a Determinant of Banks' Financial Performance

Introduction

Well-functioning and thriving economies are built on the foundation of a stable, reliable, and efficient financial system. This foundation allows individuals to mobilize savings and make productive investments, offers them efficient and safe payment systems and provides them with insurance services and other advantages that lower exposures to risk and hardship. Yet many financial systems are not fully inclusive, leaving millions of people and small businesses with no access to financial services.

It is believed that providing access to and improving the use of financial services for individuals can increase their involvement in the economy, reduce their vulnerability and even lift them out of poverty. At the same time, it is widely recognized that an inclusive financial system can act as a driver for economic growth. As a growing theme in the financial development space, financial inclusion has started receiving considerable attention in the last years not only from researches and academicians, but also from authorities and central banks of several countries around the world.

The previous chapter focused on financial performance of banks as a theoretical concept and highlighted its different measures and determinants. This chapter will focus more on understanding financial inclusion as a concept, and most importantly its relation to banks' financial performance, in order to do so, this chapter will be divided into three sections. The first section represents an introduction to financial inclusion and presents its key aspects. The second one will treat the different determinants or barriers that influence financial inclusion. And finally, the third section is a review of empirical literature that linked financial inclusion with banks financial performance.

Section One: Key Aspects of Financial Inclusion

Financial Inclusion has become of interest for many regulating bodies and authorities around the world. The World Bank has specifically put an emphasis on the importance of financial inclusion as it encourages central banks to find ways that help increase levels of financial inclusion especially in developing and underdeveloped countries as they're usually behind in levels of financial inclusion compared to other developed countries.

Through this section we aim to understand and define the concept of financial inclusion, treat any ambiguities that relate financial inclusion to other similar topics, and also understand the role of financial inclusion and why it is gaining the interest of governments and authorities around the world.

1.1 Background of financial inclusion

Financial inclusion has always been linked in literature to many other concepts such as financial exclusion, banking and inclusive banking, microfinance, and many others. As some of these concepts are often confused with financial inclusion, it is important to understand the differences between these concepts and how they are linked to financial inclusion in order to have a clear understanding of the concept of financial inclusion.

1.1.1 Definition of Financial Inclusion:

Literature has failed to find an exact definition for financial inclusion as it can vary depending on the angle it is defined from. The UK's HM treasury offers the following definition "access to appropriate financial services so that people can manage their money effectively, securely and confidently on a day-to-day basis; plan for the future and cope with financial distress to protect against short term variations in income and expenditure and take advantage of longer-term opportunities and deal effectively with financial distress".

Financial inclusion is often considered an opposite of financial exclusion in literature; however, it is more correct to say that one is the solution to the other. Gloukoviezoff (2004) defines financial exclusion as "the process by which a person encounters difficulties of access and/or use in their banking practices that they cannot or no longer lead a normal social life in their society. A situation of banking exclusion can therefore only be defined in relation to the social consequences of access and use difficulties that make it up". We can understand from this definition that financial exclusion is strongly linked to social status that can become a

barrier affecting an individual's ability to have access to financial services. Financial inclusion, however, aims to provide and make accessible financial services to all individuals despite their status.

Financial inclusion has actually been more popularized as academicians and researches started searching for solutions to reduce financial exclusion. The term financial exclusion was initially applied in the early 1990s to highlight the limited access to bank branches for liberalizing the financial sector (Gomez, 2015). Financial inclusion aims to provide and make accessible all financial services for any individual no matter their social status or financial ability. Financial inclusion refers to the easy availability of all banking services at an affordable cost, reasonable time and adequate quantity to all needy people and which should also be available in appropriate forms.

1.1.2 Banking Inclusion and Inclusive banking:

Though Financial inclusion doesn't necessarily mean access to banks' services, as it can refer to access to services offered by other financial institutions; banking institutions are inevitably extremely responsible for a better financial inclusion as they are the basic and most common providers of all financial services in every country. Good banking inclusion will even allow consumers to benefit from other financial services offered by different financial institutions. In addition, the indicators of bank penetration are one of the main sources that provide information on the degree financial inclusion or exclusion among the population, they are often used as an indicator of financial inclusion by many researches and academicians.

This is why many confuse financial inclusion with banking inclusion, given that the two concepts are not necessarily distant from each other, but are in fact much related as being included in the banking system means that the individual is financially included. However, the contrary statement in not necessarily true.

Banks have been showing great efforts and initiatives in order to achieve better levels of financial inclusion and reach all categories of the population. This is mainly because the authorities and central banks have been encouraging them to and accentuating the importance of financial inclusion, but also because other competing sectors that deal with the financially excluded population, i.e.: microfinance, have been showing great performances and profits and that could manifest as a threat to banking institutions.

There have been many attempts from banks all over the worlds to irradiate the discrimination that many individuals face due to their status and socioeconomical reasons. This gave birth to the concept of inclusive banking that is now widely adopted by many banks.

Inclusive banking according to American Bankers Association is "banks attempts to make sure that every individual should have access to the banking system and the safety and convenience that comes with a bank account". Inclusive banking encourages financial inclusion as its purpose is to provide low cost and customized services that are aligned with people's socioeconomical situation in order to achieve total inclusivity and lower discrimination and exclusion from the banking sector. Being financially inclusive, consists for a bank to have products and services that are tailored to fit the specific needs of every individual. This isn't only in relation to their financial status but also refers to being accessible and exploitable to people with disabilities or specific needs.

1.1.3 Financial inclusion and Microfinance:

In literature, microfinance is a term that appears very often while searching for financial inclusion. This is due to the fact that microfinance represents a very effective tool of financial inclusion and eradicating the exclusion of individuals from the financial system. Microfinance offers services to people or businesses that have been marginalized and excluded from the banking sector or other financial services offered by financial institutions. Microfinance provides financial alternatives to the vulnerable or low-income population as it presents them with a bridge to access and profit off financial services.

Microfinance is a relatively newer term for the economical literature, However Many definitions have been attributed to it. According to the Organization for Economic Co-operation and Development (OECD), microfinance aims to provide access to financing for small-scale projects carried out by marginalized people who aspire to create their own jobs, often for lack of other professional prospects and because they are denied access to traditional sources." The International Labor Office (ILO) states that "Microfinance is a policy tool, its impact is amplified when combined with other factors such as monetary, fiscal and labor policies, market development, improved institutional infrastructure and human resource development". As for Lelart (2005), microfinance is defined as "a small amount of credit, substantially less than the credit that a business or household might seek from a bank. This

credit is requested by people with relatively low incomes. It is often requested to develop an income-generating activity, whether it is an old activity that one would like to expand or a new one that one would like to create."

Microfinance means building inclusive financial systems which integrate specified services tailored to serve the needs of the poor and make them part of the mainstream financial system. The level of coverage and outreach of microfinance services must make it accessible to all those who need it, and to innovatively diversify methods and modalities towards that end.

The microfinance business has evolved in recent years and managed to become a very profitable and competitive sector. Jenkins (2006) states that banks are increasingly aware of the interest of the microfinance market. The profitability of microfinance entities has motivated banks to enter this market.

1.2 Role of financial inclusion

Central banks have been stressing on the importance of financial inclusion because literature states several times that financial inclusion has a pivotal role in bettering the economy and achieving prosperity. Financial Inclusion has been proved to directly or indirectly affect many other variables such as economic growth, poverty and income inequality, and the monetary and financial situation of countries.

1.2.1 Poverty and inequality reduction:

Financial inclusion aims to provide easy and affordable access to financial products to all categories of the population including low- and middle-income individuals or even those with no apparent or stable income at all. Providing individuals with services and products will allow them to profit off economical and financial benefits and eventually help them create wealth and manage their finances.

Having access to financial services and products can reduce poverty levels directly or indirectly, i.e., through economic growth. According to the World Bank, financial inclusion can help reduce poverty in two ways:

- Helping poor people climb out of poverty by making it possible to invest in education and business and small enterprises and pursue promising growth opportunities.

- Providing ways to survive economic disasters like unemployment, drought/floods, or the loss of a breadwinner, financial inclusion also prevents people from falling into poverty in the first place.

Financial inclusion provides individuals with means and opportunities to make investments, create wealth and contribute in the growth of the economy. It encourages them to better manage their savings helping them maintain financial stability.

Financial inclusion also helps reduce inequality within the society. Many individuals are often marginalized when it comes to access to financial services. For example, people with physical or mental disabilities are often victims of discrimination. It actually goes beyond that sometimes as people are discriminated not only because of their income or occupation but reaches discrimination because of race, gender, age…etc. Financial inclusion aims to reduce all these inequalities and provide everyone with financial products and services that are most suitable for them and their specific needs.

The inability to access financial services is heavily related to financial exclusion, which is tied to poverty and inequality. An individual will be excluded from society if they are unemployed, lack skills, have a low income, have an unstable environment, or poor health. This will accentuate social inequality, and national economic development will be negatively impacted. Therefore, financial inclusion is crucial to reduce the gap between the rich and the poor in the society and fight these inequalities. Countries should implement policies and regulations that are suitable for the characteristics and the nature of its society in order to reduce inequality, raise financial inclusion levels and ultimately help achieving sustainable economic growth.

2.2 Economic growth:

Achieving high levels of financial inclusivity has been pushed to the front by the World Bank because it was seen as one of the key factors into achieving sustainable economic growth. Countries that the World Bank have encouraged more are developing and under developed countries. This is due to the fact that financial inclusion is perceived as a tool that helps accelerate the economy's growth in these countries through impacting many other variables such as employment and investments.

The United Nations states that "access to a well-functioning financial system can empower people, especially the poor, economically and socially, enabling them to better

integrate into their country's economy, contribute to its development and protect themselves from economic shocks".

(Kakwani, 2000) recognized the access to easy and affordable financial services by the poor and vulnerable groups is a necessity to accelerate economic growth and reduce income disparities and poverty. Financial inclusion allows excluded people to contribute to the economy, this will potentially help create opportunities for the unemployed population and bring additional profits by including and investing in disadvantaged and under developed sectors of the economy. Opening the doors to newcomers will also raise competition in different sectors which will result in raising the productivity levels, acquiring and exploring new technologies and stimulate new investments. As a result, the amount of wealth created by the economy will increase inducing economic growth.

Many empirical research has been done on the relation between financial inclusion and economic growth, (Chhikara and Kodan, 2011; Rajan and Zingales, 2003) support that development of the financial system contributes to economic growth, (King and Levine, 1993; Levine and Zervos, 1998) Found that various finical development measures are positively and significantly related to economic growth. And Rajan and zingales (2003) also support the previous findings as the found a positive relationship between financial development and growth.

2.3 Monetary and financial stability:

- *Monetary stability*:

Financial inclusion also has an underlying impact on monetary policy choices through different ways. First, financial inclusion facilitates "consumption smoothing". This means that in the case of unexpected economic developments or crises, financially included individuals will have better responses to the shock. They will have more flexibility and will be able to adjust their savings and borrowing according to the interest rates and the situation they are facing.

Empirical evidence also supports this statement, according to a study conducted by the Bank for International Settlements (BIS) across 130 economies; the larger the share of financially excluded households, the stronger the required policy response to stabilize aggregate demand and inflation following a shock. Mehrotra and Yetman (2014) show that, as financial inclusion increases, inflation volatility also rises. The intuition behind this result is

that financially included consumers are better able than excluded consumers to adjust their savings and investment decisions to partially insulate their consumption from output volatility. Thus, as the degree of financial inclusion rises, central banks can focus more on stabilizing inflation. Anand and Prasad (2012) argue that inflation measures excluding food prices may be a poor guide to policy for economies with low levels of financial inclusion. In part, this is because financial inclusion is often lowest in rural, agriculture-dependent areas, where food products represent the main source of income. When food prices rise, financially excluded rural households, lacking access to the financial sector, do not save the extra income but increase consumption instead. This leads to higher aggregate demand and inflationary pressures. And when food prices fall, the process works in reverse. In such an economy, where the producers of food are also disproportionately financially excluded, it could be difficult for the central bank to stabilize inflation if food prices are ignored. Thus, the case for focusing on inflation may be stronger, the lower the level of financial inclusion.

Greater financial inclusion also strengthens the case for using interest rates as the primary policy tool. When financial inclusion is low, a large share of the money stock is typically accounted for by currency in circulation, with many households saving in cash "under the mattress". As inclusion increases, a growing share of broad money is likely to be made up of interest bearing bank deposits. Given that the rewards for saving (and the cost of borrowing) are affected by interest rates, greater financial access implies that a bigger share of economic activity comes under the sway of interest rates, making them a more potent tool for policymakers.

- *Financial Stability:*

Financial inclusion may also help support the central bank's task of keeping financial stability. First, consumers gaining access to the formal financial system are likely to increase aggregate savings and diversify the banks' depositor base. Any increase in savings has the potential to improve the resilience of financial institutions, given the stability of deposit funding, especially where they are backed by an effective deposit insurance scheme (Hannig and Jansen, 2010). Further, there is some evidence that aggregate balances in the accounts of low-income customers move only gradually, and are not prone to sudden month-to-month swings (Abakaeva, 2009). This resilience could be especially relevant during crises, if low-income savers are apt to maintain their deposits despite them being small when large depositors head for the exits and withdraw all of their funds. Indeed, during the global

financial crisis, total deposits fell by less in economies where the degree of financial inclusion was higher in terms of bank deposits, especially for middle-income countries, even after controlling for other factors (Han and Melecky, 2013).

Second, financial inclusion, by improving firms' access to credit, can help financial institutions to diversify their loan portfolios. Moreover, lending to firms that were previously financially excluded may also lower the average credit risk of loan portfolios. One study finds that an increased number of borrowers from small and medium-sized enterprises (SMEs) is associated with a reduction in nonperforming loans and a lower probability of default by financial institutions (Morgan and Pontines, 2014).

However, increased financial inclusion is no guarantee of improved financial stability. If financial inclusion is associated with excessive credit growth, or the rapid expansion of unregulated parts of the financial sector, financial risks may rise.

Section Two: Measures and Determinants of Financial Inclusion

2.1 Measures of financial inclusion

Financial inclusion is a complex and multidimensional concept that is related and depend on many factors. This has made measuring Financial Inclusion a very delicate process that requires an encompassing set of data which provides insights on the current level of inclusion and shed light on the areas that need further attention.

Until recently, the measurement primarily focused on density indicators such as the number of bank branches or Automated Teller Machines (ATMs) per capita. The data are usually compiled by inspecting reports or surveying financial providers. This provides a good understanding on the degree of use of financial services. However, little information was available to illuminate the global reach of the financial sector, meaning the extent of financial inclusion and to which degree poor, woman and other segments were excluded from the financial sector (Demirgüç-Kunt & Klapper, 2012).

In 2011, the World Bank has launched the Global Financial Inclusion (Global Findex) database to provide systematic indicators of the use of different financial services (Demirgüç-Kunt & Klapper, 2012). These indicators are drawn from nationally representative surveys of more than 150'000 adults above 15 years of age in over 140 economies around the world. Following the first survey in 2011, two more rounds in 2014 and 2017 were conducted. The

database covers four areas of financial inclusion indicators. The first indicator focuses on accounts at a formal financial institution (such as a bank, credit union, co-operative, post office or microfinance institution), the mechanics of the use of these accounts (frequency and mode), the purpose of the accounts (personal or business, receipt of payment from work, government or family), and barriers to account use and alternatives to formal accounts (mobile money providers). The second set of indicators focuses on savings behavior. The third indicator focuses on sources of borrowing (formal and informal), the purpose of borrowing (mortgage, emergency, or health purposes) and the use of credit cards. The fourth indicator is related to the use of insurance products for health care and agriculture. But there are critics that such set of individual indicators developed through survey data cannot accurately capture the multifaceted concept of financial inclusion (Camara, Peña & Tuesta, 2014).

Many studies have been conducted to identify a comprehensive measure of the extent of coverage of a financial system called Findex (Sarma, 2008; Nguyen, 2020). Various financial inclusion indices exist today with different approaches and indicators selected. Nguyen (2020) concluded that the measurement of the degree of financial inclusion has not yet reached a consensus. In this sub section, we will be introducing financial inclusion indicators that have been repeatedly used in literature as a proxy to measure financial inclusion.

2.1.1 Account ownership and use:

Account ownership is a key measure of financial inclusion because of the functions that an account provides. Individuals can store money and build up savings. Having an account makes it easier to pay bills, get access to credit, make purchases or send and receive remittances (Demirgüç-Kunt et al., 2018). According to the Global Findex database, 70% of adults across the world had an account in 2017. That means that they have reported to either own an account either individually or jointly at a financial institution or through a mobile money provider. The first category includes accounts at a bank or other type of formal, regulated financial institution. The second consists of mobile phone-based services not linked to a financial institution that are used to pay bills or to send or receive money. The surge of fintech companies in recent years and increasing innovation in the form of new providers or delivery channels have helped to further increase access to financial services (Beck, 2020). Account ownership is an important first step towards financial inclusion.

2.1.2 Savings:

Saving is one of the major uses of an account next to fund transfer services. Savings can be used for completing a large purchase in the future, investments in education or businesses, to prepare for individuals' needs in old age, or simply to have a cushion in case of emergencies. Individuals save in multiple ways. The Global Findex survey covers three types of savings, each considered to be mutually exclusive:

- Saved money formally; meaning at a formal financial institution.
- Saved money semi-formally.
- Savings using other methods only (i.e., saving at home "under the mattress" or in livestock, jewelry).

2.1.3 Credit:

In 2017, 47% of global adults reported having borrowed money in the past 12 months. The share of adults with new credit, formal or informal, averaged 64% across high-income economies and 44% across developing economies. The most common source of credit in high-income economies was formal borrowing; in developing economies, family or friends. Credit cards are a payment instrument, but they also serve as a source of credit. They extend short-term credit whenever used, even when credit card holders pay off their balance in full each statement cycle and as a result pay no interest on their balance. The introduction of credit cards might therefore have affected the demand for and use of short-term credit (Demirgüç-Kunt et al., 2018).

However, studies that inspect the relationship of financial inclusion and banks' financial performance differs from this as it focuses more on banks' penetration only. Thus, others indicators are used as proxies to measure financial inclusion and its impact of banks' financial performance. The most widely used indicators are: number of branches of a bank, number of accounts open, number of credit cards in circulation, number of operating ATMs…etc. These indicators focus more on the bank's reachability and the level of financial inclusion within every bank.

2.2 Determinants of financial inclusion

As exhibited in the title above, financial inclusion does impact many other variables, however financial inclusion is also function of many other factors that can become

facilitations or barriers to its development. Countries that aim for better levels of financial inclusion should consider working on these determinants.

Literature introduces several ways of classifying these determinants according to Shankar (2013), the barriers can be seen from two sides: Supply and demand. Demand includes the aspect of psychology, culture, financial literacy, while supply includes physical barrier, lacking of suitable products, and documentation barriers. Other arguments provided by (Fungáčová & Weill,2015) stating that the reasons or barriers in the use of the inclusion are seen in the expressions of: "Too far away," "too expensive," "lack of documentation," "lack of trust," "lack of money," religious reasons," and "family member has one."

In this subsection we will be discussing few financial inclusion determinants separately, these determinants were selected because they seem to be of more relevance to this specific study. These determinants are: Financial literacy, Religion and cultural norms, Technology and infrastructure, cost and affordability, and finally the contribution of authorities.

2.2.1 Financial literacy:

Financial literacy has had many different definitions in literature, National Council on Economic Education (NCEE) (2005) gives the following definition: "Financial Literacy is the familiarity with basic economic principles, knowledge about the economy, and understanding of some key economic terms", whereas Mandell (2007) defines it as "The ability to evaluate the new and complex financial instruments and make informed judgments in both choice of instruments and extent of use that would be in their own best long-run interests"

From these two definitions we can say that financial literacy can be defined as an individual's knowledge of the existence of financial services and their use, as well as having abilities to use these financial services in their favor.

Financial literacy is here strongly linked to financial inclusion because in less financially literate societies, individuals are less aware of the availability and the importance of financial services, thus, they stay involuntarily financially excluded. Whereas the more an individual is financially literate, the more services he will be willing to use. People being unaware of the use and the advantages offered by financial services, often neglect the idea of being a client of a financial institution.

It is part of the authorities and the banks' responsibility to spread awareness and raise the interest of people in order to help them gain financial knowledge. This starts with providing good levels of education as education is also a very prominent determinant of financial inclusion. Even though being educated doesn't necessarily mean having better financial knowledge, vice versa. But there is no doubt that the two are very interlinked as the educated population tends to be more aware of financial services and their use. Priyadi (2021) proposes that education has positive and significant influence on the level of family saving. The result of examination is accordance with the hypothesis. Similarly, it is also in line with the ideas delivered by Brata (1999) that the higher the level of education of the head of the family, the higher is the awareness of the people in managing and saving their money in the bank. Wardhono (2016) suggests that education has positive results on financial literacy and that a group of people graduated from Senior High School and above has higher opportunities compared to those below Senior High. The higher the education level, the better the financial literacy and the more intensive access to financial information.

2.2.2 Religion and cultural norms:

Individuals are often bound to certain religious and cultural beliefs that, even if aware and capable of using financial services, prevents them from associating with financial institutions.

This is more common in Islamic countries where the population will rather not benefit off of banks services because of interest or even insurance services due to Islamic restrictions. The emergence of Islamic finance and Islamic banking has for sure helped reduce this portion of the population that are voluntarily excluded from the banking and financial system. However, many individuals still choose to distance themselves because they are habituated to do so or still lack trust and understanding in these Islamic institutions, which is the case for countries like Algeria. The implementation of strong and trustworthy Islamic finance services is key to reach this mass of the population and achieve better levels of financial inclusion.

Being voluntarily excluded from financial services can also be rooted in the culture or the norm of societies. Some societies lack trust in banks and financial institutions in general, this could be due to previous scandals that makes people associate banks with frauds, or due to crises that the sector witnessed and that left the population damaged from the repercussions. Other parts of the society especially those with lower income also often have

misconceptions about banks and financial inclusion and would believe that they are organizations offering services and products to the wealthy population only.

Again, this puts in front the role of authorities and banks in raising financial literacy as banks need to present themselves in a way that makes them less "intimidating" and accessible to all categories of people.

2.2.3 Technology and infrastructure:

Technology and infrastructure are now necessary for the growth of every sector not only the financial sector. In order to make financial services easily accessible to the population, every country needs a strong infrastructure as well as new and up to date technology.

This concerns many aspects such as good implementation and easy accessibility to branches of financial institutions. State and availability of automated devices that facilitate many transactions. Providing people with gadgets and strong network to be able to profit off of online and mobile financial services especially in the context of modernization and the emergence of fintech, online banks, and neo banks.

A good infrastructure starts with guaranteeing a good accessibility to banks and financial institutions branches. These entities are demanded to pay a great deal of attention to the number of their branches, their geographical placements, and even the arrangement and layout of their branches. There should be enough branches to avoid making clients wait long minutes or hours in order to make use of basic services, the placement of the branches should be selected to reach the biggest number of the population and even their arrangement need to be comfortable and convenient for the clients, i.e., offer them alternatives of having to communicate with tellers with placing ATMs within the branches, making sure that the personnel is qualified enough to answer all of the clients' needs…etc.

Banks and financial institutions must possess automated and modernized materials and equipment which enables them to facilitate and accelerate their work processes and respond to customer needs in a timely manner. This implies a well-developed information system and softwares that are well adapted to the needs of their clients.

In fact, in this era of globalization and digitalization, it has become necessary to adapt to the changing environment and especially the continuous growth of the expectations of

customers. The bank or financial institutions in general must ensure to have digital platforms, websites and applications which facilitates their contact with their clients and allows them to perform all their transactions remotely and securely.

2.2.4 Costs and affordability:

One of the main barriers stopping the levels of financial inclusion is its high cost. And this concerns both financial institutions and banks as well as individuals. Empirical evidence shows that high-income countries have better levels of financial inclusion and account ownership is almost universal in these developed high-income countries. This is due to the fact that individuals with lower income often find financial services and products to be too expensive and out of reach. Having a low income also means having little money to manage or save as people who usually opt for savings are those with excess in their finances.

For a bank or a financial institutions to reach a bigger number of the population, they usually have to make big investments such as opening new branches and access points, Hiring better qualified personnel that is usually paid more, acquiring new technology and materials that can be very costly…etc. we should also consider the fact that if institutions are being more inclusive it might lead them to excessive risk taking as they're financing portions of the population that present higher probabilities of default. All of the above can generate massive costs to institutions and to cover for it, they will have to raise the prices of their products and services which will eventually make them unaffordable for the low-income population. Although the governments usually establish regulations and fixes limits to financial institutions in order to help the people of low income to access the finance with minimum requirements.

2.2.5 Contribution of authorities

Governments reform their financial systems by developing rules and regulations and enhancing financial awareness to encourage members of society to access the services offered by the financial system. On the other hand, governments push banks to innovate and increase their penetration, especially in rural areas, while offering affordable prices for loans to disadvantaged people, so they can earn more revenue.

Policymakers and regulators have taken a variety of steps to support financial inclusion at both the national and international level. Some have also sought to enhance financial literacy, while others have committed to achieving numerical inclusion targets.

Regulators in many countries have played a central role. For example, the Reserve Bank of India has relaxed the requirements for opening bank accounts, recommended the availability of accounts with a minimum number of functions and encouraged banks to expand their branch networks (Bhaskar, 2013). And in many Latin American countries, including Brazil, Colombia and Peru, agent banking regulations have been passed to encourage "branchless banking". In addition, some national policymakers have committed to achieving financial inclusion targets. Internationally, over 60 central banks, plus other public sector institutions, from more than 90 countries are part of the Alliance for Financial Inclusion (AFI) that introduced many quantifiable goals to which all these institutions agreed to.

Section Three: Review of Literature

This section presents and discusses the literature related to Financial Inclusion as a determinant of banks' financial inclusion. Several studies have examined the impact of financial inclusion on banks' profitability. These studies often use different measures and indicators to measure and express both bank profitability and financial inclusion. Hence, researches often find different outcomes and give various explanations to the impact of financial inclusion on banks' financial performance.

Shihadeh (2020) conducted a study on a sample consisting of 271 banks in 24 countries of the MENAP region, using Return on Average Assets (ROAA) and Return on Average Equity (ROAE) as dependent variables expressing banks performance and Non-Performing Loans (NPL) as a risk indicator. The study also introduces micro independent variable (National Financial inclusion, Assets, Loan to Deposit LTD, Branches) and Macro independent Variables (GDP, M2, Competition). He used Branches per 100 000 individuals, Formal accounts, formal savings, formal loans, and credit and debit cards, as indicators of National Financial Inclusion. The regression results of this study indicate that financial inclusion significantly influences ROAE although there is no significant influence on ROAA. Results also showed that financial inclusion is significantly linked to the risk of banks measured by NPL.

Another study conducted by Shihadeh (2017) on a population including 15 banks operating in Palestine from (2006 to 2016); uses operational profits, total revenues, and ROE as proxies for bank profitability, and; loans to Small and Medium Enterprises (SMEs), banking penetration, and online banking as indicators of bank penetration and financial

inclusion. Assets and GDP were also used as control variables and predictors. By using empirical analysis, it has been found that financial inclusion helps Palestinian banks improve their performance and increase their revenues.

In another paper, Shihadeh, Hannon, Guanul and Wang (2018) used data of 13 commercial banks in Jordan from 2009 to 2014, in order to inspect how financial inclusion improves bank's profitability in the country. They used ROA as a dependent variable and introduced 6 measures of financial inclusion: credits for SMEs, deposits for SMEs, number of ATMs, number of ATM services, number of credit cards, and new services. The study found a significant impact of financial inclusion on banks performance measured by ROA.

Jajah Y, Ebenezer B. Anarfo, Felix K. Aveh (2020) also studied the relationship between financial inclusion and bank profitability in Sub-Saharan Africa by using the generalized method of moments (GMM) dynamic pooled estimator for the computation of the parameters using data spanning from 1990 to 2017. The results show that there is an affirmative relationship between financial inclusion index (Findex) and bank profitability in Sub-Saharan Africa. According to the results of the regression there is a strong confirmation of a positive relationship among Findex of banks, ROA, banks ROE and the NIM in Sub-Saharan Africa. Vo (2021) studied the impact of financial inclusion on the profitability of banks in the Asian region using data from 13 emerging countries from 2008 to 2017 of. They used ROA as a dependent variable and financial inclusion, bank size, market power, GDP growth, economic freedom index and financial market development as independent variables. The results of this study indicate that financial inclusion does contribute positively and significantly to bank performance in the emerging markets in the Asian region.

On a global level, Shihadeh, Bo Liu (2019) studied how financial inclusion influences the banks' risk and performance. This research uses a database of 198 countries and 701 banks in the years 2011 and 2014. Bank branches per 100,000 individuals; formal account, formal saving formal loans, credit cards and debit cards were used as national Findex, which indicates financial inclusion at the country level. The study also uses control variables: Total assets, equity ratio, loans to deposits, capital ratio, bank concentration, GDP growth, M2 growth. Whereas ROAA, ROAE and NPL were used as dependent variables. The results show that enhancing financial inclusion through bank branching could enhance the bank's performance and reduce risks. It also indicated that the effect of financial inclusion is clear on the bank's risk than bank's performance.

As for the Maghreb region, Douma, Bettioui, Bendob (2019) studied the role of financial exclusion in weakening the performance of banks using a dynamic panel data analysis in Algeria and Tunisia. This study was conducted on Tunisian and Algerian banks during 2004 to 2012. It considers ROA, ROE, and NIM as dependent variables and financial inclusion index, CAMEL ratios and GDP as independent variables the results show a significant relation between financial inclusion and profitability indicators (ROA, ROE, and NIM).

Conclusion

Contrary to financial performance, Literature does not offer a lot of studies and researches on financial inclusion in general and more so, for financial inclusion as a determinant of banks' financial performance. This is despite the fact that financial inclusion is receiving a great deal of attention from the World Bank and many other authorities that shed the light on the importance of financial inclusion and encourage building financial systems that are fully inclusive and are of reach for every individual. The importance of financial inclusion is accentuated through its role of reducing poverty, offering opportunities, reducing equality, and eventually helping achieving prosperity and growth of GDP by creating new sources of capital flow within the financial sector.

Measuring financial inclusion is still an ambiguous matter seeing as researchers have used different proxies as financial inclusion indicators. The world bank's Findex global database remain the main source of data and information used by researches when it comes to global prospects. However, measuring financial inclusion still relies on measuring bank penetration especially in countries where banks are the predominant actor of the financial sector.

Financial inclusion is affected by several factors that are more or less important depending on the environment and the country subject of the study. Financial inclusion, apart from macroeconomic factors and those related to the efforts of the state, is linked to the specific characteristics of each society.

Chapter Three: An Empirical Study of the Impact of Financial Inclusion on the Financial Performance of Algerian Banks

CHAPTER THREE: An Empirical Study of the Impact of Financial Inclusion on the Financial Performance of Algerian Banks

Introduction

The Algerian banking sector is a very specific sector and has several distinct characteristics. This sector plays a very important role in the financing of the economy as well as in the financial inclusion of the marginalized population. This, in the absence of a developed financial market in the country that could be a potential substitute.

It is important to understand the specific characteristics of the sector as a whole in order to understand the financial performance of banks and how they function as part of a complex environment. In addition, it will help understand the decisions made by banks in terms of financial inclusion and how the latter influences the performance of the bank.

This chapter includes an empirical study of the impact of financial inclusion on the financial performance of Algerian banks. In order to have a coherent study, we divided this chapter into three sections:

The first section includes a detailed analysis of the economic and financial environment of Algerian banks and discusses the current state of the Algerian banking sector using different analyses and indicators.

The second section will define and describe the data and the variables used in order to conduct the empirical study.

The third and last section of this chapter is dedicated to showcase the regression results and discussing the different outcomes of the study.

Section One: an Analysis of the Algerian Banking Sector and its Environment

1.1 Economic and financial environment of the Algerian banking sector

Understating the performance of banks and their behaviors requires an understanding of the environment and the climate they are operating in which in many times conditions some of the bank's decisions and strategies. Moreover, a good economic and financial overall environment works in favor of increasing financial inclusion. It does, with no doubt, facilitate the mission of financial institutions, specifically banks, to reach more categories of individuals and including them in the financial sector.

1.1.1 Economic environment:

The economic status of the country is deemed as important because it can directly or indirectly affect and influence banks, for instance, fluctuations of inflation rates would require modifications of the monetary policy and that can be sometimes disadvantageous for banks that do not keep a good Asset and Liability Management. As this would directly damage their interest margins.

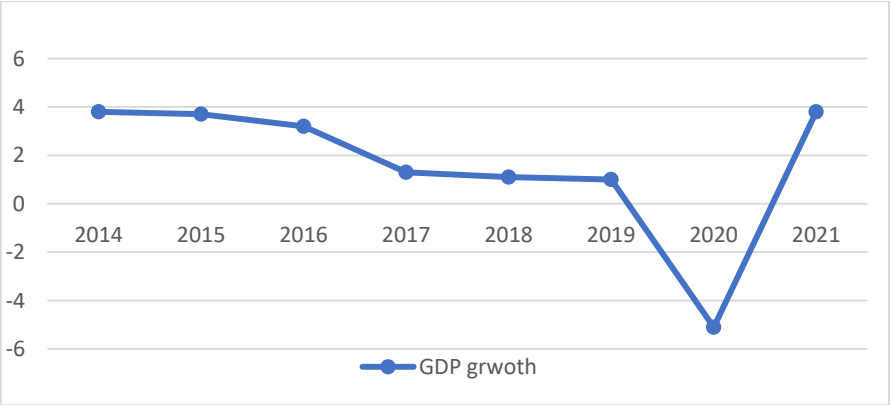
The major components of the Algerian economy and that do affect from far or close the banking institutions are economic growth, inflation rates, and unemployment rates. And one other component is deemed important in the Algerian context, considering that the economy is still an economy that is heavily dependent on the oil sector and its exportations, is Oil Prices.

a. Economic growth:

Economic growth is a commonly used indicator when it comes to describing or evaluating the economy of a country. Economic growth is measured in terms of the increase in aggregated market value of additional goods and services produced, using estimates such as GDP.

The following graph illustrates GDP growth in Algeria from (2014 to 2022).

Figure 1: Growth of GDP in Algeria (2014-2021)



Source: World Bank Indicators

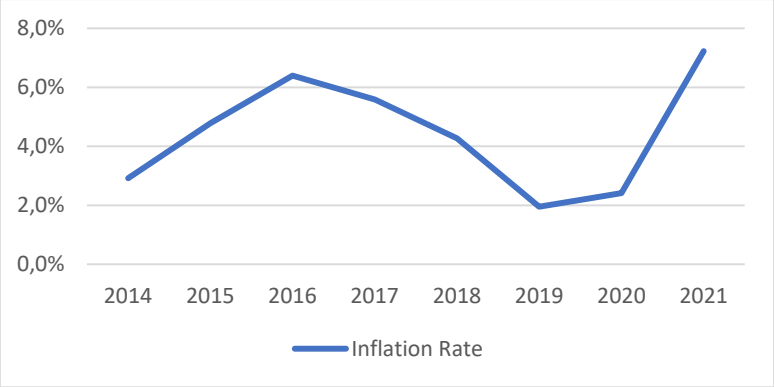
An observation of this graph shows a few outstanding changes of the level of the economic growth. For instance, ever since the oil price shock of 2014, the GDP growth has been constantly decreasing to go from 3.8% in 2014 to only 1% in 2019. This only amplifies the fact that the Algerian economy is still very reliant on the oil sector. And despite the great efforts made by the authorities and the government in order to diversify the economy, revenues from the oil market remain the most important component of the country's GDP and we are failing to find any other potential alternatives to cover this dependency. This situation was aggravated in 2020 due to the covid 19 crisis and reached -5.1%. Where not only Algeria but most economies around the world suffered from the repercussions of the virus. In 2021, and following the start of the Russian-Ukrainian war, the GDP growth showed impressive recovery and reached 3.8% as revenues from exportations of oil and gas increased noticeably. The situation continues to improve in 2022 as the IMF projects a potential growth of GDP of 4.7%.

b. Inflation rate:

Inflation, measured by the average prices increase, is defined as the general rise in prices that will lead to a decline in the purchasing power of individuals. Inflation is a really important variable while studying banks and their performance. Fluctuations of inflation rates are taken in consideration by central banks while deciding on their monetary policies. Thus, interest rates imposed on banks heavily depend on inflation rates. And as interest rates make up the biggest part of revenues for banks (especially in the Algerian context where banks still rely on their traditional role of an intermediate), the impact of inflation rates becomes even

more evident. The graph below shows the evolution of inflation rates expressed by Consumer Price Index which is one of the most common indices used as a proxy for inflation.

Figure 2: Evolution of Inflation Rate in Algeria (2014-2021)



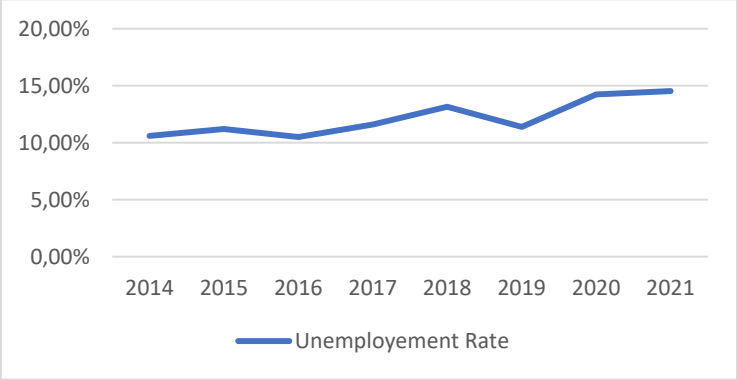
Source: World Bank Indicators

In Algeria, Inflation rates were constantly decreasing from 6.4% in 2016 to reach only 2% in 2019. The rate slightly increased in 2020 to reach 2.4%. And then in 2021 it spiked at 7.2%. This sudden increase in inflation rate was actually a worldwide occurrence and is due to the Covid-19 repercussions as the economy and businesses resumed their activities in 2021 after the lockdown of 2020.

c. Unemployment rate:

Unemployment rate represents the portion of the labor force that are currently unemployed. It is the portion of the labor force that do not have jobs but are able to work. For banks, a low unemployment rate is usually mirrored by higher levels of activity. Low unemployment rates mean that more individuals have different sorts of income and are more likely to use bank services to manage their funds. It can also mean that the level of investments in the country is increasing and more individuals or entities will proceed to use banks loans in order to finance their investments. We illustrate below the evolution of unemployment rate in Algeria from 2014 to 2021:

Figure 3: Unemployment rate in Algeria (2014-2021)



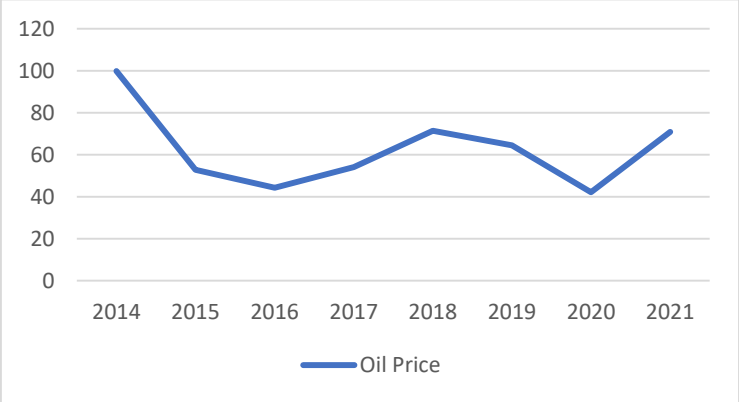
Source: World Bank Indicators

Despite the multiple efforts of the government to reduce jobs, encourage investments, and create job opportunities, the level of unemployment rates remains high and continues to increase in Algeria. It went from 10.60% in 2014 to 13.15% in 2018. It slightly went down in 2019 to 11.38% only to continue its uptrend the following years to reach 14.24% and 14.54% in 2020 and 2021 respectively. The increase in the unemployment rates in 2020 and 2021 is, mainly due the Covid-19 pandemic that caused the shutdown and the failure of many businesses, thus the dismissal of a big portion of the workforce. But there is no doubt that Algeria does suffer from high levels of unemployment that were present even before the pandemic.

d. Oil prices:

Banks are more or less affected by the changes in oil prices depending on the country they are operating in. for the case of Algeria, there is no doubt that the banking sector is more vulnerable to the matter because the Algerian economy as a whole is very reliant on the oil sector as it is the biggest component of the country's GDP. And even within the country, there are banks that will be more or less affected on the others depending on their portfolios and if oil businesses and companies represent a big part of their dealings. The following graph showcases the evolution of the price of Saharan blend from 2014 to 2021:

Figure 4: Saharan blend price (2014-2021)



Source: Oilprices.com

Following the oil price shock of 2014, the price of the Saharan blend barrel dropped severely from 99.86$ in 2014 to 52.79% in 2015 and continued to drop the following year to reach 44.28$ a barrel in 2016. These prices showed a slight recovery in 2017 and 2018 at 54.12$ and 71.44$ respectively. It went down to 64.49£ in 2019 to drop to only 42.12$ in 2020 due to the Covid-19 pandemic.

In 2021, Oil prices went up again to 70.89$ and crossed the 100$ mark within the year as the worldwide situation got better and economies resumed their activities. And in 2022, oil prices managed to stay over the 70$ mark due to the continuous resumption of activities worldwide but also because of the start of the Russian-Ukrainian war.

1.1.2 Financial Environment

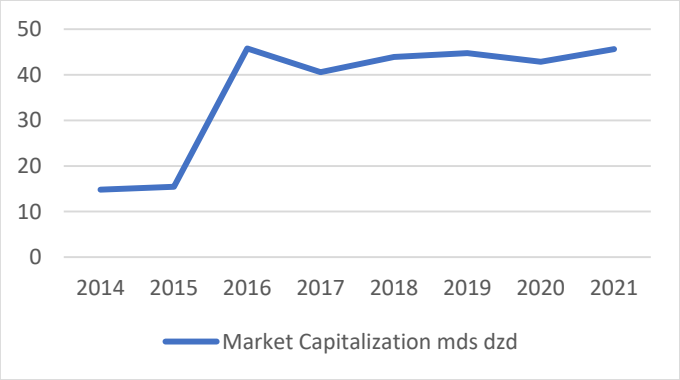
The financial environment of banks refers here to the other components of the financial market. Banks are affected by the level of development and the size of activities on the financial market as it is a very important component of the latter and plays a very important role of an intermediate within the financial sector. A well-developed financial market often represents more opportunities to the bank. It can also create competition within the sector that will certainly lead to better levels of efficiency.

In Algeria, Banks remain the most important element of the financial sector, as the stock market remains very underdeveloped.

a. Market Capitalization:

In 2022, The Algerian stock market is made of only four listed companies[2] and there hasn't been any new listings to the market since December 2018. The following graph shows the evolution of the Market capitalization in Algeria from 2014 to 2021:

Figure 5: Market Capitalization in Algeria (2014-2021)



Source: SGBV, COSOB, annual reports

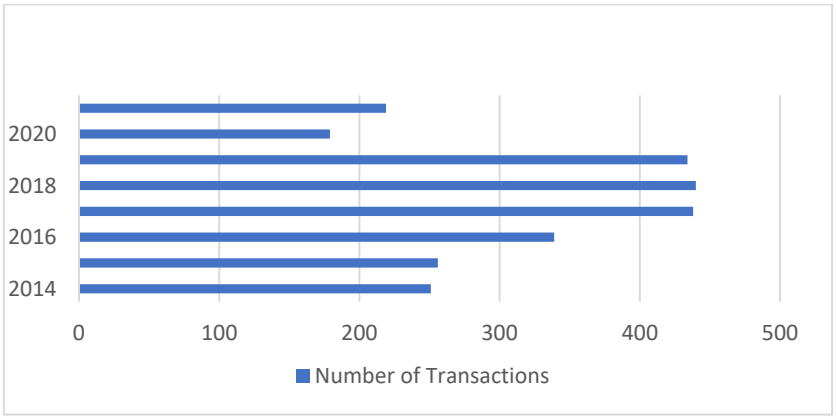
Though the evolution of the market capitalization in Algeria shows an uptrend in recent years and went from 15.43 billion DZD in 2015 to around 45.64 billion dinars in 2021, the whole value of the market capitalization remains minimal with only four listed companies as it represents less than 0.5% of the country's GDP in 2021.

b. Number of transactions on the main market:

The exchange of securities on the stock exchange is important for banks because they often act as an intermediary between the buyer and the seller of the security. The following graph illustrates the number of transactions on the main market from 2014 to 2021:

[2] Alliance Assurance, EGH Chaine El Aurassi, Biopharm, Saidal (as NCA Rouiba left in 2020, and AOM invest in 2019)

Figure 6: Number of transactions on the main market (2014-2021)



Source: SGBV, COSOB, annual reports

The graph shows that the number of transactions on the main market follows an uptrend that was only slowed down in 2020, which according to SGBV is due to the restrictions and the different measures taken as a response to the pandemic. The number of transactions increased from 251 transactions in 2014 to 256 and 359 in 2015 and then in 2016. In 2017 the number of transactions reached 438 transactions and maintained this level during 2018 and 2019 at 440 and 434 transactions respectively. The number then decreased in 2020 to only 179 transactions and then recovered in 2021 to reach 219 transactions. This number of transactions however, remains very reduced and pretty much insignificant.

This limited analysis of the financial environment shows that banking institutions are in disfavor when it comes to playing the role of a stock market intermediate. However, this can also indicate that businesses and companies do not seek this form of financing and will continue to rely on banks and bank loans in order to finance their activities.

1.3 Current state of the Algerian banking sector

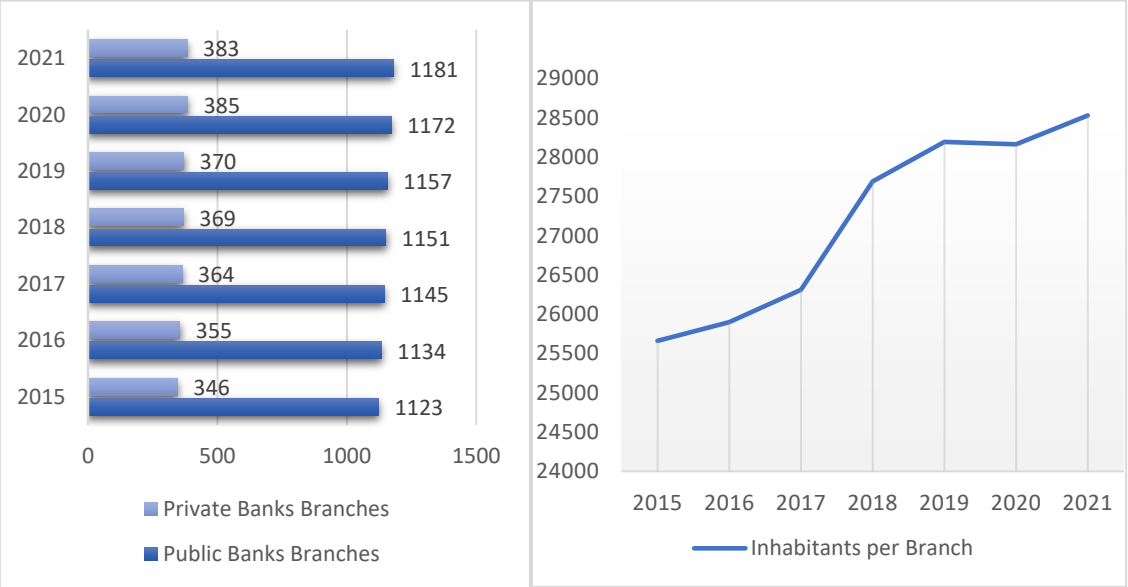
In this part we will analyze the different indicators of the sector such as the size and availability indicators as well as financial strength indicators.

1.3.1 Size and availability indicators:

a. Number of branches:

The following illustrations represents the evolution of the number of public and private bank branches in Algeria from 2015 to 2021 as well as the number of branches per inhabitant which is used as a proxy to calculate the availability rate

Figure 7: Evolution of branches number and Availability rate (2015-2021)



Source: Bank of Algeria

As shown on the illustration on the left, public banks still dominate the market when it comes to the number of branches compared to private banks. In 2021 there were 1181 public bank branches against only 383 branches for private banks even though private banks win in number (14 private banks against only 6 public banks. Overall, we can see that the number of branches isn't increasing significantly and banks only open a few new branches each year. The number went from 1545 in 2019 to 1557 in 2020 and 1564 in 2022. This shows the steady but not rapid growth of branch numbers in the country. Their evolution cannot keep up with the rapid population growth, as we can see in the graph on the right, the number of inhabitants per branch keeps increasing at a rapid rate and went from only 25660 in 2015 to 28526 in 2021, hence, the availability rate measured by number of branches per inhabitant remains very low in Algeria.

b. Deposits and Loans:

Figure 8: Size of Deposits in Algerian Public and Private Banks (2017-2021)

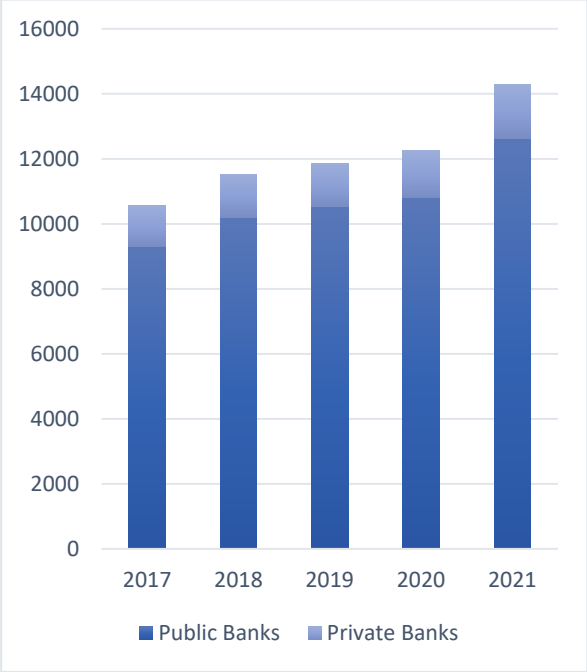
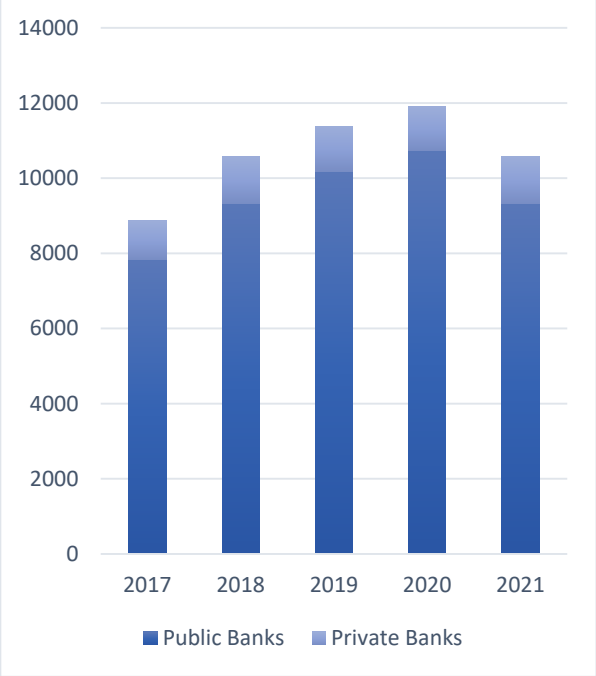


Figure 9: Size of Loans in Algerian Public and Private Banks (2017-2021)



Source: Established by the author using Banks' Annual Reports

The first thing to notice after observing the illustrations above is that the size of public banks' deposits and loans is much larger than that of private banks. In 2021 the size of deposits of public banks was 7.57 times bigger than deposits of private banks. Loans were also over 7 times larger of those of private banks.

As for the overall evolution of loans and deposits, we can see that deposits have been constantly growing in recent years and more significantly from 2020 to 2021 with a rise of 16% compared to only 6.6% from 2019 to 2020. On the other hand, the total of loans slightly decreased from 2020 to 2021 with a decrease in the size of total loans of 11% . This comes as a bit contradictory with the situation of 2021 as it was the year after the pandemic and banks were encouraged to invest and finance more businesses to help their recovery from the repercussions of the pandemic.

1.3.2 Financial Strength Indicators

a. Solvability Ratios:

Table 1: Global Solvability Ratio of Algerian Banks (2016-2021)

		2016	2017	2018	2019	2020
Global Solvability Ratio	Public Banks	18.37%	19.58%	19.24%	17.81%	18.47%
	¨Private Banks	20.32%	18.92%	18.0%	18.90%	20.27%
	All sector	18.5%	19.05%	19.05%	17.99%	18.76%

Source: Bank of Algeria

On the aggregate level, the solvability ratio shows an increase in 2020 compared to 2019 as it went from 17.99% to 18.76%. this increase was more significant in private banks as it went from 18.90% to 20.27% compared to public banks that displayed a solvability ratio of 17.81% in 2019 and 18.47% in 2020. Moreover, the aggregated sociability ratio recorded a decrease from 2018 to 2019 even though private banks' solvability ratio had an increase. This postulates that the overall solvability ratio is more influence by public banks which understandable considering that public banks are of a larger size and detain bigger parts of the market.

b. Liquidity ratios:

Table 2:Liquidity Ratios of Algerian Banks (2016-2021)

		2016	2017	2018	2019	2020
Liquid Assets/Total Assets	Public Banks	22.66%	21.88%	18.42%	14.21%	10.30%
	¨Private Banks	29.11%	33.11%	28.52%	27.31%	30.27%
	All Sector	23.52%	23.51%	19.84%	15.97%	13.07%
Liquid Assets/Short Term	Public Banks	58.84%	52.17%	46.30%	42.24%	31.44%
	Private Banks	56.25%	60.58%	52.61%	52.45%	59.46%

Liabilities	All Sector	58.39%	53.70%	47.45%	44.23%	37.06%

Source: Bank of Algeria

The table shows that the overall liquidity ratios of the sector keep decreasing each year as the liquid assets to total assets ratio decreased by around 10% in the last five years. This might be due to a shortfall in liquid assets in recent years. The liquid assets to total assets ratio dropped from 23.52% in 2016 to 13.07% in 2020. And the liquid assets to short term liabilities ratio dropped from 58.39% in 2016 to 37.06% in 2020.

And similar to the solvability ratio, even though both of the liquidity ratios for private banks are improving each year, the overall liquidity ratios of the sector are decreasing. This is because the liquidity ratios in public sector banks have been significantly dropping throughout the years and the negative impact of public banks is more prominent as they are of a much larger scale.

1.3.3 Concentration Ratio:

Concentration ratio is used as an indicator of competition in the sector, it compares the size of the banks in relation to the sector as a whole. A low concentration ratio would often indicate better competition among the banks in the sector. As for the Algerian banking sector, it is known that public banks dominate the sector in terms of assets. The table below shows the evolution of the concentration ratio from 2019 to 2021 calculated using the three largest banks and the public banks to the sector as a whole in terms of total assets:

Table 3: Concentration Ratio of the Algerian Banking Sector (2019-2021)

Year	2019	2020	2021
Concentration Ratio (Three Largest Banks)	61.81%	59.07%	60.34%
Concentration Ratio (All Public Banks)	88.06%	87.22%	87.85%

Source: Established by the author using Banks' Annual Reports

The three largest banks throughout these three years are: BNA, BEA, and CPA interchangeably. These banks alone own over 60% of the sector's assets as the concentration ratio was at 61.81% in 2019 and slightly dropped to 59.07% in 202 but increased again 2021 to 60.34%. And if we consider the six public banks of the sector, the concentration ratio raises

to around 87% as it reached 87.58% in 2021. This confirms that public banks are much larger in terms of assets and do dominate the sector and that the latter dies not have a highly competitive environment.

Section Two: Variables and Data Description

This study aims to analyze the impact of financial inclusion on the performance of Algerian banks measured by their profitability. The study includes 17 active banks on the Algerian banking sector and uses different proxies to measure their performance.

2.1 Data sources

The collection of data for this study has been a very delicate and complicated process. The first set of data that had to be collected concerns data relevant for the measure of banks' profitability and their performance. They were collected manually from annual reports of listed Algerian banks available through "le Centre national du register de commerce" CNRC. The second set of data; which helped measure bank penetration and financial inclusion levels; was obtained from "le Groupement d'intérêt économique monétique" GIE which is the entity in charge of keeping statistics relative to the use of digital means of payment as well as promoting it.

The study population includes 17 national Algerian banks out of 20 excluding the bank "CALYON" that was dissolved in 2020, as well as HSBC and CITIBANK as they are not part of the GIE. The study covers the period from 2017 to 2021, hence, a panel data of 85 observations were used. The main obstacles of this study were the difficulty of data collection and finding suitable data for analysis because of the lack of proper databases.

2.2 Variables

The variables used in this study were selected by taking in consideration our reviews of previous similar works, proxies that are considered most suitable by literature as measures of different variables, as well as the availability of data.

2.2.1 Dependent variables:

As this study aims to analyze the impact of financial inclusion on the financial performance of banks, and based on the theoretical framework in Chapter One, we selected one dependent variable as a measure of banks' performance which is ROA. In addition to this

variable that will be part of the main model we added a second independent variable which is the Interest Margin IM.

a. ROA:

ROA indicates the relation between bank's profitability and their assets. It measures how well the bank is managing its assets in order to generate profit. It is calculated as follows:

$$\boldsymbol{ROA = Net\ income/Total\ Assets}$$

ROA was selected because banks need more assets in order to reach higher levels of financial inclusion, from these assets we can mention tangible assets (branches, cards, ATMs…etc.) as well as intangible assets (e.g., new technology or software of online banking. Therefore, ROA seems as the most suitable pick.

b. Interest Margin IM:

The IM reflects the outcome of the bank's primary role of intermediation. It measures the gap between the interest received by banks on their loans and the interest paid on their deposits.

$$\boldsymbol{IM = Interest\ recieved - Interest\ paid}$$

We chose to add this variable in order to further our analysis and see if financial inclusion does significantly influence the banks' generation of profits without taking into account the costs needed to increase the level of financial inclusion. This is useful information because if financial inclusion does significantly increase profits, banks will consider investing in it. But if the impact is insignificant then banks won't find any need to work on raising financial inclusion levels.

2.2.2 Independent Variables:

a. Financial Inclusion Index:

The Financial Inclusion Index was introduced by the G20 summit in 2012. The G20 recognizes that Financial Inclusion can be measured in different ways and defined three major dimensions of measuring financial inclusion which are: access to financial services, usage of financial services, and quality of products and service delivery.

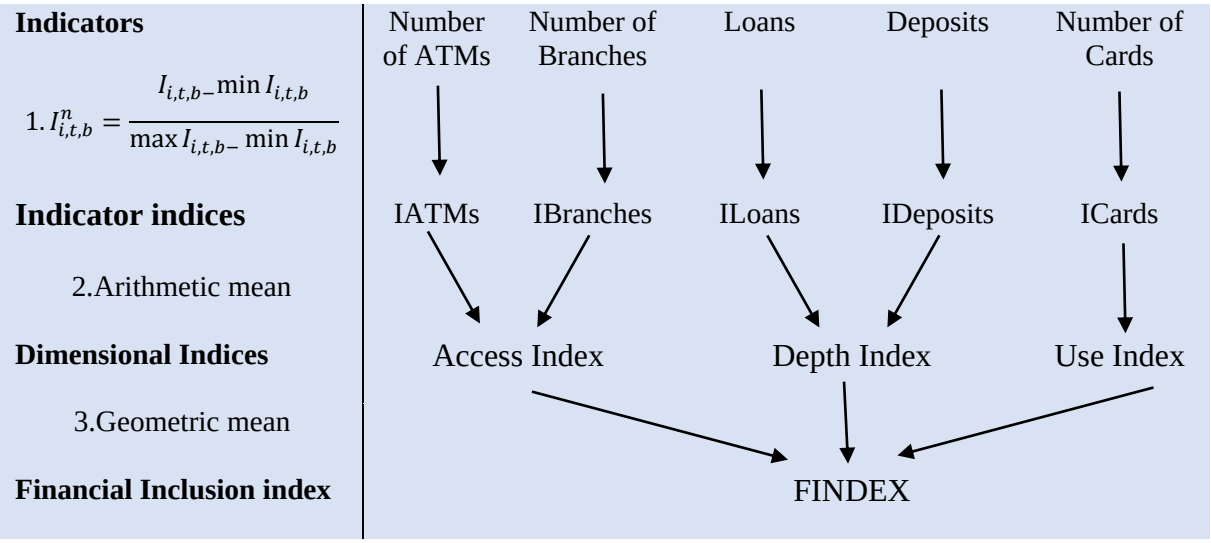
The G20 also introduced a list of multiple indicators that can take part in the calculation of each dimension. This was in order to allow a better flexibility in measuring financial inclusion as these indicators and measures can be potentially modified to suit the need of the user.

In this study, we will adopt the approach developed by (Sha'ban & al, 2019) in order to calculate the financial inclusion index. This method combines three dimensions (access, usage, and depth) into one index. As the G20 postulates, we used different indicators to calculate each dimension's index separately and then proceeded to calculate the aggregated index.

- **Calculation Process:**

The following graph demonstrates details of the different steps followed to calculate the Financial Inclusion Index:

Figure 8: Financial Inclusion Index Calculation Process



Source: Established by the author

Before engaging in the calculation process displayed in the previous graph; an initial step actually concerned the selection of the appropriate indicators that will serve as a basis in computing each dimension of the Findex. This step was rather challenging because we had multiple constraints relative to data availability. We decided to calculate each dimension using the following indicators:

- ✓ Number of ATMs and Number of Branches for the access dimension.
- ✓ Loans and Deposits for the depth dimension.
- ✓ Number of Cards for the use dimension.

After the selection of appropriate indicators, we proceed by calculating indices for all individual indicators and for all observations, by first identifying the minimum and maximum value of each indicator in the panel and the calculating the index using the following formula:

$$1.\ I_{i,t,b}^{n} = \frac{I_{i,t,b} - \min I_{i,t,b}}{\max I_{i,t,b} - \min I_{i,t,b}}$$

Where i represents the indicator, t the year of the observation and b the bank.

Once these indices are calculated, the next step consists of the determination of dimensional indices using the arithmetic mean of indicator indices affected to each dimension. We will then have three dimensional indices: Access Index (arithmetic mean of ATMs index and Branches Index), Depth Index (arithmetic mean of Loans index and deposits index), and Use Index (consenting of cards index only).

After these indices have been complied, we finally proceed to calculating the aggerated financial index by using the arithmetic mean of all three dimensions:

$$FINDEX = (Access\ Index \times Depth\ Index \times Use\ index)^{1/3}$$

This final indicator "Findex" will be used as a main variable in this study and the three dimensional indices will be used separately as independent variables in order to enhance the study and obtain more insightful and adequate results and interpretations.

b. Macroeconomic Variables:

In addition to the financial inclusion index, we added two macroeconomic variables to act as control variables in the model. These variables are Inflation rates, and GDP growth (GDPG). GDP growth is an indicator of the economic growth within the country. And Inflation rates reflect the changes of the overall prices of goods and services within the country. Both of these variables are considered major indicators of the economy as well as important external and macroeconomic determinants of banks financial overall. These variables change over time only and are the same for each and every bank.

2.3 Data Description

2.3.1 Descriptive statistics:

Summary of descriptive statistics of each variable used in the models for the entire sample of this study can be seen in the table down below. The descriptive statistics used are: the mean, the standard deviation, and the minimum and maximum value of each variable:

Table 4: Descriptive Statistics of used Variables

Variable	Mean	Std. Dev.	Min	Max
ROA	0.0146464	0.0081999	-0.0051528	0.0362561
IM	10.10847	0.53663	9.26043	11.04604
Findex	0.1714431	0.1907233	0	0.6684663
Access Index	0.3011516	0.2869554	0.0031153	0.9747082
Depth Index	0.224328	0.284467	0	0.9281822
Use index	0.1084474	01900536	0	1
GDPG	0.0043	0.0297757	-0.051	0.0385
Inflation	0.042916	0.0197734	0.019518	0.0723

Source: Established by the author using STATA15

The table shows that the mean value of ROA in the sector is at 1.46% and the maximum value of ROA in the sample of study is 3.62% and the minimum is -0.5% meaning that at least one of the banks had a year in deficit. all of these values are very low and also close to each other, explaining the standard deviation of 0.8%. There is also no big dispersion in the values of the IM as the mean is at 10.10 while the minimum value equals 9.26043 and the maximum is 11.046. The Findex has a mean of 0.17 and a maximum and minimum value of 0.668 and 0 respectively, and as the Findex is an index in the range 0 to 1, this implies that at least one of the banks is showing an outstanding performance compared to the rest of the sample (0.668 to a mean of 0.171) which resulted in a standard deviation of 0.19. and if treated individually, the dimensional indices confirm this dispersion as the maximum value for the use index is one while the minimum is 0 whereas the mean is at 0.108. the depth and the access index both have a standard deviation of over 0.28.

For what concerns microeconomic factors, GDPG, the minimum value of -0.051 corresponds to the year of the pandemic and of course it brought down the mean to 0.43% since the maximum value during the years of study was only at 3.85%. since the values are far

from each other. Inflation also significantly increased after the pandemic to 7.23% even though it was managed in the previous years of the study and its minimum value is at 1.9% resulting in a mean of 4.2%.

And as there is a very large gap between public banks and private banks in the Algerian banking sector; we added the statistics below describing the different variables sorted by the nature of their ownership:

Table 5: Descriptive Statistics of used Variables sorted by ownership

	Public Banks				**Private Banks**			
	Mean	Std.Dev	Min	Max	Mean	Std.Dev	Min	Max
ROA	0.0096	0.0065	0.0014	0.0232	0.0173	0.0077	-0.0051	0.0362
IM	10.733	0.2031	10.4131	11.0460	9.7677	0.30134	9.260	10.2997
Findex	0.4016	0.1260	0.2056	0.6684	0.0458	0.0504	0	0.16139
Access index	0.6262	0.2088	0.2394	0.9747	0.1238	0.1180	0.0031	0.3732
Depth index	0.5723	0.1978	0.2758	0.9281	0.0344	0.0292	0	0.9956
Use index	0.2569	0.2583	0.0368	1	0.0274	0.0374	0	0.1179

Source: Established by the author using STATA15

In terms of ROA, we can see that private banks are overall better performing than public banks as the mean ROA is of 0.9% for public banks and 1.7% for private banks. The maximum value of ROA of 3.62% also corresponds to a private bank. This indicates that private banks have a better management of their assets compared to public banks. As for the Findex, public banks are way further ahead with a mean of 0.4 compared to 0.05 in private banks. They also hold the maximum value of 0.6684. Analyzing each component of the Findex separately also shows a great difference between public and private banks. The access index has a mean of 0.62 in public banks compared to only 0.12 in private banks. the depth index and the use index are also higher in public banks with means of 0.57 and 0.25 respectively vs only 0.03 in private banks.

In addition, the last two years of the years of study coincide with the start and the spread of the covid-19 pandemic, hence, we added the descriptive variables sorted by years of crisis in order to have an idea of the impact of the pandemic on the variables used and on the banks in general. We considered 2020 and 20221 to be years of crisis and the rest of the years to be regular years, the results were as follows

Table 6: Descriptive Statistics of used Variables sorted by years of covid crisis

	No Crisis				Crisis			
	Mean	Std.Dev	Min	Max	Mean	Std.Dev	Min	Max
ROA	0.0161	0.0077	-0.051	0.0305	0.0123	0.0084753	-0.0030	0.0362
IM	10.093	0.5507	9.2604	1.1104	10.13	0.5220	9.4149	11.000
Findex	0.1605	0.1778	0	0.6228	0.1877	0.2102	0.0019	0.6684
Access Index	0.2920	0.2846	0.0031	0.9459	0.3148	0.2941	0.0077	0.9747
Depth Index	0.2186	0.2839	0	0.9281	0.2329	0.2892	0.0074	0.0873
Use Index	0.0949	0.1624	0	0.8483	0.1286	0.2263	0.0001	1

Source: Established by the author using STATA15

The table shows that ROA of banks did decrease in years of pandemic from a mean of 1.61% to 1.23%. Interest margins slightly increased from an average of 10.09 to 10.13. as for the Findex, the mean value increased from 0.1605 in regular years to 0.2102 in the years of crisis. This is probably due to the fact that banks began investing more in digital means of banking because of the pandemic, as many banks issued more cards, implemented more ATMs and payment terminals to promote safer banking and social distancing. They were also encouraged to give more loans in 2021 in order to support vulnerable businesses and individuals and help the recovery of the economy. This explains the increase in both the interest margin and the financial inclusion index. This statement is further confirmed by the analysis of each dimension separately, as the access index increased in average from 0.29 to 0.31, the depth index from 0.21 to 0.23 and the use index from 0.09 to 0.128.

2.3.2 Correlation between variables:

In order to understand relations between variables and how they affect one another, we used Pearson's correlation matrix to show the existing relations between variables and determine their type. The correlation matrix is the following:

Table 7: Correlation Matrix

	ROA	**IM**	**Findex**	**Access Index**	**Depth index**	**Use index**	**GDPG**	**Inflation**
ROA	1.000							
IM	-0.221	1.000						
Findex	-0.541	0.832*	1.000					

Access Index	-0.533	0.837*	0.913*	1.000				
Depth Index	-0.309	0.904*	0.782*	0.725*	1.000			
Use Index	-0.459	0.473	0.819*	0.558	0.416	1.000		
GDPG	0.0957	0.0050	-0.007	0.002	-0.011	-0.021	1.0000	
Inflation	-0.039	-0.005	0.0047	0.0106	-0.014	-0.004	0.694*	1.000

Source: Established by the author using STATA15

The results show a few significant correlations between variables. It is the case of Findex with NIM as the correlation is pretty high (over 80%). This might be because the Findex takes into account components directly correlated with the Interest Margin. This is further explained by the high correlation between the depth index and the interest margin at 90.4%. The other significant correlation is between Inflation and GDPG at over 69.47%. as well as between the three dimensional indices and the aggregate Findex. The are no other significant correlations between variables other than these. And since there are a few heavily correlated variables, we calculated the variance inflation factor VIF for variables of each model used in order to test the existence of multicollinearity of variables[3]. The results have shown that the mean VIF remain inferior to 10, and therefore, the problem of multicollinearity does not exist.

2.3.3 Expected effect of independent variables:

The following table illustrates the expected effects of independent variables on the dependent variables selected:

Table 8: Expected effect of independent variables

Variables	Expected effect on ROA	Expected effect on IM
Findex	-/+	+
Access Index	-/+	-/+
Depth Index	-/+	+
Use index	-/+	-/+
Inflation	-/+	-/+
GDPG	+/-	+/-

Source: Established by the author

[3] See Annex 3

The literature review in the previous chapters shows that many academicians found mixed results when it comes to the impact of financial inclusion on banks' financial performance. Therefore, we expect different influences of the Findex on ROA, but we expect a positive impact on the interest margin as we suppose an increase in banks' loans and deposits due to financial inclusion. The same is also expected for the dimensional indices separately. As for the macroeconomic variables, we expect different influences on both ROA and the Interest Margin.

Section Three: Regression Results

This study's main objective is to understand the impact of financial Inclusion on the financial performance of banks. It aims to define the nature of the relationship between the financial inclusion variable FINDEX and the bank profitability variables (ROA and IM).

In this research we will make use of panel data analysis as a statical instrument in order to define the effect of financial Inclusion and other macroeconomic variable (GDP growth and Inflation) factors such as inflation on banks' financial performance. Panel data analysis is a combination of time series and cross-sectional statistical analysis. It uses more than one explanatory or independent variable to explain or predict one dependent variable. STATA software is applied to obtain the regression results. It is among the most widely used programs for statistical analysis in academic research.

3.1 Hypotheses development and models identification

3.1.1 Hypotheses development:

Our aim is to verify whether there exists a relationship between the independent variables selected (Findex, GDP growth, and Inflation) and the dependent variables (IM and ROA) as well as assessing the nature of this relationship. Therefore, on a first basis, the null and alternative hypotheses are:

1- H0: there exists an insignificant impact of Financial Inclusion on the financial performance of Algerian banks.
2- H1: there exists a significant impact of Financial Inclusion on financial performance of Algeria banks

The following hypotheses were added in order to understand the nature of the relationship:

1- H2: There exists a positive impact of financial inclusion on the financial performance of Banks.
2- H3: There exists a negative impact of financial inclusion on the financial performance of banks.

3.1.2 Models Identification:

In order to answer our hypothesis as well as the main question of this study, we will first proceed by analyzing the relationship of each dimension of financial inclusion index with the financial performance of banks. We will then proceed to testing the relationship of the aggregated index of financial inclusion and the dependent variables:

The first set of models will be as follows:

✓ Model 1:

This model uses ROA as an independent variable and the Access index, Depth Index, Use Index, as well as GDP growth and Inflation as explanatory variables. This is in order to assess the relationship between each individual dimension and ROA:

$$ROA_{it} = C + \alpha 0\ Access\ Index_{it} + \alpha 1\ Depth\ Index_{it} + \alpha 2\ Use\ Index_{it} + \alpha 3\ GDPG + \alpha 4\ Inflation + \varepsilon_{it} \ldots.(1)$$

✓ Model 2:

This Model illustrates the relationship between the Interest Margin and the independent variables:

$$IM_{it} = C + \alpha 0\ Access\ Index_{it} + \alpha 1\ Depth\ Index_{it} + \alpha 2\ Use\ Index_{it} + \alpha 3\ GDPG + \alpha 4\ Inflation + \varepsilon_{it} \ldots.(2)$$

The next step concerns testing the impact of the aggregated Findex on ROA and IM using the following models:

✓ Model 3:

This Model aims to explain ROA by the independent variables:

$$ROA_{it} = C + \alpha 0\ FINDEX_{it} + \alpha 1\ GDPG_{it} + \alpha 2\ Inflation_{it} + \varepsilon_{it} \ldots.(3)$$

This Model will help answer the study's main hypotheses on the impact of financial Inclusion on the financial performance of banks.

✓ Model 4:

This Model illustrates the relationship between IM and the independent variables:

$$IM_{it} = C + \alpha 0\, FINDEX_{it} + \alpha 1\, GDPG_{it} + \alpha 2\, Inflation_{it} + \varepsilon_{it} \ldots\ldots (4)$$

3.2 Selection of the appropriate model

Panel data analysis proposes two models we can use in order to complete the regression; the fixed effects model and the random effects model. But before choosing between these two models, it is appropriate to calculate the R squared as well as conduct the Fisher test in order to confirm the significance of the models and that the coefficients of the model are indeed different than zero. Therefore, we proceeded by finding the value of the Fisher statistic for all models. And we then conducted the Hausman test on the models and the results were as follows:

Table 9: Hausman Test Results for selected Models

	Model 1	**Model 2**	**Model 3**	**Model 4**
F statistic	Prob>F=0.000	Prob>F=0.000	Prob>F=0.000	Prob>F=0.000
R-Squared	0.3570	0.6936	0.3210	0.6936
Value of Chi2	0.5198	0.2968	0.9880	0.0002
Suitable model	Random effects	Random effects	Random effects	Fixed effects

Source: Established by the author using STATA15

First, the F statistic for all four models is under the thresholds of 1%, 5%, and 10% (Prob>F=0.000). This means that the different variables' coefficients are different from 0 and all models are of significance.

The results of the Hausman test for model 1 that uses ROA as a dependent variable gave a value of Chi2 (Prob>Chi2= 0.5198) largely superior to 1%, 5% and 10%, therefor, the most suitable model is a random effects model. As for the second model (Model 2) that uses IM, Chi2= 0.2968, which is also over the thresholds of 1%, 5%, and 10% we choose to select the random effects model as well. Similarly, to the two previous models, Model 3 has a Chi2 of 0.9980 which mean that the random effects model is most suitable. Model 4 however, has a

value of Chi2 of 0.0002, inferior to all thresholds, hence, the fixed effect model is more suitable.

3.3 Testing the models

After selecting the random effects model for this regression, we have to run a few tests on the models in order to bring out any underlying problems that could be eventually fixed in order to have an accurate regression. The table below illustrates the results of the test of autocorrelation of residues as well as heteroskedasticity tests on all four models:

Table 10: Autocorrelation of Residues and Heteroskedasticity tests Results

Test	Model 1	Model 2	Model 3	Model 4
Wooldridge test for autocorrelation	Prob > F = 0.6163	Prob > F = 0.0014 .	Prob > F = 0.5884	Prob > F = 0.1246
Breusch and Pagan Lagrangian multiplier test	Prob > chi2= 0.0008	Prob > chi2= 0.3013	Prob > chibar2 = 0.0140	Prob > chibar2 = 0.0000

Source: Established by the author using STATA15

In order to test the autocorrelation of residues we used the Woolridge test. The results for Model 1,3 and 4 were Prob>F =0.6163, Prob>F= 0.5884, and Prob>F= 0.1246 respectively, all superior to 5% and therefore, there exists no problem of autocorrelation of residues in these models. Whereas the same test on model 2 gave a value of 0.0014 confirming the existence of autocorrelation in this model. As for heteroskedasticity, the Breusch and Pagan test unveils the values of Prob >chibar2=0.0008 for model 1, Prob >chibar2=0.0140 for model 3 and Prob > chibar2 = 0.0000 for model 4, which all are inferior to 5% meaning that the models are heteroskedastic and there exists a heteroskedasticity problem. But model 2 shows no problem of heteroskedasticity with a value of Prob > chi2 = 0.3013.

The autocorrelation of residues present in model 2 and the heteroskedasticity problem in models 1, 3 & 4 can be corrected by using the Panel-Corrected Standard Errors (PCSE). PCSE is considered an alternative to the random effects model when the disturbances are

assumed to be either heteroskedastic across panels or heteroskedastic and correlated across panels or autocorrelated within panel.

3.4 Regression after correction and discussion of results

The following tables illustrate the estimation of model 1 and model 2 that uses the three dimensional components of the Findex as independent variable in addition to two macroeconomic variables: GDP growth and inflation followed by the estimations of model 3 and 4 that shows the relationship between the aggregated Findex and the dependent variable ROA and IM

Table 11: PCSE Estimation, Models 1&2

	Model 1			**Model 2**		
	Coefficient	Z	P>|Z|	Coefficient	Z	P>|Z|
Access Index	-0.14816* (0.0018)	-8.12	0.000	0.73812* (0.0766)	9.64	0.000
Depth Index	0.00451* (0.0013)	3.37	0.001	1.1798* (0.01693)	69.68	0.000
Use Index	-0.0093* (0.0010)	-8.49	0.000	-0.05188 (0.04207)	-1.23	0.217
Inflation	-0.788787 (0.0560)	-1.64	0.159	-0.527724 (0.516)	-1.02	0.307
GDPG	0.062378* (0.03719)	1.68	0.094	0.4833 (0.34297)	1.41	0.159
C	0.0222* (0.0025)	8.91	0.000	9.6477* (0.03328)	289.81	0.000

Source: Established by the author using STATA15

Table 11 presents the empirical results of PCSE estimation methods for models 1 and 2, with ROA and IM as the dependent variables. The results indicated that the Access Index significantly impacts both ROA and IM. However, it has a negative impact on ROA with a coefficient of -0.14816 and a positive effect on IM with a coefficient of 0.0766. The depth index also significantly impacts both ROA and IM but its effect is positive on both as a variation of the depth index of 1% causes an increase of 0.45% in ROA and a bigger increase

of 117% in the Interest Margin. The Use index has a significant negative relationship with ROA with a coefficient of -0.0093 and no significant impact on IM.

As for macroeconomic variables, the regression results show a positive significant relationship between ROA and GDP growth and the threshold of 10% and no significant relationship between ROA and Inflation. There is also no significant relationship between macroeconomic variables and the IM.

This mixed results in the impact of the different financial inclusion dimensions on ROA and IM is due to the different components of each dimensional index separately. we can see that access index and the use index have a negative impact on ROA whereas the depth impact has a positive impact. This is because the access index and use index are calculated on the basis of parameters that require investments from the bank (Branches, ATMs, and Cards) while the depth index is composed of loans and deposits of the bank. This however, does not mean that the bank should stop investing in the other dimensions as a growth in the depth dimension is often a result in the growth of the two other dimensions as they increase reachability and accessibility. The significant positive impact of the access index on the IM supports this assumption as it proves that the access index does positively impact the revenues of the bank but its impact on ROA is negative.

Given that all three dimensions of financial inclusion do have a significant impact on ROA, we accept H1: ": there exists a significant impact of Financial Inclusion on financial performance of Algeria banks". However, given the mixed results of the nature of the impact on ROA, we cannot yet conclude if financial inclusion has a positive or a negative impact on banks' financial performance".

Table 12: PCSE Estimation, Models 3&4

	Model 3			**Model 4**		
	Coefficient	Z	P>|Z|	Coefficient	Z	P>|Z|
Findex	-0.2315* (0.0028)	-8.04	0.000	2.3430* (0.1484)	15.78	0.000
Inflation	-0.0807 (0.0568)	-1.42	0.156	-1.0078* (0.3791)	-2.66	0.008
GDPG	0.0624* (0.0377)	1.65	0.098	0.7124* (0.2519)	2.83	0.005
C	0.0218* (0.0025)	8.68	0.000	9.7469* (0.2910)	334.84	0.000

Source: Established by the author using STATA15

The regression results illustrated in table 12 show a significant relationship between Findex and ROA at the confidence level of 99%. Findex negatively impacts ROA as ROA will decrease by 2.315% for a positive variation of the Findex of 1%. On the other hand, Findex has a positive significant impact on IM with a coefficient of 2.3430. Therefore, Financial Inclusion negatively impacts banks' performance measured by ROA but positively impacts their Interest margins. And regarding the macroeconomic variables, the results show no significant relationship between Inflation and ROA and a positive significant relationship between GDP growth and ROA with a coefficient of 0.0624. They also show a significant relationship between IM and both Inflation and GDP growth as a positive variation of GDP growth of 1% will result in an increase of 25.19% of the IM while Inflation has a negative impact with a coefficient of -10078.

The outcome of the study shows a negative significant relationship between financial inclusion and the financial performance of banks. Therefore, we accept H3: There exists a negative impact of financial inclusion on the financial performance of banks.

However, the study also shows that financial inclusion has a positive impact on banks' interest margins. This postulates that financial inclusion does increase interest income in banks but comes at a high price, thus resulting in a negative relationship with the overall financial performance of the bank and its profitability. The previous results showing different effects of different dimensions of financial inclusion on banks' profitability show that despite this negative impact, banks should continue investing in financial inclusion but also search for cost efficiency ass the negative effect on ROA postulates that the banks' assets aren't used efficiently in order to generate profits.

In this context, it should be mentioned that banks should encourage their clients to use electronic services, such as ATMs, Apps, card payments, and other existing tools as these kinds of services comes at lower costs compared with classic banking through branches that require human force and bigger investments, thus decreasing bank costs. And Although these Alternatives also require investments and would probably generate heavy related costs. and even a negative impact on banks' profitability, Banks should continue investing in these tools as they indirectly help increase a bank's profitability by attracting new clients and facilitating client transactions. Therefore, banks management should enhance digital means of banking despite the fact that such services do not usually provide direct revenues for banks because they often offer basic services that come with little to no fees.

Conclusion

The Algerian banking system is a very particular system which shows a very important gap between public and private banks and this in term of several indicators. Moreover, it is a system which is evolving in an eventful environment. This requires the sector to adapt to these changes in order to ensure its efficiency and be able to complete its role in the economy.

According to the different banking sector indictors, we can say that Algeria is still far behind in terms of financial inclusion as indicators of availability as well as other bank penetration indicators remain very low. The banking sector is failing to reach bigger portions of the population and also failing at providing easily accessible and usable financial services and products to their customers.

The empirical study helps conclude that the financial performance of the Algerian banking system is negatively influenced by financial inclusion. However, this should not discourage banks in investing in order to reach more people. As the authorities stressed on the importance of Financial Inclusion and the latter is also proven to have a positive impact on banks' revenues. In addition, financial inclusion expands the size of potential clients of the bank which results in more activities and transactions for the banks. On the contrary, banks should aim to find a better allocation of assets and select investments that allows them to raise financial inclusion and extend their portfolios at lower costs such investing in more modern tools such as digital and electronic banking that usually calls for fewer costs compared to traditional banking.

General Conclusion

GENERAL CONCLUSION

In today's context of constant evolution and change, banks are increasingly facing new challenges and dilemmas. They are obliged to ensure a good financial performance while responding to the needs of the economy in order to support the latter in its development. one of the trending issues in the sector today is financial inclusion. Banks are encouraged to offer products and services to the entire population in order to reduce financial exclusion and help marginalized people take part in their country's economy. The purpose of this paper was to study the relationship between financial inclusion and the financial performance of banks. To investigate whether financial inclusion actually has an impact on the profitability of banks, and if so, to analyze the nature of this relationship and the impact of the level of financial inclusion in banks on their financial performance.

In order to be able to answer these questions, we have divided this paper into three parts, the first of which is dedicated to the study of the financial performance of banks by recalling the main concepts and theories of the financial performance of banks as well as exhibiting the different determinants and measures of financial performance of banks. The second chapter is dedicated to the concept of financial inclusion as a determinant of financial performance of banks and aims to clarify any ambiguities surrounding. And the last chapter id dedicated to an empirical study that could serve as empirical evidence when assessing the relationship between financial inclusion and financial performance in banks. it contains an analysis of the Algerian banking sector in order to be able to understand the specifics of it and then an empirical study using panel data analysis to help complete estimations on different models serving to answer our main problematic.

The study of financial performance in banks has certainly evolved with time. It is now a filed with an abundance of literature. Many researchers have contributed to this matter with different theories and explanations. Financial performance of banks can therefore be seen from different angles and explained in numerous ways. There is a certain flexibility when studying and measuring financial performance of banks depending on the needs of the researches that has to select an appropriate conceptual framework for their researches from what literature already offers. This helped us retain, for this specific study, the main variables for our empirical part such as ROA as a measure of bank’s financial performance as well as macroeconomic variables.

General Conclusion

Financial Inclusion is a field that gained a lot of attention from many authorities and central banks around the world since it has been proved to be one of the accelerators of economic growth and the improvement of the quality of living in general. However, Financial Inclusion as a concept is hard to define. It generally used to refer to the state where financial services and products are made accessible to all individuals in order to allow them to profit off these services, improving their situation, and taking part of the economy. Financial inclusion is also very hard to measure as it does not refer to only services offered by the bank but also all services offered by financial institutions. Hence, there is many ways to measure financial inclusion and bank penetration that uses different banking indicators is one of these measures. The Finical inclusion Index is also another measure that is recognized and used by the world bank and is currently the most used proxy to measure financial inclusion. This study also uses the Findex as a measure for financial inclusion and an independent variable explaining bank's financial performance given that the review of literature proved that many researchers have found a relationship between financial inclusion and financial performance of banks.

The results to our empirical study confirm the existence of a relationship between financial inclusion and the financial performance of Algerian banks. According to these results this relationship is a negative one, as an increase of the financial inclusion levels of banks measures by the Findex will cause a decrease in bank's profitability measured by ROA. However, a more detailed analysis of the separate dimensions of the Findex as well as their impact on the Interest Margin of banks indicates that financial inclusion levels do increase bank revenues but have a rather negative impact on ROA. Moreover, investing in the Access dimension or the Use dimension which are usually costly increases the number of potential clients of the bank and facilitates the accessibility to its services which will eventually bring revenues to the bank. Therefore, banks shouldn't cut down on working on their financial inclusion levels but instead search for ways to manage their investments and assets more effectively as some components of the Findex seem to have a negative impact on ROA whereas others have a positive one.

This research could be completed by a more thorough analysis of financial inclusion using a more complete database allowing the use of different indicators as components of the Findex or even the use of completely different measures. It could also be improved by using other proxies to measure the financial performance of banks rather than using a traditional

measure only. It would be interesting to see the relationship between other components of the Findex and bank's profitability as such research would be great extension of this study

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ANNEXES

Annex 1: List of banks used in the sample

SGA	Société Générale Algérie
AGB	Gulf Bank Algérie
ABC	Arab Banking Corporation
TRUST	Trust Bank Algeria
AL SALAM	Al Salam Bank
AL BARAKA	Al Baraka Bank
HOUSING	Housing Bank Algérie
FRANSBANK	Fransbank Algérie
AB plc	Arab Bank plc
BNP	BNP Paribas El Djazair
NATIXIS	Natixis Algérie
BNA	Banque National d'Algérie
BEA	Banque Extérieure d'Algérie
BADR	Banque de l'Agriculture et Développement Rurale
BDL	Banque de Développement Locale
CPA	Credit Populaire d'Algérie
CNEP	Caisse Nationale d'Epargne et Prévoyance

Annex 2: Simple Regression Model 1, 2, 3 & 4

```
. reg roa findex inf gdpg
```

Source	SS	df	MS	Number of obs	=	85
				F(3, 81)	=	12.77
Model	.001813196	3	.000604399	Prob > F	=	0.0000
Residual	.003834803	81	.000047343	R-squared	=	0.3210
				Adj R-squared	=	0.2959
Total	.005647999	84	.000067238	Root MSE	=	.00688

roa	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
findex	-.0231582	.0039368	-5.88	0.000	-.0309912	-.0153253
inf	-.0807599	.0527856	-1.53	0.130	-.1857866	.0242669
gdpg	.0624439	.0350544	1.78	0.079	-.0073033	.1321912
_cons	.0218141	.0023775	9.18	0.000	.0170836	.0265445

Annexes

```
reg logim findex inf gdpg
```

Source	SS	df	MS	Number of obs	=	85
				F(3, 81)	=	61.11
Model	16.7770775	3	5.59235917	Prob > F	=	0.0000
Residual	7.41254874	81	.091512947	R-squared	=	0.6936
				Adj R-squared	=	0.6822
Total	24.1896263	84	.287971741	Root MSE	=	.30251

logim	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
findex	2.343071	.1730831	13.54	0.000	1.99869	2.687452
inf	-1.007815	2.320746	-0.43	0.665	-5.625371	3.609742
gdpg	.7124376	1.541185	0.46	0.645	-2.354037	3.778912
_cons	9.746959	.1045278	93.25	0.000	9.538981	9.954936

```
. reg roa useindex accessindex depthindex inf gdpg
```

Source	SS	df	MS	Number of obs	=	85
				F(5, 79)	=	8.77
Model	.00201616	5	.000403232	Prob > F	=	0.0000
Residual	.003631839	79	.000045973	R-squared	=	0.3570
				Adj R-squared	=	0.3163
Total	.005647999	84	.000067238	Root MSE	=	.00678

roa	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
useindex	-.0093304	.0048156	-1.94	0.056	-.0189156	.0002547
accessindex	-.0148168	.0042112	-3.52	0.001	-.023199	-.0064345
depthindex	.0045103	.0037796	1.19	0.236	-.0030128	.0120334
inf	-.0788787	.0520343	-1.52	0.134	-.1824503	.0246929
gdpg	.0623078	.0345515	1.80	0.075	-.0064652	.1310808
_cons	.0222258	.0023784	9.34	0.000	.0174916	.0269599

```
. reg logim useindex accessindex depthindex inf gdpg
```

Source	SS	df	MS	Number of obs	=	85
				F(5, 79)	=	124.57
Model	21.4668091	5	4.29336182	Prob > F	=	0.0000
Residual	2.72281713	79	.03446604	R-squared	=	0.8874
				Adj R-squared	=	0.8803
Total	24.1896263	84	.287971741	Root MSE	=	.18565

logim	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
useindex	-.0518886	.1318541	-0.39	0.695	-.3143377	.2105604
accessindex	.7381219	.1153071	6.40	0.000	.5086088	.967635
depthindex	1.179825	.103488	11.40	0.000	.9738371	1.385812
inf	-.5277242	1.424739	-0.37	0.712	-3.363596	2.308148
gdpg	.4833327	.9460466	0.51	0.611	-1.399726	2.366391
_cons	9.647714	.0651233	148.15	0.000	9.51809	9.777339

Annex 3: VIF Test (Dimensional and Aggregated Variables)

vif

Variable	VIF	1/VIF
gdpg	1.93	0.517334
inf	1.93	0.517354
findex	1.00	0.999739
Mean VIF	1.62	

vif

Variable	VIF	1/VIF
accessindex	2.67	0.374775
depthindex	2.11	0.473444
inf	1.93	0.516989
gdpg	1.93	0.517087
useindex	1.53	0.653390
Mean VIF	2.04	

Annex 4: Hausman Test

```
. hausman fixed random

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |    fixed       random       Difference          S.E.
-------------+------------------------------------------------------------
     findex  |   -.0328961   -.0233577       -.0095383        .0264531
        inf  |   -.0789131    -.080722        .0018089        .0070651
      gdpg   |    .0611041    .0624165       -.0013123        .0049153
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        0.13
                Prob>chi2 =      0.9880
```

```
. hausman fixed random

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |    fixed       random       Difference          S.E.
-------------+------------------------------------------------------------
     findex  |    .474478    1.222357       -.7478786         .170266
        inf  |   -.6534494   -.7952791        .1418298              .
      gdpg   |    .4553484    .5582448       -.1028964              .
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       19.29
                Prob>chi2 =      0.0002
                (V_b-V_B is not positive definite)
```

```
hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
accessindex	-.0263153	-.0144515	-.0118637	.0396621
useindex	.0008241	-.0091523	.0099763	.0142851
depthindex	-.0526841	.003769	-.0564531	.0289756
inf	-.0881583	-.0791377	-.0090206	.0105569
gdpg	.0617666	.0623598	-.0005932	.0010285

```
                b = consistent under Ho and Ha; obtained from xtreg
     B = inconsistent under Ha, efficient under Ho; obtained from xtreg

  Test:  Ho:  difference in coefficients not systematic

              chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                      =        4.21
            Prob>chi2 =      0.5198
            (V_b-V_B is not positive definite)
```

```
. hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
accessindex	1.168704	.9795404	.1891637	.4045234
useindex	.0158552	-.057266	.0731212	.0878
depthindex	.1887808	.8518519	-.663071	.2722343
inf	-.8282961	-.6471757	-.1811204	.0446611
gdpg	.5098182	.4953558	.0144624	.

```
                b = consistent under Ho and Ha; obtained from xtreg
     B = inconsistent under Ha, efficient under Ho; obtained from xtreg

  Test:  Ho:  difference in coefficients not systematic

              chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                      =        6.10
            Prob>chi2 =      0.2968
            (V_b-V_B is not positive definite)
```

Annex 5 : Heteroskedascticity test

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of roa

         chi2(1)      =     8.34
         Prob > chi2  =   0.0039
```

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of logim

         chi2(1)      =    12.93
         Prob > chi2  =   0.0003
```

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of roa

         chi2(1)      =    11.31
         Prob > chi2  =   0.0008
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of logim

         chi2(1)      =     1.07
         Prob > chi2  =   0.3013
```

Annex 6: Autocorrelation Tests

```
. xtserial logim findex inf gdpg

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,       16) =     11.379
           Prob > F =      0.0039
```

```
. xtserial roa useindex accessindex depthindex inf gdpg

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,       16) =      0.261
           Prob > F =      0.6163
```

```
. xtserial logim useindex accessindex depthindex inf gdpg

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,      16) =     14.966
           Prob > F =      0.0014
```

Annex 7: Panel-Corrected Standard Errors Estimation, Models 1,2,3 & 4

```
. xtpcse roa findex inf gdpg

Linear regression, correlated panels corrected standard errors (PCSEs)

Group variable:   bankcode                    Number of obs     =         85
Time variable:    year                        Number of groups  =         17
Panels:           correlated (balanced)       Obs per group:
Autocorrelation:  no autocorrelation                        min =          5
                                                            avg =          5
                                                            max =          5
Estimated covariances      =       153        R-squared         =     0.3210
Estimated autocorrelations =         0        Wald chi2(3)      =      68.00
Estimated coefficients     =         4        Prob > chi2       =     0.0000

------------------------------------------------------------------------------
             |             Panel-corrected
         roa |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      findex |  -.0231582   .0028819    -8.04   0.000    -.0288066   -.0175098
         inf |  -.0807599   .0568912    -1.42   0.156    -.1922646    .0307449
        gdpg |   .0624439   .0377807     1.65   0.098    -.0116048    .1364926
       _cons |   .0218141   .0025142     8.68   0.000     .0168863    .0267418
------------------------------------------------------------------------------
```

```
. xtpcse logim findex inf gdpg

Linear regression, correlated panels corrected standard errors (PCSEs)

Group variable:   bankcode                    Number of obs     =         85
Time variable:    year                        Number of groups  =         17
Panels:           correlated (balanced)       Obs per group:
Autocorrelation:  no autocorrelation                        min =          5
                                                            avg =          5
                                                            max =          5
Estimated covariances      =       153        R-squared         =     0.6936
Estimated autocorrelations =         0        Wald chi2(3)      =     252.00
Estimated coefficients     =         4        Prob > chi2       =     0.0000

------------------------------------------------------------------------------
             |             Panel-corrected
       logim |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      findex |   2.343071   .1484502    15.78   0.000     2.052114    2.634028
         inf |  -1.007815   .3791755    -2.66   0.008    -1.750985   -.2646441
        gdpg |   .7124376   .2519636     2.83   0.005     .2185979    1.206277
       _cons |   9.746959   .0291096   334.84   0.000     9.689905    9.804013
------------------------------------------------------------------------------
```

Annexes

```
. xtpcse roa useindex accessindex depthindex inf gdpg

Linear regression, correlated panels corrected standard errors (PCSEs)

Group variable:   bankcode                      Number of obs      =        85
Time variable:    year                          Number of groups   =        17
Panels:           correlated (balanced)         Obs per group:
Autocorrelation:  no autocorrelation                           min =         5
                                                               avg =         5
                                                               max =         5
Estimated covariances      =       153          R-squared          =    0.3570
Estimated autocorrelations =         0          Wald chi2(5)       =    409.87
Estimated coefficients     =         6          Prob > chi2        =    0.0000
```

roa	Panel-corrected Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
useindex	-.0093304	.0010989	-8.49	0.000	-.0114842	-.0071766
accessindex	-.0148168	.0018257	-8.12	0.000	-.0183951	-.0112385
depthindex	.0045103	.0013369	3.37	0.001	.00189	.0071306
inf	-.0788787	.0560127	-1.41	0.159	-.1886615	.0309041
gdpg	.0623078	.0371958	1.68	0.094	-.0105945	.1352102
_cons	.0222258	.0024946	8.91	0.000	.0173365	.027115

```
. xtpcse logim useindex accessindex depthindex inf gdpg

Linear regression, correlated panels corrected standard errors (PCSEs)

Group variable:   bankcode                      Number of obs      =        85
Time variable:    year                          Number of groups   =        17
Panels:           correlated (balanced)         Obs per group:
Autocorrelation:  no autocorrelation                           min =         5
                                                               avg =         5
                                                               max =         5
Estimated covariances      =       153          R-squared          =    0.8874
Estimated autocorrelations =         0          Wald chi2(5)       =   5907.42
Estimated coefficients     =         6          Prob > chi2        =    0.0000
```

logim	Panel-corrected Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
useindex	-.0518886	.0420731	-1.23	0.217	-.1343504	.0305732
accessindex	.7381219	.0766068	9.64	0.000	.5879754	.8882684
depthindex	1.179825	.016933	69.68	0.000	1.146637	1.213013
inf	-.5277242	.5161724	-1.02	0.307	-1.539404	.483955
gdpg	.4833327	.3429756	1.41	0.159	-.1888871	1.155552
_cons	9.647714	.0332892	289.81	0.000	9.582469	9.71296