

Microfinance, Growth and Monetary Policy : An Empirical Analysis Using Panel Data From Developing countries.

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The University does not intend to give any approval or disapproval to the opinions expressed in this thesis. These opinions should be considered as author-specific.

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Abbreviations and Acronyms

DFS : Decentralized Financial System

UNACOOPEC-CI : National Union of Savings and Credit Cooperatives of Ivory Coast

RCMEC-CI : Network of Mutual Savings and Credit Banks of Ivory Coast

FIDRA : International Fund for the Development of Active Retirement

DM: Microfinance Department

BCEAO: Central Bank of West African States

MICROCRED-CI : Microcred-Ivory Coast

CNM : National Commission for Microfinance

IMF : Microfinance institution

WAMU : West African Monetary Union

ADB Asian Development Bank

CGAP Consultative Group to Assist the Poor

GMM The Generalized Method of Moments

IMF International Monetary Fund

NGOs (International) Non-Government Organizations

MFI Microfinance Institutions

MIX Microfinance Information Exchange

PARMEC Support Programme for the Regulation of Mutual Savings and Credit Institutions

OECD The Organization for Economic Co-operation and Development

\$ USD/United States Dollar

WB The World Bank

General Introduction

Relevance of this research in microfinance

MFIs are characterised by the joint pursuit of financial and social objectives (Ndour and Paget-Blanc, 2014; Dorfleitner et al., 2017; Caserta et al., 2018). They have made it possible to raise the standard of living of populations excluded from the traditional banking sector (Banerjee et al., 2015; Guérin, 2015) and to reintegrate marginalised people into society, particularly women (D'Espallier et al., 2011; Boehe and Cruz, 2013). In addition, according to the 2018¹ microfinance barometer based on 2016–2017 data, MFIs reached 139 million clients (an increase of 5.6%) for a loan portfolio of \$114 billion (an increase of 15.6%). These statistics reveal a strong growth potential for microfinance worldwide and reflect the dynamism of a sector that supports a growing number of vulnerable clients and microenterprises through the combined provision of financial and non-financial services.

Thus, microfinance is at the heart of economic and social activity, and the question of its impact at the macroeconomic level is becoming increasingly relevant (Raihan et al., 2017), particularly its consequences on economic growth. However, although microfinance has improved health, nutrition, job creation and social cohesion (Khetker, 2005; Afrane, 2002; Beck et al., 2004; Hieta-lahti and Linden, 2006; Hossain and Knight, 2008; Odell, 2010), it is widely criticised for its poor financial and social performance (Roodman, 2012; Simanowitz, 2011). In addition, its practice of high interest rates for clients (Servet, 2015) has met with disapproval from international political leaders (Hudon, 2007). For example, President Ortega of Nicaragua asked clients of Nicaraguan MFIs to stop paying off their debts (Gonzalez, 2010). The same is true for Indian political authorities following the microcredit crisis in the state of Andhra Pradesh, where the pressure of solidarity microcredit on borrowers led to bankruptcies (Servet, 2015).

Moreover, because of its ability to pursue both financial and social objectives, microfinance is the subject of debate between two main approaches, namely the welfarist approach and the institutionalist approach. Unlike the welfarist approach, which favours lending at below-market rates while relying on subsidies (Mayoux, 1998), MFIs that have adopted the institutionalist approach (Hermes and Lesink, 2007; Noel and Ayayi, 2009; Dehejia et al., 2012) apply interest rates on loans that are significantly higher than rates in the banking sector (Mallick, 2012). These

¹http://www.convergences.org/wp-content/uploads/2018/09/BMF_2018_FR-_VFINALE.pdf

interest rates are generally on the order of 20% to 80% per year; some MFIs have granted interest rates above 100%, notably Compartamos and Te creemos (about 125%) in Mexico, and have been very successful (Epstein and Smith, 2007; Danel and Labarthe, 2008; Malkin, 2008; Adams, 2008). Several reasons may explain these excessive rates, including the cost of raising resources, estimated at around 10%; allocations to provisions for doubtful receivables, which are around 2%; operating expenses for a rate of 6%; and, finally, the inclusion of a profit for a rate of 6%. Second, MFIs do not have access to the central bank refinancing window, unlike credit institutions. They are obliged to obtain financing, in part, from commercial banks. Finally, very few MFIs are listed on the stock exchange; there are a few cases, including BIS in Indonesia, BRAC Bank in Bangladesh, Equity Bank in Kenya, Compartamos in Mexico, SKS in India and Kaliko Microcredit Development Bank in Nepal (Servet, 2015).

Context of this microfinance research

In developing countries, the history of microcredit goes hand in hand with the creation of the Grameen Bank, founded by the illustrious Professor Mohammad Yunus. In the mid-1970s, Mr. Yunus was conducting surveys among farmers in poor villages in Bangladesh on the effects of loan sharking (Blondeau, 2006; Lelart, 2006). His attention was particularly drawn to a woman who was trying to survive by making bamboo chairs. The manufacture of these chairs brought him a few cents after deducting the loan needed to buy the raw material: bamboo. Inspired by this situation, he set up a credit system based on solidarity credits. This practice consists in granting loans to borrowers organised in small groups of five people, generally women who know each other and group together according to their affinity. Each group member receives an individual loan on condition that he accepts responsibility for the repayment of credits granted to other group members if they are unable or unwilling to voluntarily honour their debt. Loans are granted for a period of one year and are renewable. From each loan, a sum is deducted for a mandatory savings account that is returned on the day the customer decides to no longer use the bank.

On this basis, microfinance could be defined as a field of financial activity that brings together a diversity of financial actors, also known as Decentralized Financial Systems (DFS) in West Africa, or microfinance institutions (MFIs) whose mission is to provide savings, credit, insurance and, recently, transfer services to populations generally excluded from the traditional banking system (poor and low-income households as well as micro-entrepreneurs). Requested for various reasons, microcredit is mainly granted to finance an income-generating activity. It is a loan granted to poor people giving rise to a repayment of the credit with an interest rate (Benedetto, 2011).

The loan is repaid over a relatively short period of time, ranging from a few days/weeks to three years. In practice, microcredit covers various forms, from individual microcredits to collective or solidarity microcredits based on a group's joint guarantee, and their amount varies according to the country and the target population, as well as the repayment deadlines and the level of interest rates. Among solidarity microcredits, it is also important to distinguish between loans in which the institution has a direct relationship with each member of the group and those in which it is the group that manages the loan and its distribution. In either case, these microcredits can be designed as a learning phase before individual loans are granted. MFIs offer both possibilities by offering to start with the first, with the best clients then being able to apply for, or be offered, individual credit.

Once the general characteristics of microfinance have been presented, it is important to distinguish between microfinance as practiced in developed and developing countries, particularly in the Ivory Coast, with regard to its purpose.

In developed countries, the welfare state faces limitations in the treatment of mass and long-term unemployment. Hence the need to enable the unemployed to create their own jobs through the creation of microenterprises. Thus, microcredit is conceived as an instrument to combat not only long-term unemployment and social and economic insecurity, but also to promote microenterprise. According to the 2018 microfinance barometer based on 2016–2017 data, a recent study was commissioned by the European Microfinance Network (EMN) and the Microfinance Centre (MFC). For Evers and Jung estimates the total potential of the business microcredit market at 2.7 million loan applications in the European Union (EU-28), representing a total volume of 17.4 billion euros of potential demand in 2016 (Evers and Jung, 2017). These data show the financ-

ing needs of European small businesses. In addition, in 2017, 157 MFIs from 28 EU Member States affirmed the granting of around 700,000 microcredits for an estimated gross outstanding loan of over 3.1 billion \$ and served nearly one million active borrowers. The beneficiaries are self-employed entrepreneurs and microenterprises, in most cases, and can be over \$25,000. It is within this framework that the Association for the Right to Economic Initiative (ARIE) was created in France, headed by Maria Nowak, with the aim of adapting the microcredit system to the French context. Its mission is to finance and support unemployed people who want to start their own businesses but are not eligible for a bank loan. In particular, microcredit may also have appeared to be a response to concerns around suburbs where the presence of banks has been reduced. To this end, two types of microcredit can be distinguished in France: personal microcredit, which aims to promote the employability of borrowers, and professional microcredit, which finances an income-generating activity. The size of the loans is higher than in developing countries, the loans have fixed interest rates, the maximum duration is 3 years and 80% of the microcredits can benefit from the guarantee provided by the State under the Social Cohesion Fund. The regions of Western France (Pays de la Loire, Poitou Charentes, Aquitaine and Bretagne) have the highest number of beneficiaries.

In the rest of Europe, the development of the microcredit system is uneven. Microcredit is expanding more in Eastern Europe than in Western Europe. In response to the uneven development of microcredit, but also to the need to raise awareness in European Union countries of the importance of microfinance, in recent years there has been a desire on the part of stakeholders to better communicate this approach to finance. Thus, in 2007, the European Commission of the European Union developed the European Initiative for the Development of Microcredit for Growth and Employment. In the Ivory Coast, a West African country and the subject of two empirical studies in our thesis, the crisis of the 1980s led to the disappearance of development banks from the West African Monetary Union (WAMU) states. The microfinance sector has proven to be the only alternative to traditional bank financing for economic operators and the informal sector. To this end, many regional and national economic reforms have encouraged the development and supervision of the microfinance sector. For example, the 1989 currency and credit policy reform enabled the WAMU authorities to implement the regulatory conditions of the informal financial sector characterised by the practice of tontines. Hence the implementation by the Central Bank

of West African States (BCEAO) of the Support Programm for the Regulation of Mutual Savings and Credit Institutions (PARMEC), whose objective is to promote the emergence of viable and credible financial institutions capable of creating conditions for the gradual integration of the informal financial sector into the modern economy. The process led to the adoption of Act No. 96-562 of 22 July 1996 regulating Mutual or Cooperative Savings and Credit Institutions. The results achieved since the implementation of the MFI regulation in 1996 are encouraging. For example, from 3 MFIs in 1996, the Ivory Coast had nearly 50 MFIs (excluding affiliated funds) as of 30 December 2018, including 33 mutual and cooperative institutions, 17 public limited companies and 30 unitary funds². In addition, the outstanding amount of deposits is estimated at \$498 million. Outstanding loans amounted to \$525 million. Together, these structures have about 411 service points spread throughout the national territory. Over the same period, the number of beneficiaries of MFI services increased from less than 100,000 to 1,727,189 people, 61.81% of whom were men, 32.21% women and 5.97% limited companies³.

This growth, which should enable the microfinance sector to achieve its social objective of fighting poverty, is threatened by various problems. Significant deficits, in terms of operating results and equity, have negatively affected the performance of MFIs, as illustrated in Figure 1. For example, as of 31 December 2015, equity in the microfinance sector was estimated at -\$20.9 million and operating results for the same period were estimated at -\$9.4 million.

According to the Microfinance Directorate's inspection report of 2016, these difficulties are due to the lack of professionalism of MFIs, the significant deterioration of the loan portfolio and, above all, the poor governance of MFIs. In other words, of all the factors previously listed that limit the dual financial and social performance (Morduch, 1999, 2000) of Ivorian MFIs, governance issues are of particular concern, including a large board of directors, non-compliance with prudential ratios and a deteriorated financial structure. This situation leads us to reflect on the determinants of MFIs' financial and social performance and the impact of the financial structure on microfi-

²According to Act No. 96-562 of 22 July 1996, Mutual or Cooperative Savings and Credit Institutions (IMEC) can be defined as "groups of persons with legal personality, non-profit-making and variable capital, based on the principles of union, solidarity and mutual assistance and whose main purpose is to collect members' savings and grant loans". This definition shows that the particularity of IMEC lies in the distribution of credits from the savings collected. Members of savings and credit unions or mutuals are called members. These Institutions operate according to the mutualist or cooperative principle. Indeed, membership is free and voluntary without limitation of number. In addition, the functioning of the bodies is democratic. This democracy is manifested by the limitation of the mandates of elected officers and by the fact that each member, regardless of the number of shares he or she holds, is entitled to only one vote at General Assemblies. In addition, mutuality requires the creation of a general reserve that cannot be shared among the members of the institution. However, there are two fundamental differences between these two models: in a CreditMutuel bank or a mutual institution, there is also a Supervisory Board, elected in the same way, and the income is fully set aside, while in a *caisse populaire* or a cooperative institution a part is refunded to the members, in proportion to the interest they have paid if they have borrowed.

³<https://microfinance.tresor.gouv.ci/micro/wp-content/uploads/2019/03/STATISTIQUES-ANNUELLES-2015-2019.pdf>

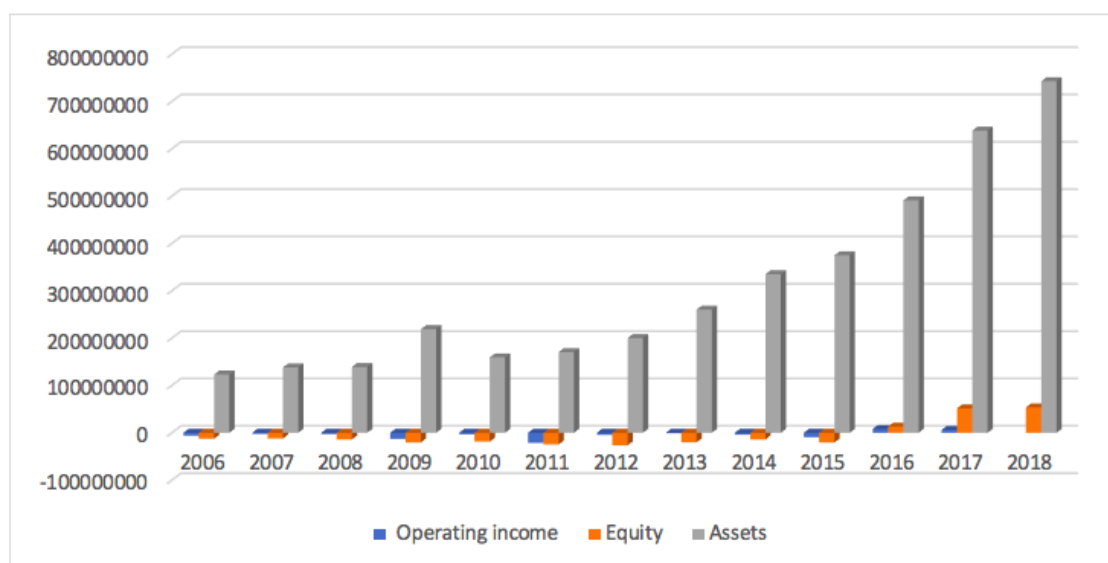


Figure 1: Evolution of the financial situation of MFIs between 2006-2018

Source: Work of the author

*Data relating to operating income for 2018 are not available

nance activity in the Ivory Coast.

According to the Microfinance Directorate's inspection report of 2016⁴, these difficulties are due to the lack of professionalism of MFIs, the significant deterioration of the loan portfolio and, above all, the poor governance of MFIs. In other words, of all the factors previously listed that limit the dual financial and social performance (Morduch, 1999 and 2000) of Ivorian MFIs, governance issues are of particular concern, including a large board of directors, non-compliance with prudential ratios and a deteriorated financial structure. This situation leads us to reflect on the determinants of MFIs' financial and social performance and the impact of the financial structure on microfinance activity in Ivory Coast.

Problematic

In this context, the academic literature has endeavoured to provide answers to several questions, in particular: What are the determinants of MFI interest rates? Does the credit granted by MFIs

⁴<http://microfinance.tresor.gouv.ci/micro/wp-content/uploads/2018/05/Rapport-annuel-dactivit%C3%A9s-CNM-2016.pdf>

improve economic growth? What is the impact of MFI governance on their financial and social performance? How can institutional change affect the financial structure of MFIs? Can the financial structure influence the performance of MFIs?

Although answers have been provided in the academic literature, several questions remain unanswered. This thesis aims to contribute to the academic literature by empirically analysing the relationship between monetary policy, economic growth and the microfinance sector in a range of developing countries. We will have to answer four questions in particular:

1) Does monetary policy have an impact on MFI interest rates?

If so, can we say that the bank interest rate is a channel for transmitting monetary policy to the MFI interest rate? Indeed, MFIs finance themselves with commercial banks, which refinance themselves with the central bank to carry out their lending activities. Therefore, can it be said that there is an indirect effect of monetary policy on MFI interest rates? At the macroeconomic level, the interest rate observed on markets or nominal interest rates depends on the real interest rate and expected inflation, which measures the likely loss of purchasing power. According to Keynesian theory, an increase in the supply of money by the monetary authorities must, through supply and demand, cause a decrease in the interest rate. Is this monetary policy effect the same for commercial and non-commercial MFI rates?

2) In view of the increasingly important role microfinance plays in terms of financial and non-financial services to its clients, can we say that microfinance improves economic growth? Clearly, it is necessary to know if MFIs contribute to economic growth by focusing on their financial and/or social performance. The work analysing the relationship between economic growth and financial development has been the subject of several studies in the academic literature. We follow the work of McKinnon and Shaw (1973) and McKinnon (1974) who suggest that financial development is essential for economic growth in underdeveloped countries. According to McKinnon and Shaw (1973), the low economic growth of these countries is due to a very low level of financial development. In addition, we have based ourselves on the the-

ory of endogenous growth (Romer, 1986, 1990; Lucas, 1988; Barro, 1995; Aghion and Cohen, 2004). Indeed, the theory of endogenous growth proposes the abandonment of the hypothesis of exogeneity of technological progress and considers that there are several sources of growth, in particular human capital, public capital, physical capital, technical capital). We believe that microfinance is a financial innovation that could have an impact on economic growth. If so, are there any channels of transmission from the microfinance sector to economic growth? Is this situation true in a financial sector where MFIs and commercial banks coexist?

3) Work examining the effect of MFI governance on their financial and social performance was conducted in a sample of countries in Central and Eastern Europe (Hartarska, 2005; Mer-sland and Strom, 2009) and Africa (Tchakounte, 2011). However, it must be noted that work on the microfinance sector in West Africa is very rare and, in particular, work analysing the microfinance sector in the Ivory Coast is almost non-existent, despite rapid growth in this sector since its institutional establishment in 1996. Thus, we examined the following question: What are the determinants of the financial and social performance of MFIs in the Ivory Coast? The question here is to what extent can the internal governance of MFIs affect their performance? More precisely, is the number of people on the board of directors of Ivorian MFIs conducive to increasing or reducing performance? Do prudential ratios have a positive or negative effect on MFI performance? Is the choice of legal form of an MFI (cooperative/mutualist and public limited company) a determining variable in the performance of Ivorian MFIs?

Indeed, governance is at the heart of the financial and social performance of any microfinance institution. It is based on formal, impersonal and explicit rules and ensures a high level of information, power and trust (Meisel, 2004). It is based on the observation that there is a necessary separation between the ownership of capital and the effective management of the company (Fama and Jensen, 1983). This finding has led to a shareholder-client model called (principal) and an officer-client model called (agent) and is analysed in the context of the agency relationship (Mackling Jensen, 1976). Compared to MFIs, this separation can lead to conflicts of interest in terms of governance and would result in a deterioration in their financial and social performance.

4) Does the financial structure of MFIs have an impact on microcredit activity in the short and/or long term? In other words, do bank loans contribute to increasing the level of credit granted to customers? Are customer deposits a source of financing for microcredit activity? What is the role of subsidies received by Ivorian MFIs in their microcredit activity? What about the equity of Ivorian MFIs? Capital structure has been an important element in explaining corporate performance for more than half a century (Modigliani and Miller, 1958). We have used the hierarchical financing theory of Myers and Majluf (1984) and Myers (1984) to fill the gap in the academic literature. This theory suggests that company managers should prioritise funding sources to limit the costs associated with the asymmetry of information between the principal and the agent.

To carry out our work, we have used traditional quantitative methods in finance, and our contribution to the literature is made through four chapters.

Structure of the thesis

Our work is based on two main microfinance themes, namely the macroeconomy of microfinance and the microeconomy of microfinance. The macroeconomics of microfinance analyses the link between microfinance and macroeconomic indicators, such as economic growth, inflation, per capita income, poverty level and income inequality. In contrast, the work associated with the microeconomics of microfinance examines the relationships between financial and social performance indicators, the impact of governance on financial and social performance, and the role of women in achieving MFI performance. And recently, this research axis has been trying to analyse, on the one hand, to what extent the change in the legal status of MFIs can affect the different performances and, on the other hand.

The indispensable role of the capital structure in the microcredit activity or its impact on the performance indicators of microfinance institutions (MFIs). Chapter I examines the effect of mon-

etary policy on the interest rates of microfinance institutions (MFIs) in order to understand the problems associated with rising interest rates in microfinance. Indeed, MFIs do not have access to the central bank refinancing window, unlike credit institutions. Several hypotheses can justify this exclusion. First, central bank (CB) financing is secured by securities sold under repurchase agreements, and it is unlikely that MFIs will have any in their portfolio. There is also the question of the ability of the CB to supervise many small and numerous institutions. However, MFIs finance themselves with commercial banks, which in turn finance themselves with the central bank. This mechanism leads us to reflect on a possible effect of indirect monetary policy on MFI interest rates through commercial bank interest rates. It should be recalled that this reflection has not yet been the subject of any work in the academic literature.

Chapter II discusses the relationship between economic growth and the performance of banks and MFIs. This work is in line with the research of Ahlin and Jiang (2008), Maksudova (2010), Vannroose and D'esppallier (2013) and Donou-Adonsou and Sylvester (2016, 2017). For example, according to Ahlin and Jiang (2008), microcredit in the long term generally reduces inequality and poverty but can also increase or decrease economic growth. Maksudova (2010) analysed the Granger causal relationship between microfinance and economic growth on a transnational sample that included data on more than 1,400 MFIs from 102 countries between 1995–2009. Maksudova (2010) found that microfinance causes economic growth in the sense of Granger even if the effects are different according to the level of development of the countries: microfinance has a positive effect only in the least developed countries. Vannroose and D'esppallier (2013) analysed the relationship between the scope and performance of microfinance institutions (MFIs) and the development of the traditional financial sector between 1997 and 2006 on a sample of 1,073 microfinance institutions from the five main developing regions of the world⁵. Vannroose and D'esppallier (2013) found that MFIs reach more clients and are more profitable in countries where access to the traditional financial system is poor. This result is consistent with the assumption of market failure: MFIs respond to a need that banks do not fill, and MFIs thrive where the formal financial sector is bankrupt.

The question here is to what extent MFIs contribute to increasing or decreasing economic growth

⁵Latin America and the Caribbean (LAC: 258 MFIs), Sub-Saharan Africa (S-Africa: 232 MFIs), Middle East and North Africa (MENA: 36 MFIs), South Asia (S-Asia: 207 MFIs), East Asia and the Pacific (EAP: 115 MFIs), Eastern Europe and Central Asia (CEA: 191 MFIs).

when they focus solely on their financial performance, solely on their social performance, or on both. In addition, we seek to determine whether MFI performance and banks contribute to improving economic growth and to identify possible channels for transmission to economic growth, including investment, consumption and human capital.

After having seen the macroeconomic implications of microfinance institutions, we have, through Chapters III and IV, examined the determinants of the internal performance of microfinance institutions and the impact of capital structure on microcredit activity. These two projects were carried out following our internship in the Directorate of Regulation and Supervision of Decentralized Financial Systems (DRSSFD)⁶. Chapter III examines the determinants of MFIs' internal governance in the Ivory Coast on a sample of twenty-two (22) MFIs between 2011 and 2014. Indeed, research exploring the impact of MFI governance on their financial and social performance has been the subject of several empirical studies in different regions of the world. For example, some work has focused on the effect of an overly large board of directors and the presence of non-national members on the board (Kyereboah-Coleman and Osei, 2008; Mori et al., 2015). Kyereboah-Coleman and Osei (2008) found that the independence and growth of the board of directors improves financial performance measured by return on assets (ROA) and social performance measured by the size of the credit granted. In addition, Kyereboah-Coleman and Osei (2008) argued that the presence of a CEO reduces the return on assets but has no effect on the average size of credit granted to clients. As for the increase in the term of office of the President and Chief Executive Officer (CEO), it has a negative impact on the financial and social performance of MFIs. Mori et al. (2015), argued that improving diversity on the board—generally by adding more independent, international and/or female members—should be seen as a way to improve the board's expertise in management monitoring and social performance. Adding more diversity to the Board of Directors could also improve understanding of the needs of poor clients and provide strong links with resource providers that are important to the MFI's mission.

In addition, work has discussed the effectiveness of governance mechanisms from the perspective of owners (shareholders, cooperators or donors), estimating their contribution to the

⁶former Microfinance Office

financial, social and organisational effectiveness of MFIs (Gohar and Batool, 2015; Augustine et al., 2016; Adusei and Obeng, 2019). Gohar and Batool (2015) assessed the effect of corporate governance on the financial, economic and social performance of microfinance institutions (MFIs) in Pakistan. The sample included 25 MFIs and covered the period from 2005 to 2009. Gohar and Batool (2015) found that the presence of women in leadership positions played no role in improving economic performance, but had a positive impact on advocacy activities. Augustine et al. (2016) measured economic performance by return on assets (ROA) and OpEx to measure operational efficiency. They found that gender diversity improved economic performance, particularly in Africa, and suggested that policy makers and managers better deploy former Microfinance Office women in microfinance staff to ensure the sustainability of MFIs' economic performance. Adusei and Obeng (2019) analysed the effect of gender diversity on the capital structure of 441 microfinance institutions from 69 countries. They found a negative, robust and statistically significant effect of gender diversity on the capital structure of boards of directors. They concluded that gender diversity on boards of directors is an important factor in the capital structure of MFIs and that it reduces MFI debt levels and, by extension, reduces their exposure to the risk of bankruptcy.

As for the work on the Ivory Coast, it is almost non-existent, despite an expansion of the microfinance sector, in terms of the number of clients, outstanding deposits and loans in the Ivorian financial landscape. Hence the interest of our work, which highlights the effect of MFIs' internal governance on their financial and social performance.

Chapter IV analyses the impact of the capital structure on microcredit activity. In the microfinance sector, several studies focus on the relationship between the capital structure and the performance of MFIs. Some work focuses on the effect of capital structure on the financial and social performance of MFIs. Shafer and Fukasawa (2011), who determined the factors that best describe the operational self-sufficiency (OSS) of a microfinance institution (MFI) between 2006 and 2008 on a sample of 1,000 MFIs, showed that the depositor/borrower ratio and the deposit/loan portfolio ratio do not have a significant impact on the operational self-sufficiency (OSS) of an MFI. Lislevand (2012) found that, out of a sample of 403 MFIs from 73 countries, most MFIs are heavily indebted and use about four times more debt financing than equity. In addition, the results of their regressions revealed that the ratio of total debt to assets and the

ratio of short-term debt to assets have a positive and significant effect on the cost of funds. More specifically, other research highlights the critical role of subsidies in achieving the financial and social objectives of MFIs (Hudon and Traca, 2011; Mukherjee, 2014; Lebovics et al., 2016). For example, Hudon and Traca (2011), using an original database of empirical data rating agencies, found that grants have a positive impact on their effectiveness. However, Hudon and Traca (2011) found that obtaining subsidies for MFIs above a certain threshold makes the marginal effect on efficiency negative. Mukherjee (2014) examined the role of microfinance institutions (MFIs) in providing capital to the ultra-poor and showed that excessive subsidies could drive poor borrowers out of the microfinance sector. Lebovics et al. (2016) used a sample of 28 Vietnamese MFIs to identify the existence of a trade-off between financial and social efficiency in a context of implicit subsidies from the state and international donors. Lebovics et al. (2016) found that financial and social efficiency are not linked and considered this as evidence that there is no reason to believe that there is such an arbitration. In addition, Lebovics et al. (2016) found that the subsidies on which most Vietnamese MFIs operated helped them to demonstrate high financial efficiency while achieving their social objectives, but emphasised that this result may not be sustainable in the long term.

As in Chapter III, research analysing the relationship between the capital structure and the performance of MFIs measured by microcredit activity in the Ivory Coast is almost non-existent. Moreover, this work rarely considers data associated with a short- and long-term dynamic of the capital structure on microcredit activity.

Contributions to the literature

This thesis contributes to the literature on microfinance by building on recent developments in quantitative literature. These contributions are of several kinds.

First, Chapter I studies the impact of monetary policy on MFI interest rates by estimating a GMM panel var model over the period 2004–2013. We show that the bank rate is a channel for

transmitting monetary policy to MFI interest rates. In addition, the impulse response functions show an immediate positive impact of key rates on MFI rates. However, this impact becomes negative in the short term and returns to its origin and then disappears at the end of the second year. Finally, the results of the decomposition of the variance of the error reveal that the rates of non-commercial MFIs are less sensitive to monetary policy than those of commercial MFIs. This result can be explained by the possibility that commercial MFIs have greater access to bank financing than non-commercial MFIs.

In Chapter II, we analysed the statistical significance of the relationship between economic growth and the performance of banks and microfinance institutions using the method of generalised moments based on panel data between 1999 and 2016. Our main contributions to the previous literature are twofold. First, we consider a wider variety of indicators to capture the different aspects of the activity of banks and MFIs. Second, in addition to traditional transmission channels, such as investment and human capital, we have an important potential transmission channel, namely consumption. Our research shows that the performance of MFIs contributes to economic development even when bank performance is taken into account. In addition, our results suggest that by improving their financial and social performance, MFIs increase investment and consumption. Finally, we also find that bank financial performance improves economic growth through different transmission channels, including investment, consumption and human capital.

Finally, Chapters III and IV study the effects of MFIs' internal governance on their performance and cover a sample of 26 and 22 MFIs, respectively, from the database of the Directorate of Regulation and Supervision of Decentralized Financial Systems (DRSSFD) between 2011 and 2014 in the Ivory Coast. Indeed, Chapter III focuses on indicators related to MFI governance (Board size, prudential ratios, legal status, presence of institutional actors on the Board of Directors) that have an impact on their financial (profit margin, subsidy dependency index) and social (number of MFI clients, average size of loans granted to clients) performance. The purpose of Chapter IV is to analyse the impact of the capital structure on microcredit activity.

Capital structure is measured by the subsidy dependency index, the ratio of bank loans to total assets, the average size of deposits and total equity to assets. Microcredit activity is measured by the average size of loans granted to clients.

The results of Chapter III show that MFIs with the status of 'limited company' have higher profit margins than mutual and cooperative savings and credit institutions (IMCEC). In Chapter IV, we find that loans to low-income populations are refinanced by bank loans, the consequence of which is an increase in the lending rate. We also show that MFIs that refinance themselves through deposits have a higher lending activity than those that refinance themselves through bank loans.

Chapter 1

The monetary policy pass-through to the microfinance interest rate in developing countries

1.1 Introduction

The monetary transmission mechanism is a powerful tool that allows monetary authorities to affect the real economy (Apergis and al., 2012). This mechanism is manifested through three channels, namely the interest rate channel, the credit channel and the exchange rate channel. According to Hernando and Page (2001), monetary authorities affect aggregate demand through the interest rate; as for the credit channel, it allows for changes in the availability and supply of loans.

In developing countries, the financial system is largely composed of three main actors: the central bank, commercial banks and microfinance institutions according to Figure 1 (see Annex). Indeed, MFIs request money from commercial banks that grant the requested loans while refinancing themselves with the central bank. This demand for money from MFIs meets the supply of money from commercial banks on the one hand and on the other hand the demand for money from commercial banks also meets the supply of money from the central bank. These requests and offers of currencies, at different levels, determine interest rates. Hence, the following theoretical model:

$$i_b = i_{bc} + \delta(1)$$

$$i_{imf} = i_b + \varphi(2)$$

By replacing (1) in (2), we have the following equation:

$$i_{imf} = i_{bc} + \delta + \varphi(3)$$

With

i_{bc} : the central bank's key interest rate

i_b : the bank interest rate

i_{imf} : the interest rate of MFIs

δ : the profit margin of commercial banks

φ : the risk profit margin of MFIs

Well before stating our assumptions, we rely on the traditional Keynesian IS-LM design of the monetary policy transmission mechanism, i.e. a reduction in policy rate results in a reduction in commercial bank rates (and vice versa), which is formalised as follows:

$$i_{bc}(\searrow) \Rightarrow i_b(\searrow)$$

or

$$i_{bc}(\nearrow) \Rightarrow i_b(\nearrow)$$

Then, a reduction in bank interest rates is followed by a reduction in interest rates on MFI loans (and vice versa) formalised as follows:

$$i_b(\searrow) \Rightarrow i_{imf}(\searrow)$$

or

$$i_b(\nearrow) \Rightarrow i_{imf}(\nearrow)$$

Thus, by transitivity effect (Diaye, 2001)¹, we assume the following final relationship:

$$i_{bc}(\searrow) \Rightarrow i_b(\searrow) \Rightarrow i_{imf}(\searrow)$$

or

$$i_{bc}(\nearrow) \Rightarrow i_b(\nearrow) \Rightarrow i_{imf}(\nearrow)$$

We believe that a decrease in the central bank's key interest rate leads to a decrease in commercial bank interest rates, which certainly translates into a decrease in MFI interest rates (and vice versa).

Thus, to analyse the transmission of monetary policy to the rates of MFIs, we will first examine the extent to which monetary policy can affect the banking sector and then examine the relationship between the banking sector and the microfinance sector.

¹That is, three baskets of goods X, Y and Z, we know that $X \succeq Y$ or X is preferred to Y and $Y \succeq Z$ or Y is preferred to Z. A preference relationship is said to be transitive if and only if $X \succeq Z$ or X is preferred to Z.

1.1.1 The relationship between monetary policy and the banking sector

Monetary policy work is mainly focused on the implications for the stability and dynamism of economic growth and the financial system, particularly the banking system. They can be grouped into two main themes to those who argue that the policy has an impact on the banking sector (Ippolito and al., 2018; Klein, 2015; Matousek and Solomon, 2018) and those who claim a more or less nuanced effect (Berger and Bouwman, 2017; Gambacorta, 2005; Giulioni, 2015; Golodniuk, 2006; Peek and Rosengren, 1995)

Monetary policy has a real impact on the banking sector

The effectiveness of monetary policy in each economy is an empirical issue of great interest to central bankers (Dudley, 2017; Praet, 2016; Shafik, 2016). Gregor and Melecky (2018) argued that the interest rate channel of monetary policy is an important channel through which the evolution of the monetary policy rate affects the cost and volume of lending to the real economy, and thus the credit cycle, the economic cycle and inflation. Ippolito and al. (2018) argued that monetary policy can directly affect the liquidity and balance sheet strength of companies through existing loans. They show that firms, particularly those with limited financing, that have more unhedged loans are more sensitive to monetary policy in terms of their prices, cash balances, inventories and fixed capital investments. This effect disappears when policy rates are at the lower bound of zero, revealing a new limitation of unconventional monetary policy. Matousek and Solomon (2018) analysed the dynamic effects of monetary policy on Nigeria's banking sector between 2002 and 2008. They revealed that the bank lending channel has improved banks' resilience to monetary shocks. Klein (2015) argued that the monetary policy in the euro zone, conducted since the financial crisis and has led to very low or even negative rates, has made it possible to revive growth, even if only slightly. It has made it possible to support consumption and investment and to boost demand for credit by economic agents who could. Interest rates below the nominal growth rate also facilitated the possibility of deleveraging for agents who had become heavily indebted before the crisis. Above all, they avoided the risk of a systemic crisis and then deflation.

A nuanced effect of monetary policy on the banking sector

Giulioni (2015) argued that monetary policy actions have had less significant or unexpected effects than those predicted by the models used to plan them in a number of recent economic events. This may be explained, in his view, by the fact that economic theory does not yet have a complete understanding of the role of the banking system in monetary transmission mechanisms. Peek and Rosengren (1995) found that small banks are no more sensitive to monetary policy shocks than large banks. Gambacorta (2005) tested cross-sectional differences in the efficiency of the banking credit channel of Italian banks. The results of this work prove that there is heterogeneity in the transmission of monetary policy. Indeed, after a monetary tightening, the decrease in loans is smaller for well-capitalised banks that are perceived as less risky by the market and are able to obtain uninsured deposits. Banks with a better liquidity ratio can protect their loan portfolios against monetary tightening simply by taking cash and securities. Golodniuk (2006) estimated the reaction of bank loans to changes in monetary policy between 1998 and 2003 in Ukraine based on a range of bank balance sheet data. These results demonstrate that under-capitalised banks are more affected by a change in monetary policy than an average financially strong bank. This suggests that monetary policy can affect commercial bank deposits and forces undercapitalised banks to change their lending. Gregor and Melecky (2018) assessed the impact of changes in monetary policy rates on lending rates for small and medium-sized enterprises (SMEs), consumer loans, mortgage loans and corporate loans in the Czech Republic. They found a significant and complete impact on SME lending rates. As for the rate of consumer loans, they consider that the transmission is unreliable. The transmission on mortgage rates and corporate interest rates illustrates significant structural changes that can be fully and largely explained by the reduction in bank debt. The profit margin for all interest rates, with the exception of corporate interest rates, increases with the widening gap between government bonds and monetary policy rates. Foreign exchange interventions mainly affect margins for business and SME rates. Berger and Bouwman (2017) examined the interaction between the creation of bank liquidity (which includes all off-balance sheet and off-balance sheet banking activities), monetary policy and financial crises. They found that monetary policy has statistically significant but economically minor effects on the creation of liquidity by small banks in normal times. These effects

are even smaller in times of financial crisis. In addition, monetary policy has very little effect on the creation of liquidity by medium and large banks in normal and crisis situations. Their results suggested that authorities need to monitor the creation of bank liquidity in order to anticipate and perhaps reduce the likelihood of financial crises. They could also consider other tools to control the creation of bank liquidity, such as capital and liquidity requirements.

1.1.2 The relationship between the banking sector and the microfinance sector

Recent observations suggest that poverty alleviation practitioners are grappling with the increase – both structural and ideological – in commercial banking services in the field of microfinance, particularly with regard to the practice of interest rates (Evans, 2010; Hermes and al., 2011; Hoque and al., 2011; Khavul, 2013).

The work on interest rates in microfinance has been the subject of several discussions in the academic literature. Indeed, Acclassato (2006), illustrated that the IMF that adopt an overall effective rate of 27%, accepted by legislation, in Benin have achieved poor financial performance. Only those IMF that apply a real loan sharking rate have covered their operating expenses and achieved financial viability.

Hermes and Lensink (2007) revealed that an increase in MFI interest rates based on individual loans leads to a deterioration in the quality of the portfolio, whereas this relationship does not exist for MFIs that grant solidarity loans (to a group of people). Beyond a certain period, this increase in interest rates leads to a deterioration in portfolio quality, whereas it does not for MFIs based on group loans. According to Hermes and Lensink (2007), solidarity loans make it possible to remedy moral hazard and adverse selection. Hermes et Lensink (2007) argued that MFIs based on individual loans focus on wealthier clients while those based on group loans are less so. Vanroose and D'espallier (2013) analysed the relationship between the performance of MFIs and the development of the financial sector of 1,073 MFIs between 1997 and 2006. They found that MFIs reach more clients and are more profitable when access to the formal financial system is very restrictive. In addition, they demonstrated that MFIs are less profitable when interest rates are higher, reflecting the fact that MFIs depend on the national banking system for additional financing. Mallick (2012) explored the impact of microfinance program intervention on the

interest rates of money lenders (usurers) in northern Bangladesh. He found that interest rates for money lenders increase with the percentage of households borrowing from village MFIs. In addition, he found that productive investments reduce lenders' interest rates. According to him, greater coverage of microfinance programs increases lenders' interest rates in villages where more loans are invested in economic activities. Roberts (2013) was interested in the relationship between interest rates and microfinance orientation on a sample of 358 MFIs over the period. It demonstrated that a for-profit orientation corresponds to high interest rates for clients. However, this does not contribute to high profitability and therefore sustainability because a profit orientation is associated with higher costs for customers. Ahlin and al. (2011) analysed the relationship between microfinance and the macroeconomic and macro-institutional indicators of 374 MFIs from 74 countries between 1996 and 2007. They demonstrated that economic growth could lead to higher microenterprise returns and allow MFIs to charge higher interest rates. However, the impact of average interest rates is negative and generally not significant. Cotler and Almazan (2013) analysed the interest rate determinants of 1,299 MFIs from 84 countries over the period from 2000 to 2008. They found that the interest rate is determined by the cost of financing, the size of the loan and the level of efficiency of MFIs. Their work revealed a negative relationship between interest rates and competition only in Asia. Rosenberg and al. (2013) analysed the interest rates of 456 MFIs over the period from 2004 to 2011. They discovered that interest rates worldwide fell sharply until 2007 before stabilizing. This is due, on the one hand, to changes in operating expenses and the long-term decline which was interrupted in 2008 and 2011; and, on the other hand, to the increase in the cost of financial resources for lenders, who are increasingly relying on commercial loans. Finally, they argued that for the group of lenders focused on poor clients (MFIs), interest rates have increased, as have operating expenses and the cost of raising resources. In addition, these lenders are, on average, much more profitable than the others (banks). Al Azzam and Mimouni (2016) used data from 481 MFIs in 73 countries over the period from 2003 to 2010 to study the relationship between microfinance interest rates and currency risk. Al Azzam and Mimouni (2016) illustrated that MFIs operating in countries with fixed exchange rates tend to charge lower interest rates than those operating in countries with floating exchange rates. Al Azzam and Mimouni (2017) analysed the impact of foreign currency debt and local currency debt on the interest rates of 670 MFIs from 77 countries between 2003 and 2014.

They found that foreign currency debt increases the financial resources available on favourable and flexible terms for MFIs. However, their use leads to high interest rates. They suggested that MFIs use debt in local currencies if the objective is to provide microcredits at low rates.

This work confirms the link between policy rate and bank interest rates and the close relationship between bank rates and MFI interest rates. However, the link between monetary policy and MFI interest rates has not been empirically studied in the academic literature. We believe that this link exists intuitively since MFIs borrow part of their resources from banks, hence our interest in this article.

Thus, in the light of the above, we asked ourselves the following question:

Does monetary policy have an impact on MFI interest rates? Specifically, does monetary policy influence the bank interest rate? What is the effect of a bank rate increase on MFI interest rates? If so, can we say that the bank interest rate is a channel for transmitting monetary policy to the MFI interest rate?

To achieve this, we plan to test the following two hypotheses:

- Hypothesis 1: Existence of the link between policy rate and commercial bank interest rates.
- Hypothesis 2: Existence of the link between commercial bank interest rates and those of commercial and non-commercial microfinance institutions (MFIs).

Finally, the article is organised as follows: Section 2 presents the methodology and data, Section 3 analyses and discusses the empirical results obtained, and Section 4 offers conclusions.

1.2 Model, Data and Econometric Methodology

1.2.1 Data

Our self-built database comes from several sources including the World Bank (www.data.worldbank.org), Thomson Reuters Eikon (www.thomsonreuters.com), Mix Market (www.mixmarket.org) respectively for the interest rates of commercial banks, central banks and MFIs. The latter has been reprocessed in our work. We have calculated the nominal interest rate, which is the ratio between the interest earned on loans and the total outstanding amount of credit multiplied by one hundred percent. Then, we determined the real interest rate of the MFIs associated with each

country in the panel per year by deducting inflation according to the following formula:

$$loanr = \frac{interestfromloans}{totaloutstandingloans} \cdot 100$$

In addition, we have taken care, with regard to MFIs, to distinguish two types of rates according to the MFI's orientation, namely the interest rates of for-profit or commercially oriented MFIs (Roberts, 2013) and those that are non-profit or non-commercial (Morduch, 2000) respectively noted *loanr_p* et *loanr_np*.

Indeed, commercial MFIs are characterised by improved access to credit and interest rates that are higher than those of the market and commercial banks. They first seek financial performance and then target social objectives (Hermes and Lensink, 2007) in order to be sustainable. However, commercial MFIs also raise concerns when they favour financial performance over social performance, in particular by emphasizing profits through high interest rates for low-income people and/or by giving priority to wealthy people.

As for non-commercial MFIs, their main objective is to improve the well-being of low-income people by empowering women, promoting literacy and providing technical assistance to micro-entrepreneurs. However, following the governance crisis, which had a negative impact on financial and social performance, leading to the disappearance of several MFIs or their transformation into profitable MFIs²(D'Espallier and al., 2017), managers of non-profit MFIs focused on financial performance at the expense of the impact of reducing the percentage of women served, increasing the amount of loans granted (Chahine and Tannir, 2010; Wagenaar, 2014) and especially the granting of loans at increasingly high interest rates.

Our final base is composed of eight countries: Argentina, Armenia, Bolivia, Brazil, Colombia, Pakistan, Peru and Russia. In addition, it includes 438 for-profit and 739 non-profit MFIs from these eight countries over the period from 2003 to 2012. In addition, just as Ahlin and al. (2011) and Lopatta and al. (2017), we retained that MFIs with diamond level 4 and diamond level 5. MFIs with diamond level 4 have their financial statements audited and certified by chartered accountants and auditors. As for MFIs with a diamond level 5, in addition to having the characteristics of MFIs with a diamond level 4, they are rated by microfinance rating agencies. Table 1

²PRODEM in Bolivia transformed into a regulated bank BancoSol in 1992; Banco Compartamos in Mexico, Banco FIE in Brazil or Bandhan and SKS in India.

presents the different indicators and their sources.

Table 1: Choice of variables

Indicators	Code	Definition and mesure	Sources
Policy rates	<i>centralbir</i>	The policy rate are the annual interest rates associated with the main refinancing operations (Open Market operations) ³	Thomson Reuters Eikon
Interest rates on bank loans	<i>bankir</i>	The interest rate associated with bank loans	World Development indicators
Interest rates of for-profit MFIs	<i>loanr_p</i>	The interest rate associated with loans from for-profit MFIs $loanr = \frac{interest_{from commercial loans}}{total outstanding loans} \cdot 100$	Mixmarket
Interest rates of non-profit MFIs	<i>loanr_np</i>	The interest rate associated with loans from non-profit MFIs $loanr = \frac{interest_{on loans from non-commercial MFIs}}{total outstanding loans} \cdot 100$	MixMarket

Source : Phd Student work

Table 2: Descriptive statistics of quantitative variables

Indicators	Observation	Mean	Standard deviation	Minimum	Maximum
<i>centralbir</i>	250	8.18	4.43	0.25	23.8
<i>bankir</i>	250	15.14	7.66	4.25	55.38
<i>loanr_p</i>	250	22.70	16.01	0	139.03
<i>loanr_p</i>	250	22.11	13.80	0	86.56

Source : Phd Student work

According to the results of descriptive statistics, we see an average policy rate *centralbir* by 8.14%. This rate is far higher than those applied by the central banks of OECD countries, in particular by the FED and the ECB, whose policy rates were below 0.5% in 2016. This result reflects a divergence in monetary policy objectives between OECD and developing countries. Then, the average bank interest rate *bankir* estimated at 15.14% is lower than the average interest rate of for-profit and non-profit MFIs respectively estimated at *loanr_p* and *loanr_np* estimated at 22.70% and 22.11%. Indeed, the interest rate of MFIs is composed of operating costs, costs related to credit losses, taking into account inflation and margins on credit operations and especially refinancing costs, in particular the use of savings, borrowing and national or international refinancing (Bogan, 2012).

³Open market or quantitative easing operations play an important role in monetary policy for steering interest rates, managing bank liquidity and indicating the stance of monetary policy. Open market operations are carried out at the initiative of the central bank, which chooses the instrument to be used and sets the terms and conditions of these operations. They may be carried out through standard tenders, quick tenders or bilateral procedures.

Not surprisingly, we observe that the average interest rate of for-profit MFIs is higher than that of non-profit MFIs. However, we notice that they are very close. This result indicates that these two categories of MFIs seek financial performance in order to reduce dependence on subsidies and be sustainable. Al Azzam and Mimouni (2016) illustrated that access to subsidised funds weakens at a later stage as donors withdraw, which can lead to higher interest rates. As a result, there may be risks of deviation from the social objective, more specifically, MFIs will reduce financial and non-financial services to low-income people, is concerned (Copestake, 2007). Finally, the average interest rate of for-profit and non-profit MFIs respectively *loanr_p* and *loanr_np* estimated at 22.70% and 22.11% is in line with Roodman's (2012) assertions which argued that 80% of MFIs in the world have real interest rates below 20% after deducting inflation. These rates are lower than the rate of wear and tear practiced by MFIs and money lenders (loan sharks) in many parts of the world. For example, in the West African Monetary Union (WAMU), the rate of wear and tear was 27%, it was reduced to 24% as of January 1, 2015. ⁴

1.2.2 Model

The purpose of our work is to analyse the impact of the key interest rate *centralbir* on the rates of commercial MFIs *loanr_p* and non-commercial *loanr_np*. To do this, we adopt the same approach as Grossman and al. (2014), Antanakis and al. (2017) and Lin and Zhu (2017), namely the GMM panel var model which combines the traditional VAR approach, treating all system variables as endogenous with panel data estimation techniques which allows unobserved individual heterogeneity by introducing fixed effects, thus improving the consistency of the estimation (Love and Zicchino, 2006). It was first used by Holtz-Eakin and al. (1988). Thus, our general panel var model at N variables is written in the following matrix form for a single delay:

$$y_{i,t} = \alpha_i + \sum_{j=1}^k \phi y_{i,t-1} + \varepsilon_{i,t} \quad i = 1, \dots, N; t = 1, \dots, T(1)$$

With

$$\varepsilon_{i,t} = \alpha_i + u_{i,t}$$

⁴https://www.bceao.int/sites/default/files/2018-05/rapport_annuel_com_ban_umoa_2013_intranet.pdf p.5.

Therefore equation (1) becomes:

$$y_{it} = \alpha_i + \sum_{j=1}^k \phi y_{i,t-1} + u_{i,t} \quad (2)$$

Where $\alpha_i \sim \text{i.i.d. } (0, \sigma_\alpha^2)$, and where covariances between disturbances α_i and $u_{i,t}$ are nul. In a matrix form, the model (1) is written:

$$y = X^* \delta + u_{i,t}$$

Where

$$X^* = (y_{-1}, X), \delta^T = (\phi^T, b^T) \quad (4)$$

With y_t is a vector of dependent variables composed of $\{loanr_p_{it}, loanr_np_{it}, bankir_{it}, centralbir_{it}\}$.

The autoregressive structure allows all dependent variables to enter the model with a number of offsets. However, we retain as explained variables the interest rate of commercial MFIs $loanr_p_{it}$ and the interest rate of non-commercial MFIs $loanr_np_{it}$. As for the explanatory variables, they are composed of bank interest rates $bankir_{it}$ and the policy rate $centralbir_{it}$.

i and t represent the country and time respectively. $loanr_p_{it}$ represents the interest rate of commercial MFIs, $loanr_np_{it}$ represents the interest rate of non-commercial MFIs $bankir_{it}$ bank interest rates and $centralbir_{it}$ policy rate. α_i represents the individual specific effect that describes the failure to take into account the failure to take into account certain individual factors or the fact that they are difficult to measure.

$u_{i,t}$ is a random disturbance just like α_i ⁵ and p the order of any delays that minimizes the current selection criteria (MMSC) developed by Andrews and Lu (2001) including the MMSC-Bayesian information criterion (MBIC), the MMSC-Akaike information criterion (MAIC) and the MMSC-Hannan and Quinn information criterion (MQIC).

Thus, according to the results of the different information criteria of Andrews and Lu (2001) mentioned above (see Table 3), we note that all three information criteria lead us to adopt a var panel process (1).

⁵ α_i and $u_{i,t}$ are considered to be independently and identically distributed disturbances (i.i.d.)

Table 3: Model selection criteria

Lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.9976074	51.18662	0.3497324	-180.5724	-44.81338	-99.96512
2	0.9983391	26.35724	0.7475917	-128.1488	-37.64276	-74.41058
3	0.9967582	7.955853	0.9501698	-69.29717	-24.04415	-42.42806
No. of obs = 125						
No. of panels = 25						
Ave. no. of T = 5.000						

Source : Phd Student work

1.2.3 3 Methodology

This choice of the GMM panel var model allows us first to take into account the generalized moment method (GMM), then to evaluate the dynamic links between the different rates using the impulse response functions (IRF) and finally to decompose the variance of the error of the selected variables. First, we use the dynamic panel Generalized Moment Method (GMM) in which the interest rates of commercial MFIs $loanr_{pit}$ and non-commercial $loanr_{npit}$ are delayed by one period. This choice was made because the GMM makes it possible to compensate for the problems related to simultaneity, reverse causality and omitted variables that weakened the results of previous studies (Feki and Chtourou, 2014). Indeed, according to the model (1), we observe that the delayed endogenous variable y_{it-1} is correlated with the disturbance $\varepsilon_{i,t}$. If we write the model (1) at time t-1, we have the expression of y_{it-1} , which depends on the individual specific effect α_i . However α_i is one of the components of the disturbance $\varepsilon_{i,t}$. According to the characteristics of the individual and temporal dimensions, this correlation can have very damaging consequences on the statistical properties of the usual estimators (Piotte, 2011) which are the OLS, within, between, GCM, GCM, HQCM estimators. Therefore, it is necessary to use convergent estimation methods, namely the instrumental variable method and the GMM. As the problem of the correlation between the delayed endogenous variable y_{it-1} and the individual specific effect α_i is based on the level model, Anderson and Hsiao (1982) proposed to reason on the model (2) written as a first difference in order to eliminate the specific individual effect α_i hence:

$$y_{i,t} - y_{i,t-1} = \alpha_i + \sum_{j=1}^k \phi(y_{i,t-1} - y_{i,t-2}) + (u_{i,t} - u_{i,t-1}) \quad (5)$$

Where :

$$\Delta y_{i,t} = \alpha_i + \sum_{j=1}^k \phi \Delta y_{i,t-1} + \Delta u_{i,t} \quad (6)$$

With $\Delta = (1 - B)$ where B is the delay operator such that $B^l y_{i,t-p} = y_{i,t-1-l}$. In a matrix form, the model (6) can be written:

$$\Delta y = \Delta X^* \delta + \Delta u \quad (7)$$

With $\Delta X^* = (\Delta y_{-1}, \Delta X)$. Although it is true that writing (7) removes the correlation between the individual specific effect and the delayed endogenous variable, it has unfortunately generated another correlation between $\Delta y_{i,t-p}$ and the disturbance $\Delta u_{i,t}$, via the disturbance $\Delta u_{i,t-1}$. Therefore, the instrumental variable method must be used to obtain convergent parameter estimates. Thus Anderson and Hsiao (1982) propose two types of instruments for the variable $\Delta y_{i,t-1}$ i. e. an instrument in difference, $\Delta y_{i,t-2}$ which is correlated with $\Delta y_{i,t-1}$ but not with $\Delta u_{i,t}$ and another instrument in level $y_{i,t-2}$ which is correlated with $\Delta y_{i,t-1}$ but not with $\Delta u_{i,t}$. However, Arellano (1989) illustrated that it was necessary to opt for the instrumental variable $y_{i,t-p-1}$ rather than the difference $\Delta y_{i,t-2}$. The advantage of Anderson and Hsiao's (1982) estimator is the simplicity of its implementation and that it does not require the strict exogeneity of the explanatory variables. On the other hand, its disadvantage is its very low efficiency. Indeed, according to Arellano and Bond (1991), its asymptotic variance was very high. This feature can lead to outliers in coefficients. Following the ineffectiveness of the Anderson and Hsiao estimator (1982), Arellano and Bond (1991) proposed an asymptotically effective generalised moment estimator (GMM). Indeed, they introduce additional instruments and take into consideration the particular structure of the variance-covariance matrix of perturbations of the model written in first difference. According to the hypotheses of Anderson and Hsiao (1982) and Arellano and Bond

(1991), which are the hypotheses of the exogeneity of the explanatory variables and the correlation of the explanatory variables with the specific individual effects, only the estimators based on variables that differ from the observations are convergent. However, if there are instruments available that are not correlated with individual specific effects, the levels of the explanatory variables contain information that is useful for estimating model parameters that, when used, greatly improve the efficiency of estimators. Thus, Arellano and Bover (1995a) proposed to combine the two types of instruments, by associating the level instruments with the deviation instruments with the observations. When writing the model for an individual i , we have:

$$\Delta y = \Delta X^* \delta + \varepsilon_i$$

Where

$$\varepsilon_i = \alpha_i e_T + u_i$$

With

$$y_i = (y_{i,1}, y_{i,1}, \dots, y_{i,T})^T, \varepsilon_i = (\varepsilon_{i,1}, \varepsilon_{i,2}, \dots, \delta^T) = (\phi^T, b^T), X_i^* \delta = (y_{-1}, X_i)$$

Second, improving the efficiency of estimators can be achieved by including a series of longer time frames as instruments. However, this would result in a reduction in the number of observations, particularly in the case of non-inflated panels (Abrigo and Love, 2015). Holtz-Eakin, Newey and Rosen (1988) proposed to create instruments using observed realizations to compensate for the loss of the number of observations through the "GMM-style" control. Missing observations are replaced by zero, assuming that the list of instruments is not correlated with errors. In addition, we perform an impulse response analysis that represents the effect of the shock (or innovation) on current and future variables of endogenous variables. A shock on the i th variable can directly affect this i th variable, but it is also transmitted to all the other variables through the dynamic structure of the panel model var according to Lardic and Mignon (2002). However, impulse response functions pose problems of correlation between innovations, making

it difficult or even impossible to interpret them economically. For instance, two variables:

$$y_{1,t} = a_1 y_{1,t-1} + b_1 y_{2,t-1} + \varepsilon_{1,t}$$

With $\varepsilon_{1,t}$ and $\varepsilon_{2,t}$ represent the respective errors (or innovations) of $y_{1,t}$ and $y_{2,t}$, $Var(\varepsilon_{1,t}) = \sigma_{\varepsilon_1}^2$, $Var(\varepsilon_{2,t}) = \sigma_{\varepsilon_2}^2$ and $Cov(\varepsilon_{1,t}, \varepsilon_{2,t}) = k \neq 0$ By calculating : $\left(y_{2,t} - \frac{k}{\sigma_{\varepsilon_1}^2}\right) y_{1,t}$ we obtain:

$$y_{2,t} = \frac{k}{\sigma_{\varepsilon_1}^2} y_{1,t} + \left(a_2 - \frac{a_1 x^k}{\sigma_{\varepsilon_1}^2}\right) y_{1,t-1} + \left(b_2 - \frac{b_1 x^k}{\sigma_{\varepsilon_1}^2}\right) y_{2,t-1} + \varepsilon_{2,t} - \frac{k}{\sigma_{\varepsilon_1}^2} y_{1,t}$$

We pose: $\varepsilon_t = \varepsilon_{2,t} - \frac{k}{\sigma_{\varepsilon_1}^2} y_{1,t}$

$Cov(\varepsilon_{1,t}, \varepsilon_t) = \mathbb{E}(\varepsilon_{1,t}, \varepsilon_t) = Cov(\varepsilon_{1,t}, \varepsilon_{2,t}) - \frac{k}{\sigma_{\varepsilon_1}^2}$ It can be observed that the two errors or innovations are orthogonal:

$$y_{i,t} = a_1 y_{1,t-1} + b_1 y_{2,t-1} + \varepsilon_{1,t}$$

$$y_{2,t} = \frac{k}{\sigma_{\varepsilon_1}^2} y_{1,t} + \left(a_2 - \frac{a_1 x^k}{\sigma_{\varepsilon_1}^2}\right) y_{1,t-1} + \left(b_2 - \frac{b_1 x^k}{\sigma_{\varepsilon_1}^2}\right) y_{2,t-1} + \varepsilon_{2,t} - \frac{k}{\sigma_{\varepsilon_1}^2} y_{1,t}$$

The generalization of the k-variable panel var model requires the use of matrix orthogonalization procedures and therefore becomes complex (Bourbonnais, 2018). One of the methods of orthogonalizing errors is the Cholesky decomposition method recommended by Sims (1980), which makes no reference to any economic theory. Although this method is widely used, the results depend on the order in which the variables are arranged, i.e. from the most exogenous to the most endogenous. In our work, we use the Cholesky method and impose a ranking based on Keynesian economic theory (cited above) and Granger causality tests (see Table 10). Thus, the variables are classified as follows: *centralbir* \longrightarrow *bankir* \longrightarrow *loanr_p* \longrightarrow *loanr_np*

Finally, we decompose the variance of the forecast error of each variable in order to calculate for each of the innovation's contribution to the variance of the error. Thanks to the Cholesky decomposition recommended by Sims (1980), it is possible to write the variance of the forecast error at a horizon h as a function of the variance of the error attributed to each of the variables (Bourbonnais, 2018). It is then sufficient to report each of these variances to the total variance to obtain its relative weight in percent. We adopt the same approach as Ndour and Paget-Blanc (2014) for the time horizon between 1 and 10 periods, namely the interval [1.3] for the short term, [4.6] for the medium term and [7.10] for the long term:

1.3 Empirical results

Our econometric results can be summarised in four main points: the analysis of the stationarity of the selected variables, followed by the regression of the panel var model, the study of the impulse response functions and finally the decomposition of the variance of the error of the variables. Well before proceeding with the regression analysis, we performed several preliminary econometric tests, including the analysis of the stationarity of our selected variables, the determination of the order p to be retained and the stability test of the panel var model. The results of the last two tests are in appendices and illustrate that the order of delay to be retained is in the order of 1, while the disc stability tests (see graph 2 and 3) demonstrate that all the characteristic roots are within the unity circle, hence the stability of our two models⁶.

1.3.1 Stationarity tests results of the different variables

Before implementing the panel var model, we analysed the stationarity of our variables to avoid false regressions. (Hurlin and Mignon, 2007) for which the results could be significant when they are not. According to Pirotte (2011), there are two generations of unit root tests, namely the first generation (Dickey and Fuller, 1979, 1981; Phillips and Perron, 1988; Harris and Tzavalis, 1999; Hadri, 2000, Levin, Lin and Chu, 2002; Im, Pesaran and Shin, 2003) based on the consideration of individual heterogeneity and the forms of individual dynamics⁷. As for the second generation (Bai and Ng, 2004; Philippe and Sul, 2003a; Moon and Perron, 2004; Pesaran, 2007), She prolonge cette analyse mais remet en cause l'hypothèse d'indépendance entre les individus, i.e. it focuses on writing the most general possible specifications to take into account the multiple cases of interdependence between individuals⁸. We applied the IPS test,

⁶The stability condition of a VAR implies that the characteristic roots of the estimated coefficient matrix of the VAR model should be within the unit circle. If this is the case, then the shocks are transient and disappear after a certain period of time. However, a model is said to be unstable if the characteristic roots are not within the unit circle whose corollary is invalid results.

⁷i.e. heterogeneity of model parameters.

⁸i.e. models with common factors in particular.

the Fisher ADF test and the Fisher PP test in our work. The results are presented in Table 4 for the variables in level and first difference (Δ).

Table 4: Stationarity test of the variables in level and first difference

Tests	Test d'IPS		Test de Fisher ADF			Test de Fisher PP		
	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
<i>centralbir</i>	-0.97	-0.31	62.90	55.19	56.73	77.18***	60.52	88.45
$\Delta centralbir$	-3.19***	0.81***	168.45***	89.81***	71.51**	258.45***	187.81***	158.50***
<i>bankir</i>	-0.29	-0.12	58.67	53.57	59.92	94.95***	75.27**	86.29***
$\Delta bankir$	-3.61***	-0.92	173.50***	103.02***	73.34***	243.26***	312.19***	285.17***
<i>loanr_p</i>	-2.008**	-0.014	48.02	74.95**	57.22	37.23	193.93***	188.35***
$\Delta loanr_p$	-4.70***	-2.58***	209.042***	108.81***	81.41***	362.68***	294.26***	286.85***
<i>loanr_np</i>	-4.46**	-0.73	25.52	104.72***	74.74**	32.32	159.35***	137.04***
$\Delta loanr_np$	-4.06***	-0.99	319.53***	235.70***	236.00***	319.53***	235.702***	236.00***

Source : Phd Student work

Δ :Variable in first difference ;

(a): No constant and no trend (2 retard);

(b): With constant and no trend (2 retard);

(c) : With constant and trend (2 retard) ;

***, **: means that we reject the null hypothesis of the unit root at 1% and 5% respectively.

Table 4 shows the results of the different stationarity tests in level and first difference (Δ) at the 5% threshold for a single delay. The test by Im, Pesaran and Shin (2003) demonstrates that at the level we cannot reject the null hypothesis confirming the presence of a unit root in the case policy rate of the central banks, interest rates of the commercial banks *bankir*, rates of the commercial MFIs *loanr_p* and non-commercial IMF *loanr_np* because all the p-value are higher than 5%. However, the null hypothesis confirming the presence of a unit root can be rejected when no trend is included with respect to the rates of commercial MFIs *loanr_p* and non-commercial *loanr_np* because all p-values are greater than 5%. However, in general, we observe that they are not stationary in level according to the results of the unit root test of Im, Pesaran and Shin (2003). The augmented Dickey–Fuller test demonstrates that the null hypothesis confirming the presence of the unit root of the different rates cannot be rejected in the presence of a constancy because all p-values are greater than 5%. We also notice the same results when we do not include a trend because the p-values associated with the augmented Dickey-Fuller test are all higher than 5% except in the case of the variables *loanr_p* and *loanr_np* which

are stationary in level (p-values < 5%). The null hypothesis confirming the presence of a unit root is accepted for policy rate *centralbir* the interest rates of commercial banks *bankir*, rates of commercial MFIs *loanr_p* when a constant and a trend are included because all p-value are greater than 5%. However, we observe that the variable the interest rate of non-commercial MFIs is stationary in level (because p-value<5%), while the Philippe-Perron test shows that the central banks' policy rate *centralbir* and commercial bank interest rates *bankir* are stationary in level (p-values<1%), only the rates of commercial *loanr_p* and non-commercial MFIs *loanr_np* because all p-values are greater than 5% when a constant is included. The same applies to *bankir* commercial banks, rates for *loanr_p* and non-commercial *loanr_np* commercial MFIs because all p-values are less than 5% when a constant and no trend is included or when a constant and a trend are retained. In the latter two cases, the only stationary variable is the central bank key interest rate. Finally, taking into account the first difference illustrates that the variables retained are stationary for a single delay because all p-values are respectively less than 1% and 5%. However, the IPS test shows that the null hypothesis confirming the presence of a unit root cannot be rejected when no trend is included because the p-values are greater than 0.05 in the case of interest rates of *bankir* commercial banks and *loanr_np* non-commercial MFIs in the first difference. However, in general, we can conclude that the variables retained in our work are stationary in first difference and therefore integrated in order 1.

1.3.2 Panel var model results analysis

The generalised current estimate (GMM) method is used to estimate the panel var model⁹.and the results are presented in Table 5. We also performed Sargan's (1988) test for the dynamic panel model since it is estimated using the GMM technique. A GMM estimator provides consistent estimates when the current conditions used are valid. Sargan's (1988) test verifies whether the conditions for overidentifying moments are valid and therefore whether the instruments considered are appropriate. The results of Sargan's test (1988) show that the conditions of time of overidentification are valid, as are the instruments used.

⁹To determine the order p of the VAR process, we estimated various VAR processes for delay orders p ranging from 1 to 3. For each model, we calculated various information criteria. Tables 5 and 6 report the results obtained and all the criteria lead us to select a VAR process(1). Indeed, according to the three selection criteria of the Andrews and Lu (2001) model, MBIC, MAIC and MQIC, and the overall determination coefficient of Hansen J, the first-order VAR panel model will be the chosen model because it contains the weakest information criterion.

Table 5: GMM panel var model results

Dependent Variables Independent Variables	<i>bankir</i> (1)	<i>loanr_p</i> (2)	<i>loanr_np</i> (3)	<i>centralbir</i> (4)
<i>loanr_p</i> L1	3.86*** (0.005)	-6.21*** (0.03)	3.92*** (0.02)	0.62*** (0.004)
<i>loanr_np</i> L1	2.24*** (0.006)	-3.99*** (0.05)	-10.47 *** (0.04)	1.28*** (0.005)
<i>bankir</i> L1	8.83*** (0.06)	6.79*** (0.24)	4.59*** (0.13)	5.02*** (0.02)
<i>centralbir</i> L1	7.57*** (0.03)	-11.92*** (0.31)	-7.77 *** (0.17)	6.60*** (0.03)
Instruments: $l(1/16).$ (<i>loanr_p loanr_np bankir centralbir</i>) Nombre d'observations: 200 Final GMM Criterion $Q(b) = 0.692$ GMM weight matrix: Robust No. of panels = 25 Ave. no. of T = 8				
Test of overidentifying restriction: Hansen's J $\chi^2(128) = 138.49903$ (p = 0.248)				

Source : Phd Student work

*** denote significance thresholds of 1% and the values in brackets are robust standard deviations

Links between policy rates and commercial banks' interest rates

The results in Table 5 (column 1) show that the policy rate, delayed for a period, have a positive and significant impact on commercial bank interest rates. Indeed, a 7.57% increase in *bankir* commercial banks' interest rates is due to a 1% increase in *centralbir* policy rate, delayed for a period. Therefore, this result confirms the assertions of Landier and al. (2013) that monetary tightening reduces loans to banks that are smaller (Kashyap and Stein, 1995), not linked to a large banking group (Campello, 2002), have less liquid assets (Kashyap and Stein, 2000) or have greater leverage (Kishan and Opiela, 2000; Gambacorta and Mistrulli, 2004). Thus, our first hypothesis that the policy rate affects the interest rates of commercial *bankir* banks is con-

firmed through this result. In addition, commercial banks' interest rates depend positively on their own past values (delayed by one period), on the interest rates of *loanr_p* and non-commercial *loanr_np* commercial MFIs delayed by one period at the 1% threshold. More precisely, an increase of 8.83%, 3.86% and 2.26% in bank rates is due respectively to a 1% increase in these own values, in the interest rates of commercial and non-commercial MFIs delayed by a period at the 1% threshold. We note that the impact of commercial (or for-profit) MFI rates is greater than that of non-commercial MFIs on bank rates. Links between commercial bank interest rates and MFI interest rates The results in Table 5 (columns 2 and 3) show that *bankir* bank interest rates have a positive and significant impact on the interest rates of *loanr_p* and non-commercial *loanr_np* commercial MFIs. Indeed, the interest rates of *loanr_p* and *loanr_np* commercial and non-commercial MFIs increase by 6.79% and 4.59% respectively when commercial bank rates increase by 1%. We find that the magnitude of the impact on *loanr_p* commercial MFI interest rates is higher than the impact on *loanr_np* non-commercial MFI interest rates. These results are in line with Garrity and Martin (2018) who argued that most for-profit MFIs have surprisingly high interest rates and are oriented towards relatively low-income people. This situation raises questions about the real motivations of the for-profit MFI market. In addition, this result can also be explained by the very close relationship between commercial MFIs and banks, particularly through their financial structure. Indeed, the transformation of non-commercial MFIs into commercial MFIs makes it possible to attract more financing from private investors (Fernando, 2004; Ledgerwood and White, 2006). These can be commercial or ethical, local or international and borrowings from commercial banks. While in the case of non-commercial MFIs such as associations and NGOs, mutual and commercial institutions, bank financing is limited. In addition, NGO and association funding comes from public funds (grants) and lines of credit negotiated with donors¹⁰. As for cooperative and mutualist institutions, financing is completed through a trade-off between savings collection and credit¹¹. Bank loans are possible but are sometimes in very small proportion to the savings and resources provided by members to make credit. We can say that the hypothesis that bank interest rates affect the rates of commercial and non-commercial MFIs is verified. Thus, the bank interest rate is a channel for transmitting monetary policy to MFI interest rates because an increase in *centralbir* policy rates has a positive and significant impact

¹⁰commercial or ethical, local or international.

¹¹These are the resources provided by members that will be used to make microcredits.

on the interest rates of *bankir* commercial banks, which then negatively and significantly affect the rates of *loanr_p* and non-commercial *loanr_np* commercial MFIs (to a lesser extent). In addition, we note that the interest rates of commercial MFIs are negatively affected by these past values and those of non-commercial MFIs delayed by a period at the 1% threshold. In other words, the interest rates of commercial MFIs fall by 6.21% and 3.99% respectively when these own values and the past values of the rates of non-commercial MFIs increase by 1%.

Links between policy rates and MFI interest rates

The results in Table 5 (columns 2 and 3) show that the policy rates have a negative and significant impact on the interest rates of *loanr_p* and non-commercial *loanr_np* commercial MFIs delayed by a period at the 1% threshold. Indeed, the rates of commercial and non-commercial MFIs decrease by 11.92% and 7.77% respectively when the policy rate, delayed for a period, increase by 1%. This result is identical to the effect of monetary policy on bank rates reported by Agur and Demertzis (2019), whose work focused on the impact of the transmission of monetary policy to bank risk and its interaction with the optimization problem of a regulatory body. Agur and Dermertz (2019) illustrated that there are two compensatory effects on banking risk. First, the increase in the policy rate increases the cost of debt and encourages the bank to incur less debt, which reduces the bank risk (i.e., increases the bank's probability of survival) that they define as "leverage". Secondly, the increase in the key interest rate reduces the bank's profitability because the refinancing rate increases with the risk-free rate. With lower profitability, the bank has less incentive to take risks that they call "profit effect". When leverage dominates the profit effect, then an increase in the policy rate reduces bank risk, while if the profit effect dominates the leverage effect, an increase in the policy rate increases bank risk. In the case of commercial and non-commercial MFIs, we can say that an increase in the policy rate translates into an increase in the previous bank interest rate, which in turn increases the cost of financing MFIs. This increase in the cost of financing reduces the profitability of MFIs as stipulated by Agur and Dermertz (2019). This situation leads MFIs to make an arbitrage between financing clients with high interest rates, knowing that these clients have a risky profile (for some) or focusing on people with a better repayment history, which would have a double consequence: the reduction of the risk

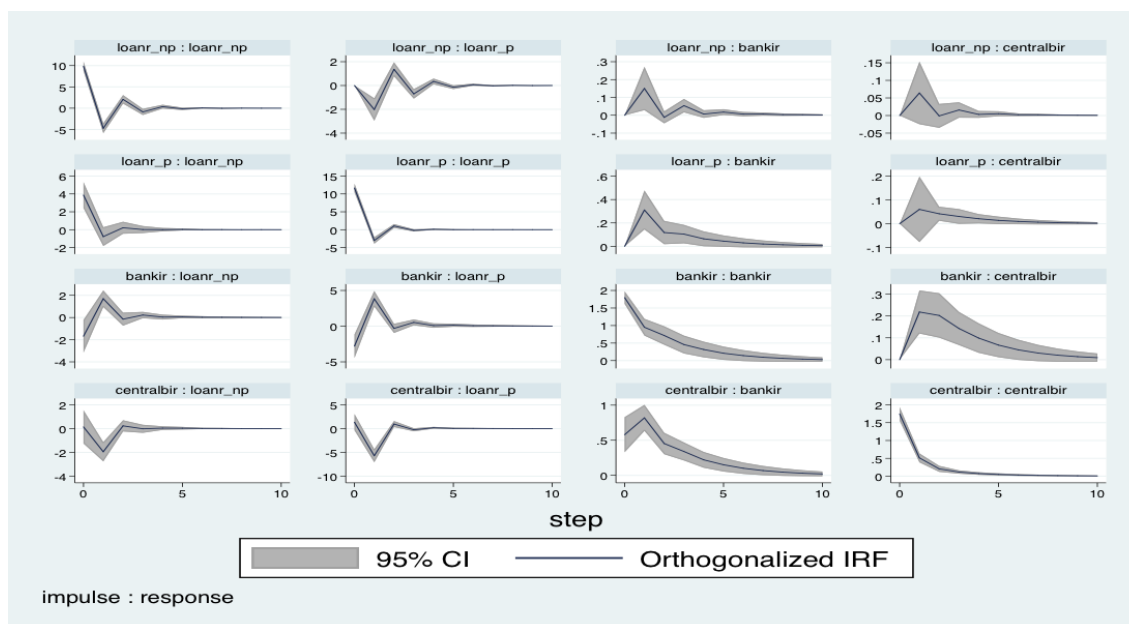
of unpaid credit or even bankruptcy and/or the deviation of the MFI' social mission. In addition, Giuolioni (2015) found that an increase in the policy rate leads to the removal of safe borrowers from the loan portfolio, which leads to a gradual increase in the risk of the loan portfolio due to the presence of risky individuals with very low repayment levels. These results will lead MFIs to reduce their new interest rates following the previous increase in the key interest rate.

Another result: links between policy rate, bank rates and MFI interest rates

Table 5 (column 4) reports that the interest rates of *loanr_p* and *loanr_np* commercial and non-commercial MFIs, delayed for a period, have no impact on the *centralbir* policy rate. However, the policy rate depends positively on these own values and the *bankir* bank rates delayed by a period at the 1% threshold. More precisely, the policy rate increased by 6.60% and 5.02% when these own past values and the previous bank rates of a period increase by 1% respectively.

1.3.3 Impulse response functions

Figure 2 presents the results from the impulse response functions between policy rate, *centralbir*, *bankir* bank rates and interest rates of *loanr_p* and non-commercial *loanr_np* commercial MFIs.



Orthogonalization order: *centralbir* \longrightarrow *bankir* \longrightarrow *loanr_p* \longrightarrow *loanr_np*

The two lines on either side of the impulse response are 5th and 95th percentile confidence intervals constructed using Monte Carlo simulations with 2000 repetitions.

Impact of policy rate on interest rates of commercial banks and MFIs

Figure 2 illustrates that an increase in the key interest rate has a positive and significant effect on these own current and future values, although the effect decreases over time. In addition, an increase in the key interest rate results in a positive and significant response from bank interest rates, reaching an estimated peak of 0.7% in the first year. This trend decreases continuously but without depreciation until the tenth year. We can therefore say that the effect of monetary policy is slowly diminishing from the third year onwards. Secondly, an increase in the key interest rate has a positive and immediate impact on the interest rates of commercial and non-commercial MFIs. However, the magnitude of the shock on commercial MFIs is greater than that on non-

commercial MFIs, estimated at 1.5% and 0.1% respectively. This positive shock translates into a negative impact with a peak in the first year estimated at 2%. This shock returns to its original level of 0% and disappears after the third year.

Impact of commercial bank interest rates on policy rate and MFIs

We note that a positive bank interest rate shock has an immediate negative and significant impact on the interest rates of *loanr_p* and *loanr_np* commercial and non-commercial MFIs, estimated at -4% and -1.80% respectively. This shock increases and then becomes positive in the first year to reach a peak of 4% and 1.80% for the interest rates of *loanr_p* and non-commercial *loanr_np* MFIs respectively. We find that the impact of the magnitude of the shock is greater in the case of interest rates of *loanr_p* commercial MFIs than in the case of *loanr_np* non-commercial interest rates. However, bank rates have no long-term effect because the shock begins to disappear from the third year onwards. We also observe that the effect of a bank rate shock on these own values is positive and significant and estimated at 1.50%. Then, the effect of this shock slowly decreases and disappears in grade 8. As for the effect on policy rate, it is not immediate and then becomes positive and significant, reaching a peak of 0.21% at the end of the first year. Then, we observe a decrease in this trend, which begins at the end of the tenth year.

Impact of MFI interest rates on commercial bank rates and policy rate

We note that the interest rate shock of positive and immediate non-commercial MFIs estimated at 10% on these own short-term values and has no impact on the interest rates of commercial MFIs immediately. This shock evolves discontinuously and disappears after the third year. As for the impact on commercial bank interest rates and on policy rate, it is not immediate and believes positively to reach a peak estimated at 0.15% (for bank rates) and 0.06% (for policy rate). However, the impact of this shock declines slowly and tends to disappear after the fifth year. We can therefore affirm that the interest rates of non-commercial MFIs have an impact on these own values, on the rates of commercial MFIs, on bank interest rates and on short-term

policy rate. However, we note that it has no impact on long-term rates. Our results also reveal that the interest rates of *loanr_np* commercial MFIs have an immediate positive impact on these own values and on the interest rates of non-commercial MFIs reaching peaks estimated at 11% (for commercial MFIs) and 3.8% (for non-commercial MFIs) respectively. The impact on *bankir* bank interest rates and policy rate is not immediate. We see that an increase in the level of the impact reaches a peak of 0.3% (for *bankir* bank rates) and 0.05% (for *centralbir* policy rate) then decreases to amortise in the tenth year.

1.3.4 Decomposition of the variance of the forecast error

The results of the decomposition of the variance of the forecast error are reported in Table 6.

Source : Phd Student work Order: *centralbir bankir loanr_p loanr_np* Standard deviations and confidence intervals of the decomposition of the forecast error variance decomposition were obtained from 2,000 Monte Carlo simulations

The decompositions of the variance indicate that 96% of the variance of the *centralbir* policy rate error is due to its own innovations, 3% to bank rate innovations and less than 1% to those of the *loanr_p* and *loanr_np* commercial and non-commercial MFI rates. We note that the innovations due to the interest rates of *loanr_p* non-commercial MFIs are very low. The decompositions of the variance of the bank rate error shows that 76% of its variance of the forecast error is due to its own innovations, 20% to those of the *centralbir* policy rate, 1.9% to those of the *loanr_p* commercial rate and less than 1% to those of the *loanr_np* non-commercial MFIs. Our results also indicate that interest rates of non-commercial MFIs contribute little to the variance of the *bankir* bank rate forecast error, reinforcing allegations of mistrust by commercial institutions (banks and commercial MFIs) towards non-commercial MFIs that appear to be unprofitable or in a lethargic state (this is not necessarily the case in all countries)¹² in part because of governance problems negatively impacting their financial and social performance (Guerin and Servet, 2004; Guerin and Palier, 2006). In addition, we observe that the variance in the forecast

¹²In the Ivory Coast, there are commercial MFIs that are financially and socially efficient. These are GESCI and FIDRA.

Table 6: Decomposition of the variance of the forecast error

response variable	Impulse variable			
forecast horizon	<i>centralbir</i>	<i>bankir</i>	<i>loanr_p</i>	<i>loanr_np</i>
<i>centralbir</i>	<i>centralbir</i>	<i>bankir</i>	<i>loanr_p</i>	<i>loanr_np</i>
0	0	0	0	0
1	1	0	0	0
2	0.9835386	0.0141575	0.0010799	0.0012239
3	0.9715515	0.0256944	0.0015599	0.0011942
4	0.9656441	0.0312921	0.0018099	0.0012539
5	0.9628761	0.0339466	0.0019259	0.0012514
6	0.9616142	0.0351518	0.0019775	0.0012564
7	0.9610392	0.0357024	0.0020016	0.0012567
8	0.9607774	0.0359529	0.0020124	0.0012573
9	0.9606581	0.036067	0.0020173	0.0012575
10	0.960604	0.0361189	0.0020196	0.0012576
<i>bankir</i>				
0	0	0	0	0
1	0.0943619	0.9056382	0	0
2	0.191555	0.7857869	0.0183694	0.0042886
3	0.2025326	0.7752324	0.0184481	0.003787
4	0.2099795	0.7667863	0.0191898	0.0040444
5	0.2125738	0.7640973	0.019373	0.0039559
6	0.213816	0.7627506	0.0194713	0.0039621
7	0.2143599	0.7621769	0.0195141	0.0039492
8	0.2146071	0.7619127	0.019533	0.0039472
9	0.2147196	0.7617934	0.0195419	0.0039451
10	0.2147706	0.7617391	0.0195458	0.0039445
<i>loanr_p</i>				
0	0	0	0	0
1	0.0126742	0.0536291	0.9336967	0
2	0.1662141	0.1093854	0.7046912	0.0197093
3	0.1675834	0.1077748	0.6964484	0.0281934
4	0.1671507	0.1086697	0.6937647	0.0304149
5	0.1671833	0.1086163	0.6932468	0.0309537
6	0.1671643	0.1086834	0.6931098	0.0310426
7	0.1671694	0.108698	0.6930703	0.0310622
8	0.1671717	0.1087087	0.6930556	0.031064
9	0.1671729	0.1087129	0.6930497	0.0310645
10	0.1671735	0.108715	0.693047	0.0310644
<i>loanr_np</i>				
0	0	0	0	0
1	0.0001891	0.0247189	0.1304446	0.8446473
2	0.02626	0.0396649	0.1080508	0.8260244
3	0.0258516	0.0386263	0.1051335	0.8303887
4	0.0257115	0.0387557	0.1045616	0.8309712
5	0.0257016	0.0387308	0.1044652	0.8311024
6	0.0257072	0.038746	0.1044501	0.8310968
7	0.0257086	0.0387507	0.1044467	0.831094
8	0.0257105	0.0387536	0.1044462	0.8310897
9	0.025711	0.038755	0.1044459	0.8310881
10	0.0257114	0.0387556	0.1044459	0.8310872

error of the rate of *loanr_p* commercial MFIs is due to 69% of its own innovations, 16.71% of policy rate innovations, 10.86% of bank rate innovations, 3.1% of *loanr_np* non-commercial rate innovations.

Our results are in line with Peter's (2013) assertions that for-profit MFIs are considered part of the movement towards a more commercial microfinance sector. They are expected to set more appropriate loan prices and operate more effectively in terms of financial viability and sustainable social impacts (Callen and al., 2003; Hermès and Lensink, 2007; Chacravarty and Pylypiv, 2015), making it easier for them to attract the necessary investments in the microfinance sector. Our results show that 83% of the variance in the forecast error of the rate of *loanr_np* non-commercial MFIs is due to its own innovations, and 10.4% to innovations in the rates of *loanr_p* commercial MFIs. The *centralbir* policy rate and *bankir* bank rates are not important because their contributions to the variance of the forecast error of the rates of *loanr_np* non-commercial MFIs are estimated at 2.5% and 3.8% respectively. These last two results indicate that non-commercial IMF interest rates *loanr_np* are less sensitive to monetary policy than *loanr_p* commercial MFIs, whose contribution to the variance of the error is estimated at 16%.

1.4 Conclusion

Finally, our work examines the impact of monetary policy on the interest rates of commercial and non-commercial MFIs between 2004 and 2013 through a GMM panel var analysis on a panel composed of twenty-five developing countries. The results of our work indicate that policy rates have a negative impact on MFI rates.

In addition, the impulse response functions, after 2,000 Monte Carlo simulations, show that policy rates generally have an immediate positive impact. However, this impact becomes negative in the short term and returns to its origin and then disappears at the end of the second year with peaks estimated at -2% (for non-commercial MFIs) and -5% (for commercial MFIs).

The results of the decomposition of the variance of the error show that non-commercial MFIs are disconnected from monetary policy, unlike commercial MFIs, which are more sensitive to monetary policy, whose impact contributes 2.5% and 16% respectively. This result is explained by the possibility that commercial MFIs have greater access to bank financing than non-commercial MFIs. This possibility of access to finance implies a desire for professionalism and growth (D'Espallier and al., 2017) which leads commercial MFIs to move towards banking standards, which suggests a deviation from its social mission (Copestake 2007; Armendáriz and Szafarz, 2009; Augsburg and Fouillet, 2010; Hermes, Lensink and Meesters, 2011).

Finally, our results can be complemented by the effect of monetary policy on the financial and social performance of MFIs, which will open the way to new research opportunities in microfinance.

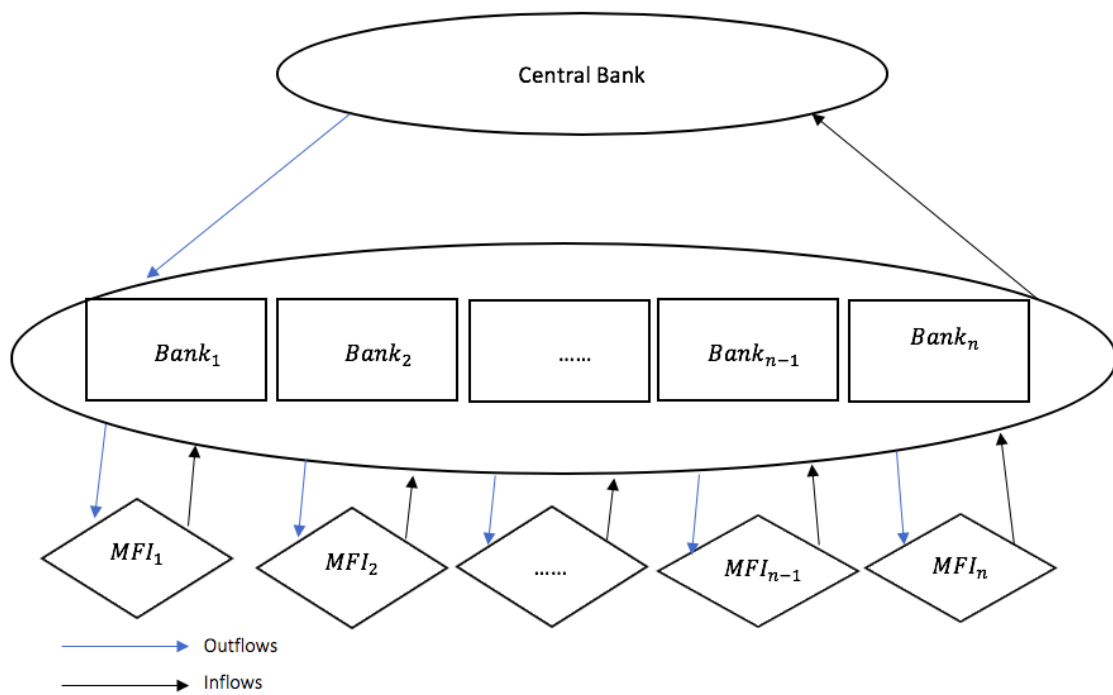


Figure 1.1: Relationship between the central bank, commercial banks and microfinance institutions

APPENDIX

Table 7: Pearson correlation coefficient

Dependent Variables	centrblbir	<i>bankir</i>	<i>loanr_p</i>	<i>loanr_np</i>
centrblbir	1			
<i>bankir</i>	0.4715***	1		
<i>loanr_p</i>	0	-0.1045*	1	
<i>loanr_np</i>	0.1450**	0.0871	0.2052***	1

Table 8: Countriees

Albania	Nigeria
Argentina	Pakistan
Armenia	Panama
Azerbaijan	Peru
Bangladesh	Roumanie
Bolivie	Russia
Brazil	Serbia
Chile	South Africa
India	Sri Lanka
Kenya	Tadjikistan
Macedonia	Tanzanie
Mexico	Ukraine
Mozambique	

Table 9: Average interest rates by geographical area (excluding OECD)

Geographical Area	Half of MFIs charge these rates	5% of MFIs use these extreme rates
Southeast Asia	<15%	>44
Central Asia	environ 23%	>48%
Eastern Europe	environ 23%	>48%
Latin America and the Caribbean	<28%	>73%
East Asia and the Pacific	<29%	>61%
Middle East	<32%	>44%
Africa	<32%	>67%

Table 10: Granger causality tests results

<i>Equation \ Excluded</i>	chi2	df	Prob >chi2
<i>centralbir</i>			
<i>bankir</i>	25.199	1	0.000
<i>loanr_p</i>	0.385	1	0.535
<i>loanr_np</i>	1.639	1	0.200
all	28.469	3	0.000
<i>bankir</i>			
<i>centralbir</i>	57.272	1	0.000
<i>loanr_p</i>	14.914	1	0.000
<i>loanr_np</i>	5.009	1	0.025
all	68.404	3	0.000
<i>loanr_p</i>			
<i>centralbir</i>	142.116	1	0.000
<i>bankir</i>	46.056	1	0.000
<i>loanr_np</i>	15.898	1	0.000
all	149.438	3	0.000
<i>loanr_np</i>			
<i>centralbir</i>	60.377	1	0.000
<i>bankir</i>	21.027	1	0.000
<i>loanr_p</i>	15.381	1	0.000
all	94.900	3	0.000

Chapter 2

Growth Effects Of The Financial And Social Performances Of Microfinance Institutions And Banks

2.1 Introduction

Many empirical studies have attempted to analyse and measure the contribution to growth that financial institutions provide (see Ang 2008; Baltagi, Demetriades, and Law 2009; De Gregorio and Guidotti 1995; Jalilian and Kirkpatrick 2002; King and Levine 1993a, 1993b; Odedokun 1996). In these studies, authors measure financial development by using aggregate financial or monetary variables such as the ratio of M2 to GDP (King and Levine 1993a), the M3 to GDP ratio (Khan and Senhadji 2000), gross domestic savings to GDP (Hassan and al. 2011), banks' deposits or assets over GDP, and private credit by banks over GDP (Levine, Loayza, and Beck 2000) or liquid liabilities to GDP. However, it is crucial to account for different types of financial institutions as far as they serve different objectives and clients or provide different types of financial services. Consequently, the previously mentioned measures are problematic to the extent that pooling all these institutions within the same financial sector won't allow for capturing their potentially different effects on economic development.

Many studies have taken an interest in the growth effect of banks very early on at the macro level. Conversely, the focus mainly stays on the microeconomic effects of microfinance institutions (MFIs), almost at a local level (see Khandker 2005). Indeed, microfinance is a recent bottom-up approach to financing development that focuses mainly on the individual. Based on World Bank estimation, 2.7 billion people globally have no access to formal financial services (Chaia and al. 2009; World Bank 2011) and must rely on informal financial services that may be more costly and less reliable (CGAP 2010). However, according to the report of the Microcredit Summit Campaign (Reed 2013), microcredit increased exponentially from 1997 to 2010, from the 7.6 million poorest clients receiving microcredit at the end of 1997 to 137 million at the end of 2010. In 2010, the total number of clients reached by the 3,652 microfinance institutions reporting to the Summit was 205 million. According to data from the MIX Market (2011), the gross loan portfolio of the 1,115 worldwide MFIs reporting data to this institution totalled 64.769 billion USD.

Based on all of these characteristics and despite their relatively small size, many studies aim to overcome this shortcoming by differentiating between the performance of banks and MFIs. MFIs

are social enterprises that aim at balancing both their social and financial outcomes. It is precisely the “economic paradox” whereby financial institutions’ profitability should lead to poverty reduction and economic growth. Therefore, a growing amount of microfinance research and practice distinguishes between MFIs’ social and financial performance and proxy social performance by their outreach to poor clients. The latter is quantified by indicators such as average loan balances, number of borrowers, as well as percentage of female clients (Rosenberg 2009). Regarding MFIs’ financial performance, it is measured by profitability, portfolio quality, efficiency-productivity and balance sheet management, or more precisely, return on equity, return on asset, profit margin, portfolio at risk, operational cost to average loan portfolio and portfolio yield. Furthermore, prior literature has found bidirectional causal interactions between both MFIs’ performance and economic development (e.g., Assefa and al. 2013; Vanroose and D’Espallier 2013; Lopatta and Tchikov 2016). Indeed, some studies show that microfinance impacts economic development by increasing economies’ capital and improving financial development (Armendariz and Morduch 2010; Kamath 2009). Empirically, Adonsou and Sylwester (2015) find that the growth of microfinance loans has a positive and significant effect on economic growth and total factor productivity. Buera and al. (2012) conclude that microfinance can have significant effects on output, capital, wages, interest rates, and total factor productivity. Ahlin and Jiang (2008) and Yusupov (2012) also find that microfinance can have significant macroeconomic effects. Given the above, our work is mainly in line with the studies of Lopatta and Tchikov (2016, 2017) and Adonsou and Sylwester (2015, 2017), which investigate the MFI-specific contribution to sustainable economic development. Following Swamy and Tulasimala (2011) as well as Lopatta and Tchikov (2016, 2017), our main assumption is that banks and MFIs have a mission of long-term economic development. Thus, we will measure the fulfilment of this mission by country-level economic development indicators such as GDP per capita and GNI per capita. Indeed, the underlying idea is that financially and economically developed economies are less plagued by poverty. As argued by Mckinnon and Shaw (1973), financial development is an important factor of economic growth and development in the least-developed and developing countries. In other words, we indirectly investigate the promise of banks and MFIs for long-term economic development in an attempt to measure its fulfilment. In addition, we consider a large variety of indicators that help to capture different aspects of banks’ and MFIs’ performance that had not yet been

taken into account simultaneously in the previous literature. Indeed, we are the first to consider simultaneously financial performance indicators (the yield on gross portfolio, return on assets, ratio of operating expense to loan portfolio, operational self-sufficiency, the ratio of the provision for loan impairment to assets, profit margin), social performance indicators (the number of active borrowers, number of active clients, the average loan balance per borrower / GNI per capita, the percent of female borrowers), banking system stability indicators (the banking system z- scores, bank credit as a share of total deposits, ratio of bank liquid assets to deposits and short-term funding, cost-to-income ratio) and banking system efficiency indicators (the ratio of bank interest revenue to interest-bearing assets, ratio of bank overhead costs to total assets, bank return on assets, bank return on equity and bank non-interest income to total income). Finally, besides traditional channel transmission such as investment and human capital, we are the first to our knowledge to empirically test consumption as a potential transmission channel through which the performance of banks and MFIs can affect economic development.

More precisely, we aim to jointly analyse the performance of banks and MFIs on economic development through a GMM analysis. In particular, we will try to answer the following questions: By focusing only on their social performance, do MFIs contribute to economic development? By focusing only on their financial performance, do MFIs contribute to economic development? Despite their relatively small size, does MFIs' performance contribute to economic development when accounting for banks' performance? Besides investment and human capital, can consumption also be a significant transmission channel through which MFIs' and banks' performance affects economic development? Answering these questions can respond to important policy concerns. Indeed, it can help target development programmes as well as socially responsible investments that can be applied in developing economies in order to strengthen economic development and alleviate poverty. Knowing that microfinance investments and MFIs are risky undertakings because of the lack of regulation and standardization (see Dieckmann 2008), our results can also help investors and other stakeholders in the optimization of their investment strategy.

Our results suggest that MFIs should pursue their dual objective in order to fulfil their economic development mission. Moreover, we find that despite their relatively small size, MFIs' performance contributes to economic development even when accounting for banks' performance.

Furthermore, we find that investment and household consumption are significant transmission channels through which banks' and MFIs' performance can affect economic development. Human capital is not found to be a good transmission channel for MFIs' performance, but appears to be a good transmission channel through which banks affect economic development.

More precisely, by raising their provision for loan impairment to assets ratio, MFIs' performance undermines borrowers' investment and thus economic development. By increasing return on equity, banks finance unproductive investment. We also find that the rise of overhead costs can have a positive effect on investment and GDP per capita growth. In addition, we clearly find that by increasing the number of female borrowers, MFIs' social performance positively affects economic development. Furthermore, women use their loans to consume and not to invest. Our findings also suggest that MFIs should increase the average loan balance per borrower in so far as it promotes GDP growth through investment improvement. In other words, MFIs' resources should be spread qualitatively among those who need them most. Finally, we also suggest that MFIs diversify their financial activities more, for example in housing loans, renewable energy and agriculture, to be effective in breaking the poverty trap cycle.

The rest of the paper is organized as follows: Section 2 reviews the literature. In Section 3, we explain our choice of indicators of performance. Section 4 describes the data and empirical methodology. GMM results and the aforementioned channels are given in section 5. Section 6 reports robustness checks. Section 7 provides concluding discussion.

2.2 Literature review

Many researchers have focused on the impact of MFIs on economic development.

Through a theoretical analysis, Ahlin and Jiang (2008) model the long-run effects of micro-finance on development. Their aim is to determine the conditions under which microcredit can promote development through credit market improvement. Indeed, this improvement can help agents to be self-employed. Therefore, they distinguish self-employment (low class) from entrepreneurship (high class). According to their model, MFIs create opportunities for self-employment, which increases the "graduation rate," the rate at which self-employed agents

becomes entrepreneurial ones via the accumulation of wealth (savings). At macro level, this mechanism can help to promote economic growth and lower poverty. By going beyond the exogenous assumption of “graduation”, Yusupov (2012) endogenizes the probability of graduation. He assumes that this probability depends on the population of micro entrepreneurs. Therefore, according to Yusupov (2012), more micro entrepreneurs increase the competition for MFI loans, which can lessen the probability of graduation and undermine development.

Through an empirical analysis, Maksudova (2010) analyses the microfinance Granger causality on growth. To do so, the author uses a cross-country sample comprising data for over 1,400 MFIs from 102 countries and 14 years (1995–2009) and quantifies microfinance by country and year averages of the growth rate of MFIs’ gross loan portfolios. In addition, the paper uses annual growth rates of real GDP, money supply and increases of the ratio of private credit to GDP as macroeconomic indicators. Maksudova (2010) finds that microfinance Granger causes GDP growth even if the effects are heterogeneous across countries’ development levels. Indeed, the effect is positive only in less developed countries through lagged values where formal financial intermediation is immature, leaving significant space for alternative means such as microfinance. In addition, Maksudova (2010) finds an ambiguous negative interaction between the growth rates of MFIs’ gross loan portfolios, of money supply and private credit.

Lacalle-Calderon and al. (2015) investigate the effect of official development aid (ODA) and microfinance (gross loan portfolio) on economic growth and compare the results. By using an unbalanced panel of 67 developing countries for the period 2001–2011, they find that microfinance is better able to raise growth than receiving foreign aid. In addition, their results show that microfinance has a positive and statistically significant effect on economic growth through private investment, while ODA has no effect on growth. Alimukhamedova and Hanousek (2015) study the link between microfinance and growth by grouping countries into three broad clusters delineated by a set of macro-institutional determinants to address heterogeneity across countries. Like Lacalle-Calderon and al. (2015), they report long-term evidence of a significant ability of microfinance to promote economic growth. In addition, they find that the microfinance effect is more pronounced in weaker macro-institutional environments, but more so in countries with stable institutional environments.

Donou-Adonsou and Sylwester (2015) investigate the macroeconomic effects of microfinance

loans. They use a system generalized method of moments methodology on a sample size of 71 developing countries over 2002–2011. They find that microfinance loan growth has a positive and significant effect on economic growth and total factor productivity. However, no strong evidence of microfinance loan growth on investment and education could be established. Their results also suggest that microfinance loans can improve income in developing countries, albeit slowly.

Furthermore, Lopatta and Tchikov (2016) empirically investigate the economic and social promise of microfinance in an attempt to gauge its fulfilment. They use multivariate regressions of economic development variables such as per capita gross national income based on PPP converted to international dollars (GNI per capita PPP), GDP growth, as well as gross capital formation and labour participation rate against specific microfinance institutions' (MFI) variables. They find that an increase in the number of active borrowers undermines economic development. A higher percentage of female borrowers has positive effects on labour participation and money growth, while it has smaller negative effects on GDP growth and GNI per capita. In addition, the average loan balance per borrower divided by GNI per capita is highly significant for all economic development indicators except GDP growth. In the same line, they find that the number of MFI offices has a significant and positive effect on gross savings and labour participation rate. They also show no significant effects for MFIs' return on assets and profit margin on a global basis. Finally, the effects of the performance of the microfinance concept on economic development are found to differ across regions.

However, some other studies found little or no relationship between microfinance and economic growth. By focusing on 7 Sub-Saharan African countries, Alimi (2015) examined the relation between financial development and economic growth. Their results suggest that financial development and economic growth are causally independent. Through a theoretical model, Buera and al. (2012) found that in general equilibrium, the redistributive impact of microfinance is stronger than in partial equilibrium. In contrast, the impact on aggregate output and capital is smaller in general equilibrium. In addition, microfinance has a positive effect on aggregate total factor productivity (TFP) in general equilibrium but decreases in partial equilibrium. In the case of general equilibrium, scaling up the microfinance program will have only a small impact on per-capita income even if the vast majority of the population will be positively affected by micro-

finance through the increase in equilibrium wages. Indeed, higher TFP is counterbalanced by lower capital accumulation, inducing the redistribution of income from high-savers to low-savers. Similarly, Copestake and Williams (2011) argued that microcredit cannot, on its own, promote sustained income growth and reduce poverty rates.

Going farther, some studies analyse jointly the performance of banks and MFIs on growth. Sodokin and Donou-Adonsou (2010) investigate the complementary relationship between commercial banks and microfinance institutions in the West African Economic and Monetary Union (WAEMU). They use panel data on seven countries from 1999 to 2005 with the feasible generalized least squares and the AR (1) disturbances. This study indicates that the banking and microfinance sectors are prone to operating individually, and that banks benefit from microfinance activities. In other words, a single action of microfinance institutions appears to be less significant than a joint effort of both sectors in facing credit allocation. Thus, the authors suggest a joint or complementary approach through savings management to face the challenge of the economic growth in the Union.

Similarly, Adonsou and Sylwester (2017) use a panel of 85 developing countries over the period 2002–2013 and the system-GMM estimator to compare the growth effect of lending from microfinance institutions to that from traditional banks. They mainly find strong evidence that microfinance loans raise growth in contrast to bank loans. Furthermore, bank loans have a positive and significant effect on investment whereas microfinance loans do not appear to do so. Finally, their results suggest that bank loans finance non-productive investments when microfinance loans are not primarily invested as physical capital. However, microfinance loans could still augment total factor productivity.

2.3 Choice of indicators

2.3.1 Endogenous variables

Following Lopatta and Tchikov (2016, 2017), we use the gross domestic product (GDP) per capita to measure economic development, in contrast to Knar and al. (2017), who consider GDP per capita as a control variable (to analyse the impact of capital structure on MFIs' performance).

Furthermore, we also use gross national income (GNI) for our robustness check.

2.3.2 Exogenous variables

As exogenous variables, we account for indicators which reflect MFIs' and banks' performance.

Indicators of MFIs' performance

To account for the financial performance of microfinance institutions, we consider the following indicators: the yield on gross portfolio, return on assets, ratio of operating expense to loan portfolio, operational self-sufficiency, the ratio of the provision for loan impairment to assets and profit margin (see Table 1).

First, the yield on gross portfolio captures the gross loan portfolio's ability to generate cash financial revenue from interest, fees, and commissions (see Mersland and Strøm 2009; Louis and al. 2013). However, this indicator does not account for any revenues that have accrued but not been paid in cash, or any non-cash revenues in the form of post-dated checks, seized but unsold collateral, etc. Second, the return on assets (ROA) reflects how well banks and other commercial institutions use their total assets to generate returns (see Fahlenbrach and Stulz 2011; Aebi and al. 2012; Beisland and al. 2014). Besides ROA, to measure the attractiveness of an MFI, the commonest indicator is the return on equity (Strom and al. 2014). However, we do not consider the return on equity in so far as we account for the for-profit and the non-profit microfinance institutions. Thus, the common indicator of both types of MFIs is the return on assets, as in the work of Lopatta and al. (2017).

Third, the ratio of operating expense to loan portfolio includes all administrative and personnel expense. It is commonly used to capture the efficiency for MFIs (see Quayes 2012; Beisland and al. 2014; Lopatta and al. 2017). The higher the ratio, the less efficient are the MFIs.

Fourth, operational self-sufficiency consists of three components: financial revenues and costs, losses due to default, and operating costs. By capturing the extent to which operations are becoming (increasingly) self-sustaining, this indicator is an important measure of the sustainability of the lending operations (see Mersland and Strøm 2009; Prior and Argandoña 2009; Rosenberg

2009; Briere and al. 2015; Gul and al. 2017). Furthermore, it reflects whether or not enough revenue has been earned to cover the MFI's direct costs, excluding the (adjusted) cost of capital, but including any actual financing costs incurred. Thus, if an MFI does not reach operational self-sufficiency, eventually its equity (loan fund capital) will be reduced by losses (unless additional grants can be raised to cover operating shortfalls). In other words, there will be a smaller amount of funds to loan to borrowers (which could lead to closing the MFI once the funds run out).

Fifth, to access the true profitability of an MFI, the ratio of the provision for loan impairment to assets appears to also be a good indicator. Indeed, to address the inherent risks prevalent in the loan portfolio, MFIs make a provision for the estimated loan loss that might occur. More precisely, a loan loss provision is an expense set aside as an allowance for uncollected loans and loan payments. Furthermore, this ratio can be considered as a proxy of the quality of bank assets. Following authors like Gajewski (1988), Gonzalez-Hermosillo (1999), Arena (2005), and Cihak and Poghosyan (2009), a bank holds those provisions when it expects to face losses following defaults on its credit portfolio. Thus, the higher the ratio is, the worse is the quality of bank assets.

Sixth, the profit margin measures the percentage of operating revenue that remains after all financial, loan-loss provision, and operating expenses are paid (see Louis and al. 2013; Lopatta and al. 2017). This indicator helps to measure the commercial performance of microfinance institutions. It depends on the ability of an MFI to generate a causality link between operating revenue and operating expenses. More precisely, to ensure their profitability, operating expenses should not grow faster than operating revenue.

In addition, we use the number of active borrowers, number of active clients, the average loan balance per borrower / GNI per capita and percent of female borrowers to capture the social performance of microfinance institutions (see Table 1).

The number of active borrowers captures the number of individuals who currently have an outstanding loan balance with the MFI (see Rosenberg 2009). This indicator also includes individuals who are primarily responsible for repaying any portion of the gross loan portfolio.

The number of active clients consists of individuals who are active borrowers, depositors, or both (see Mersland and Strøm 2009; Tchakoute 2011). Note that individuals who have multiple loans or accounts with an MFI are counted as a single client. However, individuals who are not cur-

rently receiving any service directly from the MFI are not included, such as those with facilitated savings.

The average loan balance per borrower / GNI per capita is the best simple proxy measurement for depth of outreach to the poor when detailed client surveys are not available (see Rosenberg 2009; Louis and al. 2013). In addition, the average loan per borrower can be interpreted not only as a measure of poverty but also as an indicator of MFIs' mission drift (see Cull, Demirgüç-Kunt, and Morduch 2007; Mersland and Strøm 2009).

The percent of female borrowers is used as the second proxy for the social outreach of institutions (see Rosenberg 2009; Hermes 2011; Quayes 2012; Van damme and al. 2016). This indicator represents the fraction of active borrowers who are women as a fraction of all active borrowers.

Finally, we account for the total assets and gross loan portfolio as controls. The total assets of MFIs include all asset accounts net of all contra-asset accounts, such as the loan-loss allowance and accumulated depreciation (see Tchakoute 2011; Beisland and al. 2014; Knar and al. 2017). The gross loan portfolio (see Knar and al. 2017; Louis and al. 2013) is frequently referred to as the loan portfolio or loans outstanding. Both create confusion as to whether they refer to a gross or a net figure. MFI portfolio growth is decomposed into extensive growth captured by the number of borrowers and intensive growth captured by the average loan size. However, the gross loan portfolio should not be confused with the value of loans disbursed.

Indicators of banks performance

To account for banking system stability, we use the banking system z-scores, bank credit as a share of total deposits, ratio of bank liquid assets to deposits and short-term funding and cost-to-income ratio (see Table 2).

Firstly, the banking system z-scores are considered as a good measure of bank risk (see Lepetit and al. 2008; Soedarmon 2011; Meslier 2014, 2016). Indeed, the z-score captures the probability of default of a country's banking system in so far as it compares the buffer of a country's banking system (capitalization and returns) with the volatility of those returns. According to Meslier (2016), the z-score indicates the number of standard deviations that a bank's ROA has to fall

below its expected value before equity is depleted. Thus, a higher value of z-score is associated with a lower default probability. Secondly, the bank credit as a share of total deposits is used as a measure of liquidity. Knowing that deposits constitute a stable source of funding for banks, they should not have a low volume of deposits to fund loans. If they do, they must rely more heavily on non-deposit sources of funds, whose availability and price are much more sensitive to changing economic or financial conditions. Furthermore, this indicator is also related to banks' financial health. Thus, when the ratio is well above the average, banks are more likely to be risky along many dimensions besides liquidity risk.

Thirdly, the ratio of bank liquid assets to deposits and short-term funding reflects the ability of a bank to repay its short-term claimed liabilities by using its cushion of cash and the readily monetized assets (see Said and Saucier 2003). When the ratio is high, that means that following unexpected deposit withdrawals or commercial paper roll-offs, banks are able to repay their short-term liabilities with the liquid assets from their balance sheet.

Fourthly, the cost-to-income ratio is used to measure banks' management efficiency. In other words, it reflects the ability of managers for minimizing costs. When production costs increase, bank financial soundness is jeopardized, which may raise bank vulnerability to shocks. To capture banking system efficiency, we use the ratio of bank interest revenue to interest-bearing assets, ratio of bank overhead costs to total assets, bank return on assets, bank return on equity and bank non-interest income to total income (see Table 2).

The ratio of bank interest revenue to interest-bearing assets¹ can be viewed as a proxy of the net interest margin, which is net interest income expressed as a percentage of average interest-earning assets. Thus, the higher the ratio, the more efficient the banking system is.

Next, the ratio of bank overhead costs to total assets is used as an indicator of operations and measure of efficiency. Knowing that banks incur higher costs and that there exists a higher wedge between lending and deposit interest rates, when this ratio is high, banking efficiency decreases.

The bank return on assets is used as a proxy of bank earnings. In a similar vein, the bank return on equity is also considered as a central measure of performance in banks. Indeed, it measures

¹Many companies have interest-bearing assets, such as loans and investments that generate a stream of income for the company. That interest can be categorized as either "interest receivable" or "interest revenue."

banks' profitability by revealing how much profit they generate with the money shareholders have invested. The higher the return on equity is, the more efficient the banks' operations are.

Lastly, the bank non-interest income to total income helps to evaluate potential diversification benefits in banks. Indeed, high levels of that ratio suppose more diversification activities and more non-interest income in banks. Furthermore, non-interest income appears to be more cyclical than net interest income. This suggests that the banking industry should not necessarily be counting on non-interest income to smooth revenue flows or reduce aggregate cyclicity.

To control for the previous indicators of bank performances, we use bank credit to the private sector and bank assets that capture banking system depth (see Table 2).

Indeed, the bank credit to the private sector refers to financial resources provided to the private sector by other depository corporations (deposit-taking corporations other than central banks), such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries, these claims include credit to public enterprises. The bank assets are all claims on the domestic real nonfinancial sector that banks own and that can provide future financial benefits (see Fratianni and al. 2017).

2.4 Methodology

2.4.1 Data

Our dataset consists of an unbalanced panel of 76 developing countries between 1999 and 2016. The size of the panel was conditioned by the availability of data. More precisely, we obtained bank data from TheGlobalEconomy (see Table 2). Macroeconomic indicators are from World Development Indicators, Education statistics, The Penn World Table 8.1, Federal Reserve Economic Data, conference- board and TheGlobalEconomy (see Table 3). In the same line as Levine and al. (2000) and Adonsou and Sylwester (2017), human capital and investment are considered as inputs, whereas inflation, government expenditures, and trade openness are considered as policy factors.

MFIs' data are obtained from the Microfinance Information Exchange (MIX) Market Database (see Table 1). One should be aware that in the MIX Market Database, MFIs self-report these data on an annual basis in current US dollars, which represents the main limitations of the data set. Indeed, for this voluntary reporting, MFIs have to invest resources. Consequently, the database might be likely to under-represent smaller providers of microfinance services (see Allet and Hudon 2015).

Nonetheless, the MIX Market is recognized as the one of the most exhaustive databases of MFIs worldwide. Thus, it is frequently used as the main data source for many relevant studies on microfinance (see, for instance, Cull and al. 2007; Hermes and al. 2011; Vanroose and D'Espallier 2013). Moreover, the MIX scales institutions with regard to the quality of the MFIs' reporting after being audited by third-party accounting firms. Thus, we focused on MFIs that have their financial statements (balance sheet and income statement) audited and certified by the chartered accountants and auditors (for diamond level 4) and rated by the rating agencies (for diamond level 5²) in order to ensure reliability of data (as in Ahlin and al. 2011; Tchakoute 2011 ; Lopatta and al. 2017).

2.4.2 Empirical approaches

In our analysis, we consider four specifications of panel models. Consider the multiple linear regression model for individual $i = 1, \dots, N$ who is observed at several time periods $t = 1, \dots, T$; is based on:

$$y_{it} = \alpha + c_i + \beta x'_{it} + \dots + u_{it}$$

Where y_{it} is the dependent variable and x'_{it} is a K-dimensional row vector of time-varying explanatory variables. α is the intercept and c_i is an individual-specific effect β is a K-dimensional column vector of parameters and u_{it} is the error term.

Our first specification is based on the fixed effects model. The fixed effects model assumes

²Level 5 MFIs have the same characteristics as Level 4 MFIs in addition to being rated by the rating agencies.

the correlation of unknown form between the entity's error term and explanatory variables. In addition, the entity's error term and the individual-specific effect should not be correlated with the others.

A natural competitor to the fixed effects model is the random effects model. The random effects model assumes that the individual-specific effect is a random variable that is uncorrelated with the explanatory variables (unrelated effects) (see Green 2008). However, if the individual-specific effect really is an unrelated effect, the random effects model may be more suitable than the fixed effects model. This is usually tested by a Hausmann test, which is only valid under homoscedasticity and cannot include time fixed effects.

As a third specification, we consider an instrumental variables (IV) model in which some of the exogenous regressors are assumed to be endogenous in the sense that they could be correlated with the error term. Thus, IV³ methods provide a way to nonetheless obtain consistent parameter estimates. Formally, the model is written as follows:

$$y_{it} = \beta_1 x_{it}^{1'} + \beta_2 x_{it}^{2'} + u_{it}^1$$

$$x_{it}^1 = \gamma_2 x_{it}^{1'} + \gamma_3 x_{it}^{2'} + u_{it}^2$$

Where $i = 1, \dots, N$ and $t = 1, \dots, T$. x_{it}^1 is a vector of endogenous explanatory variables. x_{it}^2 is a vector of exogenous explanatory variables and x_{it}^3 is a vector of instrumental variables. β_1 and β_2 are vectors of structural parameters, while γ_1 and γ_2 are reduced-form parameters. The vector (u_{it}^1, u_{it}^2) is assumed to be multivariate normal with variance–covariance matrix:

$$\begin{pmatrix} 1 & \Sigma'_{12} \\ \Sigma_{12} & \Sigma'_{22} \end{pmatrix}$$

The model is estimated using Newey's efficient two-step estimator. Fourthly, we consider an IV-GMM model since heteroscedasticity is present. Indeed, the GMM estimator is more

³Although IV estimators address issues of endogeneity, the violation of the zero conditional mean assumption caused by endogenous regressors can also arise for two other common causes: measurement error in regressors (errors-in-variables) and omitted-variable bias. The latter may arise in situations where a variable known to be relevant for the data generating process is not measurable, and no good proxies can be found.

efficient than the simple IV estimator, whereas if heteroscedasticity is not present, the GMM estimator is no worse asymptotically than the IV estimator. Suppose we wish to fit the following simple model:

$$y_{it} = \alpha + c_i + \rho y_{it-1} + \beta_1 x'_{it} + u_{it}$$

where we suspect that some elements of x'_{it} are endogenous. We have as instruments a vector z_i consisting of the elements of x that are exogenous as well as additional variables not correlated with u_i . α is the intercept and c_i is an individual-specific effect. In a GMM framework, the moment conditions can be written as:

$$\mathbb{E}\{z_{it}u_{it}(\beta)\} = \mathbb{E}\{z_{it}(y_{it} - (\beta)x'_{it})\} = 0$$

Where instruments used are: $x_{(i,t-1)}, x_{(i,t-2)}, \dots, x_{(i1)}$. Generalized method-of-moments (GMM) estimators choose the estimates that minimize a quadratic form of the moment conditions. GMM gets as close to solving the over-identified system as possible. Furthermore, GMM reduces to MM when the number of parameters equals the number of moment conditions.

2.5 Results

2.5.1 Descriptive statistics

According to the descriptive statistics in Table 4, the profit margin of MFIs ranges from -13.2857 to 0.4552. This explains why the average profit margin is negative (-0.01). Recall that profit margin usually refers to the percentage of revenue remaining after all costs, depreciation, interest, taxes and other expenses have been deducted. This statistic suggests that revenues fail to cover the expenses of MFIs. In other words, many microfinance institutions continue to operate despite their negative profit margin. This can be explained by the fact that in developing countries, many MFIs are subsidized.

Regarding social performance indicators of MFIs, the average number of active borrowers in MFIs is 625,489.5. However, the range is quite large in so far as it is from 2 to 2,982.84. This observation is the same for the number of clients. Moreover, an average of 48.61% of borrowers are women.

Table 4 also reports that the average loan balance per borrower to GNI per capita ratio is about 0.943962, whereas in our sample it ranges from 0.0036 to 16.1633. This low average level of the average loan balance per borrower to GNI per capita ratio reflects the MFIs' mission drift. In other words, the target is not really the poorest.

2.5.2 Preliminary tests

Firstly, we analyse the correlation test between our endogenous variable and different types of MFIs and banks' performance indicators (see Table 5). Table 5 reports a negative and significant correlation between GDP per capita growth and provision for loan impairment to assets ratio (-0.1312), yield on gross portfolio (-0.0946). Results also suggest a positive and significant correlation between GDP per capita growth and the average loan balance per borrower / GNI per capita (0.0845), the operational self-sufficiency (0.1391), total assets (0.0955), the gross loan portfolio (0.0858). In addition, our results suggest that the significant correlation coefficients are mainly low among MFIs' indicators of performance except for the MFIs' return on assets, which is slightly correlated with profit margin (0.6809) and operational self-sufficiency (0.6229). The correlation coefficient (0.8412) is also high between MFIs' assets and MFIs' gross loan portfolio. However, the correlation is much higher among banks' performance. For instance, bank return on equity (ROE) is highly correlated to the bank interest revenue to interest-bearing assets ratio (0.9941), bank overhead costs (0.9959) and bank return on assets (0.7128).

Furthermore, the significant correlation coefficients are low: we find low correlation between performance indicators of MFIs and banks. Following Lopatta and al. (2017), this can be explained by a slight co-movement between these two types of indicators. In other words, these indicators are not capturing the same underlying characteristics. This finding is in line with Ahlin, Lin, and Mario (2011) and with Cull, Demirgüç-Kunt, and Morduch (2014), who argue that the lack of association reflects that bank lending and MFI lending are neither complements nor substitutes

overall.

Secondly, we run the IPS (Im, Pesaran, and Shin 2003) and the Fisher-type tests of panel unit root. The Im-Pesaran-Shin (IPS) (2003) test relaxes the assumption of a common unit root process. Then, the alternative hypothesis is that the fraction of panels that are stationary is nonzero. The Fisher-type approach tests for panel-data unit roots from a meta-analysis perspective. Especially, these tests conduct unit-root tests for each panel individually, and then combine the p-values from these tests to produce an overall test. Even though neither test requires strongly balanced data, sometimes the IPS test cannot be run for our unbalanced database. Indeed, with the Fisher-type test, the individual series can have gaps, whereas in the IPS test, there can be no gaps in each individual time series.

When these tests reject the null hypothesis of a unit root, it indicates that the indicator is not individually stationary. We then take the log first difference of these series. Our results are not reported here, but they are available upon request to the authors.

Thirdly, we run the Hausman test to decide between fixed and random effects. The null hypothesis is that the preferred model is random effects vs. the alternative fixed effects (see Green 2008, chapter 9). It basically tests whether the error term is correlated with the regressors, while the null hypothesis is that it is not. Unfortunately, our model fitted on our data fails to meet the asymptotic assumptions of the Hausman test. Our test is thus inconclusive.

Fourthly, we run the Durbin-Wu-Hausman (DW-H) test of the endogeneity of regressors. A rejection of the null indicates that endogenous regressors' effects on the estimates are meaningful, and instrumental variables techniques are required. Our results show that the regressors are endogenous (see Table 6).

Finally, we run the Breusch-Pagan test for heteroscedasticity. If the probability associated with the test is less than the significance level (1%, 5%, 10%), the hypothesis of homoscedasticity H_0 is rejected. Our results show the presence of heteroscedasticity (see Table 6). Then, we will only analyse the results obtained from GMM specification.

2.5.3 GMM results analysis

Table A shows results from different specifications of GMM when the endogenous variable is the GDP per capita growth. GMM (1) reports results when we consider only the indicators of social performance of MFIs. In GMM (2), we consider only the indicators of financial performance of MFIs. GMM (3) reports results when we consider all indicators of MFIs performance. In GMM (4), we report results when we consider indicators of banks' performance. GMM (5) shows the results when we add some macroeconomic control variables to indicators of MFIs' performance. In GMM (6), we add some macroeconomic control variables to indicators of Banks' performance. GMM (7) reports results when we consider all indicators of MFIs' performance and banks' performance. In GMM (8), we report results when we add some macroeconomic control variables to all indicators of MFIs' performance and banks' performance.

In Table A1, GMM (1) and GMM (2) show that when indicators of social performance and indicators of financial performance of MFIs are considered separately, none of them are significant to explain GDP per capita growth. In other words, our results suggest that if MFIs focus only on their social objective or on their financial objective, they have no contribution on economic development.

Considering all indicators of MFIs' performance, GMM (3) shows that the provision for loan impairment is the only significant variable. Moreover, it has a negative impact on GDP per capita growth, which can be explained by two channels. Firstly, if microfinance institutions have to increase the proportion of assets used for provision, they may be constrained to reduce the proportion of assets used for loans, which can jeopardize the GDP per capita growth. Indeed, due to a higher proportion for loan impairment, there may be a reallocation of resources to the disadvantage of borrowers' loans. Even if higher provision for loan impairment / assets fits into a preventive strategy for MFIs, it can be to the disadvantage of borrowers who could have less access to credit. This can therefore undermine investment and GDP per capita growth. Secondly, microfinance institutions have to increase their provision for loan impairment when there is an increase of their borrowers' loan impairment. Knowing that higher loan impairment or customer defaults can be due to bad management of loans or inefficient use of loans, this can lead to a higher level of unproductive investments and lower GDP per capita growth. Given the above,

our results suggest that MFIs should pursue their dual objective in order to fulfil their economic development mission.

In GMM (4), significant variables are the banks' liquid assets to deposits and short-term funding, the banks' credit as percent of bank deposits, the banks' overhead costs and banks' return on assets. Firstly, the results show that higher bank liquid assets to deposits and short-term funding improve GDP per capita growth. Indeed, this ratio gives information about a bank's sensitivity to selected types of funding (deposits of households, enterprises, banks and other financial institutions and funds from debt securities issued by the bank). Therefore, it should capture the bank's vulnerability related to these funding sources. The higher the value of the ratio, the higher the capacity to absorb liquidity shock, which helps maintain the confidence of agents (households, investors) in their banking system. Thus, this result confirms that better confidence in the banking system can encourage investment, which has a positive effect on GDP per capita growth.

Secondly, we find that the increase of banks' credit as percent of bank deposits promotes GDP per capita growth. Indeed, the rise of this ratio suggests that banks are lending more, which can have a positive effect on investment and GDP per capita growth. Furthermore, this ratio is a commonly used statistic for assessing a bank's liquidity. Too high value of this ratio means that the bank may not have enough liquidity to cover any unforeseen fund requirements. Conversely, too low value of this ratio suggests that the bank may not be earning as much as it could be. Therefore, the increase of banks' credit as percent of bank deposits reports banking system stability, which induces better confidence in the banking system, higher investments and GDP per capita growth improvement. Furthermore, this ratio also indicates the banks' ability to finance by themselves their loan activities. Indeed, this ratio suggests that below 100%, banks can fully fund their loan activities with bank deposits, and conversely, when the ratio is above 100%, they have to find other funding sources besides bank deposits (on interbanking market, financial markets, from shareholders through an increase in equity). Thirdly, results show that banks' overhead costs have a negative impact on GDP per capita growth. Knowing that the objective of the banking system is maximizing profits and minimizing costs, the increase of banks' overhead costs decreases the banking system's efficiency. This undermines investors' confidence in the banking system, which could induce lower investments and thus lower GDP per capita growth. Indeed, many studies suggest a positive and highly significant effect of efficiency on profitability

(see, for example, Alexiou and Sofoklis 2009; Athanasoglou and al. 2008; Dietrich and Wanzenried 2011; García-Herrero and al. 2009; and Pasiouras and Kosmidou 2007, among others). This relation would imply that operational efficiency is a prerequisite for improving the profitability of the banking system, with the most profitable banks having the lowest efficiency ratios.

Fourthly, our findings show that higher banks' return on assets (ROA) increases GDP per capita growth. ROA gives information about how profitable a bank is relative to its total assets. According to Nwanyanwu (2010), the banking sector mobilizes surplus funds from depositors who have no immediate needs of such funds in order to grant credit to investors who lack the necessary capital to execute brilliant ideas on how to create additional wealth in the economy. This creates income for the banks to ensure their profitability, which has a positive effect on GDP per capita growth. Moreover, we know that profitability in banks remains the main essence of investment for shareholders (Adeniyi 2006). Therefore, the increase of banks' return on assets could also encourage investors to invest more in the banking system.

GMM (5) reports that an increase in the percentage of female borrowers has a significant and positive effect on GDP per capita growth. This result shows a direct positive impact on GDP per capita growth, while Lopatta and Tchikov (2016, 2017) find an indirect positive impact through labour participation and money growth. In many cases poor women are explicitly targeted by microcredit institutions because they appear to be better clients than men, as shown by their higher repayment rates (for specific examples, see, e.g., Hossain 1988; Khandker and al. 1995; and Hulme 1991). According to Mody (2002) as cited in Armendariz de Aghion and Morduch (2003), women constitute over 80 percent of the client membership for the 34 largest microcredit institutions around the world. Furthermore, the preferences of women are thought to be more in line with the social objectives of microfinance, according to the collective household model's characterization of intra-household decision-making. Indeed, targeting women is considered to have a greater positive impact on household welfare outcomes. Finally, the provision of microcredit directly to women is considered to increase their economic and social empowerment both within the household and in the community at large.

Regarding GMM (6), we found that more bank liquid assets to deposits and short-term funding induces GDP per capita growth improvement, as in GMM (4). In addition, the following control variables are significant: the gross capital formation, the human capital, the household's con-

sumption, the bank credit to the private sector and bank assets. Firstly, we confirm that the investment measured by the gross capital formation has a significant and positive effect on GDP per capita growth. Secondly, we found a negative impact of human capital on GDP per capita growth. Indeed, Logossah (1994), for instance, explains that individuals tend to invest less and less in education and training as their working lives unfold. One could also think that by reducing their investment in human capital, there may be a reallocation of agents' resources in favour of other types of investments, which generate revenue and raise GDP per capita growth.

Thirdly, increases in household consumption can undermine GDP per capita growth. There are many reasons for this negative relationship. More consumption can generate inflationary pressures by increasing demand (Keynesian approach). As supply is no longer able to respond immediately to demand, prices rise and consumers are totally or partially unable to consume as before. Moreover, competition increases with the development of international trade. Consequently, the rise in consumption is mainly related to imported tradable goods, especially in developing countries. In this case, this increase benefits foreign countries and does not affect national (or domestic) growth. Finally, the liberal theory holds that investment is fundamental for the development of consumption, but it is always at the expense of saving. Thus, banks may have lower levels of savings to finance investments, which can have a negative effect on GDP per capita growth. To conclude, it is not the rise in consumption itself that is detrimental to consumption.

Given the above, investment, human capital and household consumption will be tested as a transmission channel in the next subsection.

Fourthly, higher bank credit to the private sector induces GDP per capita growth improvement. For instance, through cross-country regressions, King and Levine (1993) find a strong positive relation between economic growth and the amount of liquid liabilities, the importance of commercial banks in relation to the central bank when allocating credit, the ratio of credit allocated to private enterprises to total domestic credit, and credit to the private sector. In addition, Levine, Loayza, and Beck (2000), Beck and al. (2000), and Caporale and al. (2015) used the system GMM for panel data and found the data very similar to those obtained earlier in pure cross-country analysis.

Fifthly, more bank assets promote GDP per capita growth. Knowing that the most important as-

sets of banks are loans and reserves, more loans generate interest revenue and more reserves keep deposits safe. For instance, Hasan and al. (2009) suggest that the interaction between better banking and deeper capital markets is most beneficial. Indeed, they find an independent and economically significant effect of higher mean cost efficiency for economic growth.

GMM (7) reports that more female borrowers have a positive and significant effect on GDP per capita growth, as in GMM (5). Banks' credit as percent of bank deposits also promotes GDP per capita growth as in GMM (4). Finally, we found that more bank non-interest income compared to total income induces higher GDP per capita growth. Indeed, the non-interest income captures the fact that many banks also engage in non-lending activities, such as investment banking and brokerage services, which generate income. For instance, Williams and Prather (2010) suggest that shareholders of Australian banks will benefit from increased bank exposure to non-interest income via diversification. However, Brunnermeier and al. (2011) also found that systemic risk is higher for banks with a higher non-interest income to interest income ratio, which is consistent with the model of Shleifer and Vishny (2010).

In GMM (8), our results show that social performance indicators such as the average loan balance per borrower / GNI per capita, the number of active borrowers and the percentage of female borrowers are significant and positively correlate with GDP per capita growth. Indeed, the lower the average loan size per borrower based on gross national income (GNI), the more an MFI is moving towards the very poor. Thus, by improving their social performance, microfinance institutions contribute to improvement in GDP per capita growth. Furthermore, Rosenberg (2009) argues that as an MFI matures and growth slows, a lower percentage of its clients are first-time borrowers, and average loan sizes will rise even if there has been no shift in the market it is serving. Likewise, MFIs sometimes discover that their limits on the size of initial loans are unnecessarily conservative; relaxing those limits produces a loan size growth that has nothing to do with abandoning poorer clients. It should be noted that GMM (5) results corroborate the assertions of Lopatta and al. (2016, 2017) regarding the non-significance of the average loan balance per borrower to GNI per capita ratio and the number of active borrowers. In addition, Lopatta and al. (2016, 2017) find that the percent of female borrowers has a negative and significant impact on economic growth. These different results can be largely due to the integration of the banking system and macroeconomic controls in our analysis (in GMM (8)); which is not taken

into account in the work of Lopatta and al. (2016, 2017).

As in GMM (4) and GMM (6), banks' liquid assets to deposits and short-term funding have a positive effect on GDP per capita growth. As in GMM (7), more bank non-interest income to total income promotes GDP per capita growth.

In addition, GMM (8) reports that government expenditures have a negative impact on GDP per capita growth. Indeed, Devarajan and al. (1996) by using a panel of 43 developing countries over 20 years, show that an increase in the share of current expenditure has positive and statistically significant growth effects. However, a higher capital component of public expenditure undermines the per-capita growth. Thus, productive expenditures could become unproductive when used in excess. Their results suggest that developing-country governments have been misallocating public expenditures in favour of capital expenditures at the expense of current expenditures. Finally, we find that lower gross loan portfolio has statistically and positive impact on GDP per capita growth. Cournède, and al. (2015), Cournède, and al. (2015a) argue that in the aftermath of the credit binge, with the private sector overladen with debt, further credit "expansion is likely to slow rather than boost growth", particularly if taken up by households.

Our results suggest that despite their relatively small size, MFIs' performance contributes to economic development when accounting for banks' performance. When MFIs improve their social performance (higher average loan balance per borrower / GNI per capita, number of active borrowers and percentage of female borrowers), they contribute more to economic development. And, more social performance indicators of MFIs become significant when we account for the performance of banks and macroeconomic indicators compared with GMM (7) case.

In addition, knowing that MFIs used to give relatively "low" loans compared to banks, our results suggest that MFIs should increase the average loan balance per borrower. That way, borrowers can start to invest or invest more in the productive activities of others, such as agriculture, housing, education, green finance, etc., which need more funds. Through this result, we also suggest that MFIs diversify their financial activities more, for example in housing loans, to be effective in breaking the poverty trap cycle.

2.5.4 Transmission channels

Investment

In Table A2, GMM (3) and GMM (7) show that when microfinance institutions increase their provision for loan impairment / assets, investment lessens. This is in line with the previous analysis (see Table A1- GMM (3)). Thus, higher provision for loan impairment / assets induces lower investment, which undermines GDP per capita growth. We also find that a rise in the percentage of female borrowers does not improve investment. This result suggests that women do not use their loans to invest (see GMM (3), GMM (5) and GMM (7)). Moreover, GMM (8) reports that higher average loan balance per borrower / GNI per capita has a positive effect on investment. By increasing their average loan balance per borrower, MFIs contribute to the improvement of investment. Consequently, we observe the increase of GDP per capita growth (Table A1- GMM (8)). Following Servet (2015), this result can be explained by the fact that the increase in the size of loans allows MFI clients to increase their productive capacities and not their consumption considered as economically unproductive. Also, Banerjee and al. (2015), in a study in India argues that microcredit has a positive effect on the micro enterprises creation. In fact, borrowers who have already taken part in an activity before granting credit invest in durable goods but reduce non-essential expenses, which helps them increase their profits.

GMM (4), GMM (6) and GMM (8) show that when banks raise their return on equity, investment increases even if we find that ROE has no significant impact on GDP per capita growth (see Table A1). Hence, by increasing return on equity, banks finance unproductive investment. In contrast, higher return on assets undermines investment. Thus, even if it induces lower investment, GDP per capita growth increases with return on assets (see Table A1- GMM (4)). We can say that investment is not the channel through which return on assets positively affects GDP per capita growth.

Furthermore, GMM (8) also reports that more bank liquid assets to deposits and short-term funding and bank assets promote investment. Then, this result confirms that by increasing investment, bank liquid assets to deposits and short-term funding improves GDP per capita growth

(see Table A1- GMM (4), GMM (6) and GMM (8)). When banks increase their assets, we observe an investment improvement. However, we find that banks' assets are not statistically significant to explain GDP per capita growth (see Table A1- GMM (8)). Hence, by increasing assets, banks finance unproductive investment. We also find that the rise of bank overhead costs can have a positive effect on investment (see GMM (8)). This finding illustrates the positive effect that bank overhead costs can have on investment and GDP per capita growth.

Finally, our results confirm that trade openness promotes investment (see GMM (5), GMM (6) and GMM (8)). GMM (6) also reports that inflation has a positive effect on investment. Indeed, inflation can make stock prices go up and, more than higher prices, stock market investors need the stock price to increase more than the rate of inflation to make real money. If not, they will essentially lose money.

Consumption

In Table A3, we find that the more females borrow, the higher consumption is (see GMM (3), GMM (5), GMM (7) and GMM (8)). This finding indicates that women use their loans to consume rather than to invest (see Table A1- GMM (5), GMM (7) and GMM (8)). This result is in line with some previous results found in the literature whereby beneficiaries allocate a large part of the microcredits to consumption. According to Servet (2015), a report from Microfinance Equity Bank (publicly traded) shows that 30.43% of the total outstanding credit is for consumption, 9.15% for microenterprises and for agriculture, with the rest of the portfolio going for 41.88% to small firms and 15.55% to medium-sized enterprises. These results are confirmed by Guerin's (2015) research in South India, which finds that the proportion of loans for consumption is between 60% and 95%. Moreover, Pitt and Khandker (1998) find that providing credit directly to women has a significant positive effect on consumption expenditure, children's schooling, and labour supply by using a quasi-experimental design. To do so, they account and correct for non-random program placement and self-selection in program participation. Specifically, they find that, at the mean, when microfinance institutions provide an additional 100 taka of credit to women, this heightens

the total annual per capita household consumption expenditure by 18 taka. However, Roodman and Morduch (2011) show that the microcredit benefits for women were annihilated because Pitt and Khandker (1998, 2005) failed to remove the 16 wealthiest families of the 5,218 families studied.

GMM (5), GMM (7) and GMM (8) show that increasing microfinance institutions' profit margin, operating expense / loan portfolio and provision for loan impairment / assets has a positive effect on consumption.

Firstly, we found previously that more provision for loan impairment undermines GDP per capita growth (see Table A1- GMM (3)). Hence, consumption is the transmission channel through which provision for loan impairment / assets has a negative effect on GDP per capita growth. Recall that the virtuous image presents microcredit as a loan that enables MFIs' clients (households, micro-entrepreneurs) to improve their production capacities. However, these clients are sometimes illiterate and consist mainly of retirees, small craftsmen and housewives. Thus, they have not sufficiently explored the opportunities issue (see Servet 2015) and their competitive environment. They also do not have the necessary managerial capacities or technical training. Consequently, there is a significant risk of failure which may negatively impact their revenue and their consumption. In the same line, Banerjee and al. (2015) find that microcredit increases the consumption of households that have not had any activities. One can suppose that health problems or unfortunate events may have a negative impact on loan repayment.

Secondly, the operating expenses are composed of staff costs and overheads. The staff includes a small proportion of the management staff and a large proportion of the administrative staff (especially the loan collectors). Thus, an increase in staff costs leads to a reallocation of the MFIs' financial resources in favour of the staff. As a result, these resources inevitably increase their incomes and improve their purchasing power. Regarding the overhead costs, they consist of supplies of pens, paper, and ink necessary for their loan activity. Knowing that MFIs usually award supply contracts to selected third parties (SMEs owned by family members, friends, etc.), this can induce a reallocation of the MFIs' financial resources in favour of these third parties. Consequently, we can observe a rise in income and consumption thanks to the staff of these third parties.

Thirdly, GMM (8) also reports that more yield on gross portfolio of microfinance institutions un-

dermines consumption but has no significant impact on GDP per capita growth. This result could be explained by the problem of the interest rate on the one hand and the repayment terms of the loan on the other hand (see Servet 2015). Indeed, for an activity to be viable, the cost of credit through the interest rate and commissions must be lower than the return on the activity for which the investment is made. However, we notice the interest rates in microfinance are sometimes excessive. They vary between 30% and 70% in Asia; in sub-Saharan Africa, specifically in the UEMOA space, it increased from 24% to 27% on 1 January 2015. However, in practice, MFIs tend to exceed this rate. The most prominent case is that of the MFI Comportamos in Mexico, which granted loans at rates of 100% to its clients. These very high rates may have negative impacts on the repayment of credit and revenues, which could reduce the share of income intended for consumption.

Fourthly, in the GMM (8), we also observe that higher profit margin leads to a consumption improvement. An increase in the profit margin is synonymous with good financial performance. This suggests the occurrence of additional charges corresponding to the birth of additional revenues. These additional revenues may help promote consumption.

Regarding bank liquid assets to deposits and short-term funding, we find that it has a positive effect on consumption (see GMM (7) and GMM (8)). On one hand, more liquid assets can increase the amount of loans granted to borrowers, who can consume more. On the other hand, better confidence in the banking system also encourages consumption besides investment, which improves GDP per capita growth (see Table A1- GMM (4), GMM (6) and GMM (8)). In addition, when bank raise their return on assets and their return on equity, this lessens consumption (see respectively GMM (4) and GMM (8)). Thus, increasing bank profitability promotes GDP per capita growth (see Table A1- GMM (4)), but not through consumption improvement.

Finally, our results report that an increase in bank assets has a positive effect on consumption (see GMM (6) and GMM (8)), while more assets held by microfinance institutions undermine consumption (see GMM (5) and GMM (8)). In GMM (6), we find that the rise of investment and government expenditure may negatively affect consumption.

Human capital

In Table A4, we find that an increase in the number of active borrowers promotes human capital (see GMM (5) and GMM (8)), while higher human capital undermines GDP per capita growth (see Table A1- GMM (8)). An increase in the number of active borrowers increases the human capital on the one hand (Table 4 GMM 8), and on the other hand, this increase in human capital decreases the GDP per capita (Table 1 GMM 6), and an increase in the number of active customers improves the GDP (Table 1 GMM 8). As a result, human capital is not a channel through which the number of active borrowers promotes economic growth. This corroborates the finding of Barnerjee and al. (2015), whereby microcredit has no impact on non-economic variables such as education, health or the power of women in the household.

According to GMM (7), higher MFI return on assets also has a positive impact on human capital. Thus, by improving their profitability, microfinance institutions can raise the number and amounts of loans to borrowers, which can increase the investment in human capital. Furthermore, we can note that microfinance institutions also provide additional trainings in entrepreneurship, accountability, health, agriculture, etc. This can ensure the profitability of borrowers' activities, projects which can increase the investment in human capital. Nevertheless, human capital is not a transmission channel in this case.

GMM (4) reports that bank interest revenue lessens human capital. By contributing to banking system stability, higher bank credit as a percent of bank deposits increases GDP per capita growth (Table A1 – GMM (4) and GMM (7)) through reduction of human capital. Finally, we find that rise of gross loan portfolio and lower bank assets increase human capital (see GMM (5), GMM (7) and GMM (8)). However, a decrease of gross loan portfolio and bank assets lessens GDP per capita growth. Thus, human capital is not a transmission channel through which gross loan portfolio and bank assets affect GDP per capita growth.

According to the results of the estimations, the bcbd increases when the human capital decreases (Table 4 – GMM4), and when the human capital decreases, there is an increase of the GDP (Table 1 – GMM 5, 6); thus (by the relation of transitivity), when the bcbd increases, the GDP increases (see Table A1 GMM 3, 4,6). Therefore, human capital is a transmission channel

of the bcdb ratio towards growth.

To conclude, our results show that human capital appears to be a good transmission channel through which banks' performance affects economic development.

2.6 Robustness check

2.6.1 Endogenous variable: GNI per capita growth

In Table B1, results show that among the indicators of social performance of MFIs, only the number of active clients is significant to explain GNI per capita growth (see GMM (1) and GMM (7)) while, in GMM (2), none of the indicators of financial performance are significant. In addition, these results show that an increase in the number of active clients has a negative impact on GNI per capita growth. While one should expect a positive relation, this result is quite counterintuitive. Why? Accordingly to Rosenberg (2009), almost all microfinance interventions aim ultimately at expanding the number of clients being served. However, a rapid expansion sometimes proves to be unsustainable, especially during an MFI's early years when it needs to focus on designing its products and building its systems. It is usually counterproductive for funders to pressure MFIs for rapid expansion. Thus, a rapid increase in the number of active clients can induce lower financial revenues for funders, which consequently can negatively affect GNI per capita growth.

According to Servet (2015), not all MFI beneficiaries are not necessarily microentrepreneurs, autoentrepreneurs or even pretending to be either. They include fairly low-level officials and traders in the developing countries. For them, unsuitable repayment terms of customers, the low level of loans granted, prohibitive interest rates and over-indebtedness of customers result in pressure on the salaries of customers. For example, Servet (2015) argues that following the refusal of reimbursement of some customers in developing countries, they have not gone to the MFIs but rather their employers to demand better remuneration in order to fulfil their debts and interests, the repayment of which was done automatically from their bank accounts where their salaries were paid.

Considering all indicators of MFIs' performance, GMM (3) reports that the profit margin is the only significant variable which has a positive impact on GNI per capita growth. Profit margin usually

refers to the percentage of revenue remaining after all costs, depreciation, interest, taxes, and other expenses have been deducted. Therefore, by increasing their profit margin, microfinance institutions contribute to the rising of revenues, which promotes economic development.

Regarding GMM (4), we find that banks' liquid assets to deposits and short-term funding, and bank credit as percent of bank deposits, have a positive effect, while bank overhead costs have a negative effect on GNI per capita growth. GMM (5) and GMM (6) report that higher investment promotes GNI per capita growth. We also find that more active borrowers are statistically significant and have a positive impact on economic development. In GMM (6), we find that more bank assets and the increase of human capital lessen GNI per capita growth.

Regarding GMM (8), our findings show that the increase of bank interest revenue, percent of interest-bearing assets and investment are statistically significant and improve GNI per capita growth. Indeed, by generating more interest revenue, banks contribute to higher financial revenues and then GNI per capita growth improvement. These results also suggest that when accounting for all indicators of MFIs' performance, of banks' performance and macroeconomic controls variables, none of MFIs' performance indicators are found to explain significantly GNI per capita growth. Given the above, we will use investment and human capital as potential transmission channels.

These results confirm the previous ones obtained with GDP per capita growth. By using GNI per capita growth as economic development, we confirm additional results previously found in the literature. Consistent with Tonelli and Dalglish (2011), our findings suggest that microfinance should not be presumed to be a mass business. Thus, resources should rather be spread qualitatively among those who need them most. Likewise, Lopatta and al. 2017 argue that the key role of MFIs should be as financial intermediaries and that they should focus on the depth, not breadth, of their outreach. Finally, we find that profit margin can also be one of the key indicators of MFI performance, which significantly affects economic development.

2.6.2 Transmission channels

Investment

In Table B2, GMM (2) shows that by increasing the operational self-sufficiency, microfinance institutions contribute to investment improvement. In addition, lower provision for loan impairment / assets has a positive effect on investment (see GMM (2), GMM (3) and GMM (7)). In GMM (2) and GMM (8), we find that more profit margin lessens investment. Hence, we can say that investment is not the transmission channel through which profit margin promotes GNI per capita growth. We have reached the same result for number of active borrowers in Table B1 (GMM 5). We can conclude that investment is not the transmission channel through which number of active borrowers increases GNI per capita growth. Table B2 (GMM 3). Table 2 (GMM (5) and GMM (8)) report that female borrowers do not use their loans to invest and that an increase in the number of active borrowers reduces investment.

Furthermore, more bank credit as percent of bank deposits and lower bank cost to income ratio induce investment improvement (see GMM (4)). In GMM (4), GMM (6) and GMM (8), investment increases with bank return on equity (ROE) and decreases with bank return on assets (ROA). Finally, GMM (5) and GMM (8) report that trade openness promotes investment.

Furthermore, our results show that more bank credit as percent of bank deposits increases investment (Table B2 – GMM 4 and GMM 6), and investment improves GNI per capita (Table B1 – GMM 5, 6, 8), so more bank credit as percent of bank deposits increases GNI per capita (Table B1 – GMM 4, 6). Therefore, we say that investment is a good transmission channel through which bank credit as percent of bank deposits improves GNI per capita growth.

Human capital

In Table B4, GMM (3) shows that higher return on assets and lower operating expense

/ loan portfolio induce more human capital. We also find that when microfinance institutions increase their average loan balance per borrower / GNI per capita, this positively affects human capital (see GMM (3) and GMM (7)). In addition, more women borrow (see GMM (7)), and the lower the number of active clients (see GMM (8)), the greater the human capital is. However, none of these indicators significantly affects GNI per capita growth.

Furthermore, GMM (4) reports that more bank liquid assets to deposits and short-term funding, bank credit as percent of bank deposits, and bank interest revenue reduce human capital. In GMM (5), the rise of gross loan portfolio also lessens human capital. Finally, GMM (6) shows that more investment and less in bank assets promote human capital.

To conclude, we can say that human capital may not be a good transmission channel to capture the link between these indicators of performance and GNI per capita growth.

In Table 4, GMM 8 shows that a larger number of active clients has a negative and significant impact on human capital, and less human capital improves GNI (Table B1 – GMM 6). In addition, a higher number of active borrowers decreases GNI per capita (Table B1 – GMM 7). Therefore, we say that human capital is not a good transmission channel through which number of active clients decreases GNI per capita.

Our results show that more bank credit as percent of bank deposits and bank liquid assets to deposits and short-term funding decrease human capital (Table B4 – GMM 4). Also, less human capital improves GNI per capita (Table B1 – GMM 6). So, human capital has a true transmission channel through which more bank credit as percent of bank deposits and bank liquid assets to deposits and short-term funding improve GNI per capita growth.

Furthermore, in Table B4, GMM 6 shows that higher assets of banks mean a decrease in human capital, and more human capital has a negative and significant impact on GNI per capita. So we can say that human capital is a good transmission channel through which higher assets of banks decrease GNI per capita growth. To conclude, we can say that human capital may be a good transmission channel to capture the link between more bank credit as percent of bank deposits and bank liquid assets to deposits and short-term funding and GNI per capita growth but for bank assets.

2.7 Conclusion

Our article investigates the promise of banks and MFIs for long-term economic development in an attempt to gauge its fulfilment. More precisely, we aim to jointly analyse the performance of banks and MFIs on economic development through a GMM analysis. Our main findings are fourfold.

Firstly, we find that if MFIs want to fulfil their economic development mission, they should pursue their dual objective of social and financial performance. Moreover, our results suggest that despite their relatively small size, MFI performance contributes to economic development even when accounting for banking system performance. By increasing their return on equity, banks finance unproductive investment.

Secondly, investment and household consumption are significant transmission channels through which banks and MFIs' performance can affect economic development. Human capital, on the other hand, appears not to be a good transmission channel through which MFIs' performance affects economic development.

Thirdly, we show that a higher provision for loan impairment to assets ratio induces lower investment which undermines GDP per capita growth. We also find that the rise of overhead costs can have a positive effect on investment and GDP per capita growth.

Fourthly, we find that by improving their social performance (higher average loan balance per borrower / GNI per capita, number of active borrowers and percentage of female borrowers), MFIs contribute significantly to economic development. More precisely, we show that women use their loans to consume, not to invest. Furthermore, our finding suggests that MFIs' resources should be spread qualitatively among those who need them most. In addition, we suggest that MFIs should increase the average loan balance per borrower in so far as it promotes GDP growth through investment improvement. Finally, we suggest that MFIs diversify their financial activities more, for example in housing loan, to be effective in breaking the poverty trap cycle.

APPENDIX

Table 1: Indicators of performance of MFI

Code	Definitions	Measurement	Sources
Financial Performance			
Ygpm	Yield on gross portfolio (real) (Weighted Average)	Yield on gross portfolio = Cash financial revenue from loan portfolio / Average gross loan portfolio	MixMarket
Roam	Return on assets (Weighted Average)	ROA = (Net operating income – Taxes) / Average assets	MixMarket
Oelpm	Operating expense / loan portfolio (Weighted Average)	Operating expense / loan portfolio	MixMarket
Ossm	Operational self-sufficiency (Weighted Average)	Operational self-sufficiency = financial revenues and costs + losses due to default + operating costs.	MixMarket
Plim	Provision for loan impairment / assets (Weighted Average)	Provision for loan impairment / assets	MixMarket
Pmm	Profit margin (Weighted Average)	Profit margin = Net operating income/ Operating revenue	MixMarket
Social Performance			
Nabm	Number of active borrowers (Sum)	Based on the number of individual borrowers rather than the number of groups.	MixMarket
Nacm	Number of Active Clients (Sum)	The number of individuals who are active borrowers, depositors, or both.	MixMarket
Albbm	Average loan balance per borrower / GNI per capita (Weighted Average)	Average loan balance per borrower / GNI per capita	MixMarket
Fbm	Percent of female borrowers (Weighted Average)	(Female borrowers/ Number of active borrowers) x 100	MixMarket
Controls			
Am	Assets (Sum)	Total assets	MixMarket
Glpn	Gross Loan Portfolio (Sum)	Gross Loan Portfolio (Sum)	MixMarket

Table 2: Indicators of financial performance of BANKs

Code	Definitions	Measurement	Sources
Banking system stability			
Bzscore	Banking system z-scores	$Bzscore = (ROA + (equity/assets)) / sd(ROA)$; $sd(ROA)$ is the standard deviation of ROA	TheGlobalEconomy
BCBD	Bank credit as percent of bank deposits	BCBD= Bank credit/ demand, time and saving deposits in deposit money banks	TheGlobalEconomy
BLAD	Bank liquid assets to deposits and short-term funding	BLAD = cash and due from banks, trading securities and at fair value through income, loans and advances to banks, reverse repos and cash collaterals/ total customer deposits (current, savings and term) and short term borrowing (money market instruments, CDs and other deposits)	TheGlobalEconomy
BCIR	Bank cost to income ratio, in percent	BCIR= sum of net-interest revenue / sum of operating income	TheGlobalEconomy
Banking system efficiency			
BIR	Bank interest revenue, percent of interest-bearing assets	BIR = Accounting value of bank's net interest revenue/ average interest-bearing (total earning) assets	TheGlobalEconomy
BOC	Bank overhead costs, percent of total assets	BOC = Operating expenses / total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax assets, discontinued operations and other assets	TheGlobalEconomy
BROA	Bank return on assets, in percent	BROA = net income/total assets	TheGlobalEconomy
BROE	Bank return on equity, in percent	BROE = amount of net income returned / shareholders' equity	TheGlobalEconomy
BNII	Bank non-interest income to total income, in percent	BNII = noninterest income / (net-interest income +noninterest income)	TheGlobalEconomy
Banking system depth / Controls			
BCPS	Bank credit to the private sector as percent of GDP	BCPS = loans+ purchases of nonequity securities+ trade credits and other accounts receivable, that establish a claim for repayment+ credit to public enterprises	TheGlobalEconomy
BA	Bank assets, percent of GDP	BA = claims on domestic real nonfinancial sector (central, state and local governments, nonfinancial public enterprises and private sector)	TheGlobalEconomy

Table 3: Macroeconomic Indicators

Code	Definitions and Measurement	Sources
Endogenous variables		
GDPc	GDP per capita, PPP (constant 2011 international) \$	WDI
GNlc	GNI per capita, PPP (constant 2011 international) \$	WDI, UNDP
GDPcgrowth	GDP per capita growth (annual %)	WDI
GNlcgrowth	GNI per capita growth (annual %)	WDI
Control variables		
Invest	Gross capital formation as a % of GDP	WDI
Inflat	Inflation: Annual percentages of average consumer prices are year-on-year changes	WDI
Expend	Government expenditures: Total expenditure consists of total expense and the net acquisition of nonfinancial assets. Expressed as a % of GDP.	WDI, TheGlobalEconomy
TOpenness	Trade openness: Sum of exports and imports of goods and services measured as a share of gross domestic product	WDI
Human ^{cap.}	Human capital Barro-Lee: average years of primary schooling, 15 + total	Education statistics, factfish
TFP	Total factor productivity: TFP level at current reference prices (USA = 1)	The Penn World Table 8.1, Federal Reserve Economic Data, Conference-board
Consump	Household consumption as percent of GDP	TheGlobalEconomy

Table 4: Descriptive statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
gdpcgrowth	1101	0.0330724	0.0425459	-0.190568	0.330305
ygpm	815	0.193091	0.1530429	-0.2038	1.7099
roam	1051	0.0120677	0.0799592	-0.9194	0.6686
oelpm	1052	0.2717608	0.5472552	0.0004	14.6558
ossm	1095	1.114536	0.3043417	0.07	4.3546
plim	1026	0.0188659	0.0265569	-0.065	0.4552
pmm	1087	-0.0102495	0.6491566	-13.2857	0.7704
albbm	1100	0.943962	1.266093	0.0036	16.1633
fbm	1080	0.4861666	0.2596191	0.0001	1.8714
nabm	1101	625489.5	2270618	2	2.72e+07
nacm	1101	189688.8	1044554	0	1.79e+07
am	1101	6.37e+08	2.23e+09	0	4.24e+10
glpm	1101	4.89e+08	1.38e+09	0	1.85e+10
nacm	1101	189688.8	1044554	0	1.79e+07
bzscore	1088	12.23528	8.383324	1.54	47.83
blad	1089	0.3672167	0.1837751	0	1.4447
bcir	1089	0.5967676	0.1373506	0	1.3913
bir	1083	0.0621782	0.0280971	0	0.2119
boc	1083	0.0528926	0.0427165	0	0.8331
broa	1083	0.0214703	0.0293728	-0.5154	0.2404
broe	1083	0.2161291	0.1836981	-0.4812	2.2669
bnii	1089	0.3796037	0.1340182	0	0.875
bcps	1086	29.3677	21.69611	0.45	140.15
ba	1087	35.12443	26.14478	0.63	170.58
invest	1078	23.16709	8.140725	0	60.1562
inflat	1071	55.13526	913.2945	-8.97474	24411
topenness	1089	74.19083	29.06961	22.106	199.675
expend	1081	13.82955	4.952405	2.05	32.23
humancap	999	4.327613	1.609063	0.89	10.95
tfp	695	0.458245	0.2018106	0.10542	1.15483
Consump	1063	72.45833	13.51906	28.79	133.11

Table 5: The Pearson correlation coefficients

Variables	gdpgrowth	ygm	roam	oelpm	ossm	plim	prmm	albm	ftm	namgrowth	namgrowth	GLPmgrowth	amgrowth
gdpgrowth	1.0000												
ygm	-0.0946*	1.0000											
roam	0.0733	0.1864*	1.0000										
oelpm	-0.0212	0.5840*	-0.1472*	1.0000									
ossm	0.1391*	0.0046	0.6229*	-0.1410*	1.0000								
plim	-0.1312*	0.3328*	-0.2591*	0.0905*	-0.2323*	1.0000							
prmm	0.0449	0.0411	0.6809*	-0.1579*	0.6292*	-0.2969*	1.0000						
albm	0.0845*	-0.1864*	0.0101	0.1759*	0.0493	-0.0275	0.0207	1.0000					
ftm	-0.0331	0.2376*	-0.0061	0.0756	-0.0663	0.0391	-0.0782	-0.2926*	1.0000				
namgrowth	-0.0005	-0.0152	0.0232	0.0428	-0.0266	-0.0107	-0.0171	-0.0223	-0.0659	1.0000			
namgrowth	-0.0011	0.0551	0.1520*	0.1668*	-0.0138	0.0550	-0.0093	-0.0033	0.0054	0.6125*	1.0000		
GLPmgrowth	0.0858*	-0.0434	0.0275	0.1528*	-0.0175	-0.0044	-0.0366	0.0028	-0.0696	0.3818*	0.4827*	1.0000	
amgrowth	0.0955*	-0.0572	0.0165	0.0996*	-0.0442	-0.0090	-0.0896*	-0.0080	-0.0501	0.2448*	0.4401*	0.8412*	1.0000
bzscore	-0.0024	0.0384	0.0943*	-0.0650	0.1046*	0.0125	0.0519	-0.0354	0.0780	0.0988*	0.0461	-0.0139	-0.0034
blad	0.0083	0.0167	-0.0072	0.1123*	-0.0680	0.0260	-0.1046*	0.1063*	0.0147	0.0303	0.0433	0.1309*	0.1040*
bair	-0.1892*	0.1527*	-0.0320	0.0698	-0.1120*	0.0735	-0.0286	0.0751	-0.0347	-0.0077	0.0316	-0.0555	-0.0711
bcbdgrowth	0.1551*	-0.0393	-0.0207	-0.0698	0.0477	0.0461	0.0220	0.0493	-0.1157*	-0.0242	-0.0780	-0.0397	-0.0506
brgrowth	-0.0791	-0.0622	-0.0190	0.0314	-0.0071	-0.0070	-0.0350	-0.0100	-0.0500	0.0091	0.0208	0.1522*	-0.0859*
bocgrowth	-0.0782	-0.0389	-0.0200	0.2382*	-0.0069	0.0149	-0.0294	-0.0100	-0.0327	0.0086	-0.0557	0.1487*	0.0823*
broagrowth	0.0751	0.0291	0.0103	0.0175	0.0149	-0.0168	0.0086	-0.0212	0.0124	0.0075	-0.0009	0.0284	-0.0084
broegrowth	-0.0744	0.0081	-0.0016	0.0176	-0.0091	-0.0096	-0.0158	-0.0119	0.0121	0.0095	0.0107	0.1520*	0.0851*
bnigrowth	-0.0182	0.0055	-0.0052	0.0430	-0.0036	0.0442	-0.0037	0.0043	0.0221	-0.0126	0.0096	-0.0150	0.0428
bcpgrowth	0.1415*	-0.0177	0.0046	-0.0464	0.0704	-0.0866*	0.0467	0.0904*	-0.0924*	-0.0097	-0.0532	0.0380	0.0069
bagrowth	0.0371	-0.0582	0.0114	-0.1137*	0.0070	-0.0478	0.0351	0.1100*	-0.1144*	-0.0147	-0.0764	0.0003	-0.0403
log(invest)	0.3350*	-0.1731*	-0.0014	-0.1481*	0.0737	-0.0449	0.0393	-0.0006	-0.0358	-0.0040	-0.0980	-0.0905*	-0.0585
log(openness)	0.1461*	-0.0665	-0.0192	-0.0079	-0.0524	-0.0052	-0.0272	0.2027*	-0.1333*	0.0438	-0.0098	0.0056	-0.0007
log(expend)	-0.0412	-0.0033	-0.1745*	0.0132	-0.0969*	0.0153	-0.0960*	0.0987*	-0.1476*	-0.0134	0.0061	-0.0276	-0.0018
log(humancap)	0.0965*	0.0725	0.0783	-0.0315	0.0575	0.0268	-0.0266	0.0076	-0.1393*	0.0227	0.0268	-0.0010	0.0021
log(tfp)	0.0518	0.1292*	0.1153*	-0.0929	0.1161*	0.0352	0.0162	-0.2950*	-0.0495	0.0459	0.0446	-0.0319	-0.0491
log(inflat)	-0.0442	-0.1201*	0.0436	0.0569	0.0327	0.0020	0.0272	0.0682	0.0102	-0.0100	0.0414	0.0839*	0.0782
log(consump)	-0.2263*	0.0529	-0.0141	0.0705	-0.0918*	0.0262	0.0185	0.0925*	0.0826*	-0.0406	-0.0378	-0.0368	-0.0853*

Variables	bzscore	blad	bair	bcbdgrowth	brgrowth	bocgrowth	broagrowth	broegrowth	bnigrowth	bcpgrowth	bagrowth	log(invest)	log(openness)
bzscore	1.0000												
blad	-0.1472*	1.0000											
bair	-0.1300*	0.0234	1.0000										
bcbdgrowth	-0.0254	-0.0654	-0.1042*	1.0000									
brgrowth	-0.0219	0.1258*	-0.0559	-0.0599	1.0000								
bocgrowth	-0.0225	0.1280*	-0.0543	-0.0577	0.9979*	1.0000							
broagrowth	0.0736	0.0127	0.0519	-0.0199	0.0809	0.0565	1.0000						
broegrowth	-0.0175	0.1293*	-0.0525	-0.0635	0.9941*	0.9959*	0.7128*	1.0000					
bnigrowth	0.0543	0.1016*	0.0627	-0.0859*	-0.0840*	0.0841*	-0.0154	-0.0065	1.0000				
bcpgrowth	-0.1063*	0.0887*	-0.0315	0.4053*	-0.1314*	-0.1269*	0.0043	-0.1260*	-0.0749	1.0000			
bagrowth	-0.1260*	0.0708	-0.0638	0.4699*	-0.0442	-0.0390	-0.0307	-0.0397	-0.0987*	0.5587*	1.0000		
log(invest)	0.1931*	-0.2645*	-0.2287*	0.1980*	-0.1472*	-0.1464*	-0.0206	-0.1480*	-0.0905*	0.0234	0.0993*	1.0000	
log(openness)	0.1449*	-0.0001	-0.1076*	0.0023	0.0070	0.0082	-0.0209	0.0060	-0.0256	0.1052*	0.1520*	0.1519*	1.0000
log(expend)	0.0344	-0.0498	0.1518*	-0.0113	0.0379	0.0402	-0.0281	0.0373	0.0325	-0.0047	0.0552	0.0507	0.0243
log(humancap)	0.0497	0.0014	0.0140	0.0889*	0.0170	0.0176	-0.0269	0.0129	0.0143	0.0081	-0.0436	-0.0343	0.1120*
log(tfp)	0.2485*	-0.2345*	-0.2209*	0.0062	-0.0078	-0.0091	-0.0374	-0.0113	-0.0468	-0.0820	-0.0610	0.1525*	-0.0776
log(inflat)	-0.1800*	0.2366*	0.0067	0.0541	0.1280*	0.1221*	-0.0452	0.1182*	0.0504	-0.0150	-0.0051	-0.2233*	0.0003
log(consump)	-0.0608	0.2375*	0.1337*	-0.0882	0.0221	0.0225	0.0558	0.0243	0.0013	0.0333	0.0142	-0.2769*	0.0294

Variables	log(expend)	log(humancap)	log(tfp)	log(inflat)	log(consump)
log(expend)	1.0000				
log(humancap)	0.0497	1.0000			
log(tfp)	-0.1106*	0.3496*	1.0000		
log(inflat)	-0.1754*	0.1100*	-0.0370	1.0000	
log(consump)	-0.1014*	-0.1854*	-0.4703*	0.1401*	1.0000

***, **, and * denote significance respectively at 1%, 5%, and 10%.

Table 6: Other tests

gdpgrowth	(1) FE model	(2) RE model	(3) IV model
ygpm	-0.0160701 (0.0222581)	-0.02026 (0.0223512)	-0.0294794 (0.0901393)
roam	-0.3202838*** (.1101177)	-0.1539581 (0.0970972)	-1.017634 (2.203136)
oelpm	0.1630406*** (.0383872)	0.1016044*** (0.0268725)	0.1327054 (0.1576764)
ossm	-0.0144252 (0.0707264)	-0.0300347 (0.0336459)	0.1842883 (0.3841843)
plim	0.288592 (.2702836)	-0.0002581 1 (.2302848)	0.30888 (1.009815)
pmm	0.0565621 (0.074833)	0.0775466** (0.0377595)	0.1000532 (0.328213)
albbm	0.011675 (0.0101025)	0.0084615* (0.0045376)	-0.0224011 (0.0404853)
fbm	0.0200871 (0.015186)	0.0114624 (0.0120491)	0.0217786 (0.0401114)
nabmgrowth	0.3763471*** (0.0623293)	0.2511797*** (0.0552053)	0.4098623 (0.3731764)
nacmgrowth	-0.0163785 (0.0147732)	-0.0146339 (0.0145507)	-0.0856021* (0.0516678)
bzscore	0.000892 (0.0009768)	-0.0001829 (0.0004627)	0.0036508 (0.005538)
blad	0.0820874 (0.0527413)	0.059276*** (0.0214081)	0.2217106 (0.225607)
bcir	-0.0188424 (0.0427676)	0.0158369 (0.0329434)	-0.1204529 (0.1568254)
bcbdgrowth	0.0877818** (0.0400974)	0.0824662** (0.0340396)	0.1811308 (0.2711635)
birgrowth	-0.0011683 (0.0066715)	0.0002531 (0.0065323)	-0.0370761 (0.0487504)
bocgrowth	0.0066976 (0.0052127)	0.0001767 (0.0046706)	0.0413044 (0.0454942)
broagrowth	-0.0021351 (0.0017726)	-0.0011993 (0.0015974)	0.001331 (0.025367)
broegrowth	0.0000978 (0.0009113)	-0.0003785 (0.0009182)	-0.0096748 (0.0306211)
bniigrowth	0.0183888* (0.0103246)	0.0036889 (0.0096172)	0.0594241* (0.0311289)
log(invest)	0.0415174* (0.0244248)	0.0435676*** (0.0131537)	0.0701786 (0.1136266)
log(topenness)	0.0236423 (0.0291692)	0.0099059 (0.0109705)	-0.1893699 (0.2258794)
log(expend)	-0.0796763** (0.0370287)	-0.0290768** (0.0133319)	0.0393939 (0.172603)
log(human.cap)	-0.0868765 (0.0632353)	0.0211029** (0.0096921)	-0.224665 (0.2160814)
log(tfp)	0.0008238 (0.0285293)	0.005475 (0.0103636)	0.1153227 (0.0971133)
log(inflat)	-.0043117 (0.0049992)	0.0001736 (.0034936)	0.0004946 (0.0222384)
Log(consump)	-0.0234691 (0.0533361)	-0.0373374 (0.0230715)	-0.5026236 (0.4456384)
GLPmgrowth	-0.5547449 (0.1132163)	-0.355041*** (0.0997233)	-0.5343773 (0.5550504)
amgrowth	0.2266218** (0.0908294)	0.1810282** (0.0858426)	0.0448106 (0.3419327)
bcpsgrowth	0.0065666 (0.0136376)	-0.0008132 (0.0137527)	0.0642031 (0.0536095)
bagrowth	-0.0374906 (0.033857)	-0.046538 (0.0316907)	-0.1745717 (0.1586313)
cons	0.1850679 (0.3357683)	0.0476994 (0.1360595)	2.756874 (1.966609)
R-sq:	0.4230	0.3497	0.1565
	Test that all $u_i=0$: F(39,97)=3.55 Prob>F= 0.0000	Breusch-Pagan test F(30,136)=60.09 Prob>F= 0.0000	Durbin-Wu-Hausman test F(30,64)=2.89007 p= 0.0002

Values in parentheses are robust standard errors. ***, **, and * denote significance respectively at 1%, 5%, and 10%.

Table A1: GMM results with GDP per capita growth

gdpgrowth	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
gdpgrowthL1.	-0.0070146 (0.1053713)	0.2483034*** (0.0959735)	-0.049582 0.0836555	0.2289247*** (0.0778924)	-0.1714434 (0.197519)	0.002218 (0.0683363)	-0.0222204 (0.1011303)	-0.5852807 (0.5355885)
Ygpm		-0.0140521 (0.027928)	0.0293709 (0.0203839)		0.0220374 (0.0257396)		0.0446382 (0.0294392)	-0.0088082 (0.0379912)
Roam		0.0574081 (0.0623922)	-0.0255413 (0.1094529)		-0.1482299 (0.3503114)		-0.0835667 (0.1499487)	-2.327784 (1.54456)
Oelpm		0.0206734 (0.0212257)	-0.0175265 (0.0303589)		0.0160859 (0.0755426)		-0.0427952 (0.0355513)	0.0374744 (0.0878221)
Ossm		0.0224939 (0.0207163)	-0.0092401 (0.0229268)		-0.0379668 (0.1142862)		-0.0161965 (0.024322)	0.2055698 (0.2394178)
Plim		-0.1441704 (0.0999949)	-0.426157** (0.1955472)		-0.2004978 (0.4822678)		-0.3648331 (0.2519312)	0.2354641 (0.6986623)
Pmm		0.0184825 (0.0194949)	0.0182278 (0.0181067)		0.0046227 (0.1364122)		0.0277393 (0.0238071)	0.2997139 (0.2348195)
Albbm	0.0009508 (0.0018998)		0.0021553 (0.0065452)		0.0117239 (0.0130526)		-0.001786 (0.0061465)	0.0458668* (0.026361)
Fbm	-0.003185 (0.0087127)		0.0082392 (0.0054)		0.0187646* (0.0104284)		0.0103276* (0.0060545)	0.0191448** (0.0077421)
nabmgrowth	0.0162147 (0.0207687)		-0.0174436 (0.0781833)		0.1515973 (0.2551202)		0.0428644 (0.1072737)	0.6576526** (0.3290668)
nacmgrowth	-0.0057124 (0.0091095)		-0.0104809 (0.0087439)		-0.0104981 (0.0116619)		-0.0081449 (0.0098927)	0.0202738 (0.0210999)
Bzscore				-0.0005712 (0.0007948)		-0.0004838 (0.0007783)	-0.0012399 (0.0010649)	0.0017638 (0.0014637)
Blad				0.0343505* (0.0188886)		0.0672303** (0.0336644)	-0.011926 (0.0352147)	0.2064007* (0.1059216)
Bcir				-0.0140002 (0.015019)		0.0107843 (0.0199616)	-0.0259382 (0.0380927)	0.1028717 (0.0811256)
bcbdgrowth				0.0519875*** (0.0142858)		0.0519644 (0.0348095)	0.0480681* (0.0289655)	0.0693366 (0.0479215)
birgrowth				0.0008756 (0.0041818)		0.0011555 (0.0066587)	-0.0031583 (0.0023762)	-0.0053504 (0.0065134)
bocgrowth				-0.0071678* (0.0043238)		-0.0073531 (0.0069697)	0.0036341 (0.0022493)	0.0110326 (0.007185)
broagrowth				0.0003785* (0.0002276)		0.0003225 (0.0002374)	-0.0006557 (0.0010485)	-0.0001322 (0.0020107)
broegrowth				-0.0000642 (0.000325)		-0.0002964 (0.0003063)	0.0003951 (0.0007683)	0.0005337 (0.0012678)
bnlirowth				0.0041912 (0.0061052)		0.0013829 (0.0025307)	0.0161508** (0.0055792)	0.0291748** (0.0136559)
log(invest)					0.0247888 (0.0375617)	0.067888*** (0.0150217)		-0.0238231 (0.0718237)
log(openness)					0.0042346 (0.0455125)	0.0249157 (0.0239407)		0.0759387 (0.0766113)
log(expend)					-0.0242002 (0.026816)	0.0180832 (0.042739)		-0.1475638** (0.0656963)
log(humancap)					-0.10516 (0.1268249)	-0.1256816** (0.0587352)		0.0696759 (0.1498852)
log(tfp)					0.0327407 (0.0395258)	-0.0363135 (0.030313)		0.0579948 (0.0542064)
log(inflat)					-0.0033307 (0.0037345)	-0.0015857 (0.0030353)		-0.0014297 (0.0070501)
log(consump)					-0.0416112 (0.0574438)	-0.1199078* (0.0657479)		0.0723506 (0.0774933)
GLPmgrowth					-0.1773861 (0.3598698)			-1.325502* (0.7296198)
amgrowth					0.1688452 (0.1369085)			-0.4673036 (0.5130991)
bcpgrowth						0.0351289** (0.0171094)		-0.0273596 (0.0249)
bagrowth						-0.0970607*** (0.034005)		0.0170479 (0.0582335)
cons	0.0357953*** (0.0067548)	-0.0008332 (0.0200128)	0.0586315*** (0.0244622)		0.3923922 (0.4349474)		0.0981779** (0.0414654)	

Values in parentheses are robust standard errors. ***, **, and * denote significance respectively at 1%, 5%, and 10%.

Table A2: GMM results with Investment as channel transmission (for GDP)

log(invest)	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
log(investL1.)	0.8661274*** (0.1596145)	0.4949625*** (0.08891)	0.9397149*** (0.1955382)	0.5527662*** (0.0678356)	0.4641616** (0.1885776)	0.6168806*** (0.177613)	0.9643816*** (0.1581477)	0.9373552** (0.4056071)
ygpm		0.0054154 (0.0558192)	0.1626184 (0.1197402)		0.0723586 (0.0892686)		0.1530704 (0.1402663)	0.1384649 (0.1667586)
roam		-0.3653615 (0.3541858)	-0.3449995 (0.4836267)		-0.657427 (1.150222)		-0.1678583 (0.6225729)	-1.167407 (2.183314)
oelpm		-0.0991754 (0.066023)	-0.0784692 (0.1507089)		-0.1854726 (0.2547383)		-0.1128843 (0.2255384)	0.0211153 (0.4681514)
ossm		0.0167475 (0.077527)	0.1392449 (0.1334708)		0.125773 (0.3229207)		0.1753244 (0.1473636)	-0.5365056 (0.7761076)
plim		-0.2354599 (0.4118403)	-1.613564** (0.6881308)		-0.0217216 (1.610511)		-1.853607* (0.9661192)	-3.512958 (2.255314)
pmm		0.1051286 (0.1231808)	-0.1478371 (0.1090682)		-0.0194482 (0.317181)		-0.2197288 (0.1705834)	0.481461 (0.7976411)
albbm	0.0106746 (0.0138915)		0.0374331 (0.0446132)		-0.016988 (0.0615638)		0.0385352 (0.0623894)	0.0865018* (0.0480764)
fbm	-0.0314537 (0.0645115)		-0.0951273* (0.0525994)		-0.1399126*** (0.0537901)		-0.1160217** (0.0577286)	-0.0103177 (0.0566645)
nabmgrowth	-0.1265526 (0.0990117)		-0.0834282 (0.1480384)		-0.4339427 (0.5852422)		-0.145246 (0.2174374)	1.047657 (0.9362193)
nacmgrowth	-0.0603297 (0.0627472)		-0.067545 (0.047107)		-0.0212635 (0.0416407)		-0.0527767 (0.0646903)	-0.00537 (0.0966766)
bzscore				-0.0014066 (0.0027249)		-0.003627 (0.0022252)	-0.0047681 (0.0099426)	-0.000415 (0.0047922)
blad				-0.2227522** (0.0880907)		-0.0240316 (0.2381358)	0.0310572 (0.2557351)	1.670645* (0.8879836)
bcir				-0.0676387 (0.1052287)		0.0384064 (0.125083)	0.0230284 (0.1630389)	0.0487521 (0.2965211)
bcbdgrowth				0.2531073** (0.1095228)		0.4277992 (0.3257426)	0.0513443 (0.1705462)	0.140931 (0.4392831)
birgrowth				0.0154864 (0.021649)		0.0144575 (0.0225841)	-0.0083586 (0.0271532)	-0.0501102 (0.0398295)
bocgrowth				-0.025305* (0.0153358)		-0.0106035 (0.0114985)	0.0082579 (0.0209781)	0.0801193** (0.0383519)
broagrowth				-0.0003295 (0.0006504)		-0.0014719*** (0.0003712)	-0.0003121 (0.0043812)	-0.0201872* (0.0115468)
broegrowth				0.0017522* (0.0009632)		0.0030202*** (0.0005557)	0.0015537 (0.002114)	0.0079232*** (0.0028995)
bniigrowth				0.0163161 (0.0160215)		-0.0084707 (0.011756)	0.0072013 (0.0396592)	0.1220489 (0.0946789)
gdpcgrowth					1.036476 (0.8102303)	1.451807** (0.6753079)		-1.044344 (1.172145)
log(topeness)					0.5975676*** (0.1772213)	0.2406444* (0.1261771)		0.7807207*** (0.2537205)
log(expend)					0.0303703 (0.1430866)	-0.0211214 (0.1736126)		-0.2860291 (0.5189645)
log(humancap)					0.1990297 (0.4093815)	0.3909255 (0.2833675)		0.0297896 (0.862439)
log(tfp)					-0.0077409 (0.0825682)	0.087649 (0.2275794)		0.1020277 (0.4336215)
log(inflat)					0.0040116 (0.0132921)	0.0285534* (0.015168)		-0.0212957 (0.0162476)
GLPmgrowth					0.4976042 (0.9493252)			-1.297632 (1.274406)
amgrowth					-0.2306939 (0.4752694)			0.4874347 (0.7465215)
bcpsgrowth						-0.0309236 (0.0925366)		-0.0626023 (0.0621461)
bagrowth						-0.2354988 (0.2685086)		0.6355049*** (0.2330089)
cons	0.4484379 (0.4923356)		0.1069845 (0.7056495)				0.0444214 (0.595602)	-2.284781 (4.202292)

Values in parentheses are robust standard errors. ***, **, and * denote significance respectively at 1%, 5%, and 10%.

Table A3: GMM results with Consumption as channel transmission (for GDP)

log(consump)	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
Log(consumpL1.)	0.3277797 (0.2158518)	0.3164869*** (0.1166117)	0.5524244*** (0.0635522)	0.4759893*** (0.0854117)	0.662175*** (0.0565395)	0.3706782*** (0.1344006)	0.5628699*** (0.0464514)	0.7191164*** (0.0704934)
ygpm		-0.034269 (0.0265364)	-0.0519832 (0.0340425)		-0.0362977 (0.0289109)		-0.0755211** (0.0297006)	-0.0624104* (0.0369295)
roam		0.096258 (0.0811341)	0.0687817 (0.0850687)		-0.1003616 (0.1185365)		0.0260949 (0.0706325)	-0.382441 (0.3788512)
oelpm		0.0099614 (0.019162)	0.073206 (0.0517561)		0.0395225 (0.0508414)		0.085335** (0.0372743)	0.0587157 (0.0466363)
ossm		0.0083416 (0.0179)	0.0246581 (0.031809)		0.0192441 (0.0221947)		0.018547 (0.0218406)	0.0191428 (0.0313036)
plim		0.061729 (0.0703261)	0.430069 (0.2775659)		0.3685369 (0.2526524)		0.6881314** (0.3190522)	0.6393769* (0.3789706)
pmm		-0.0076937 (0.0145746)	0.0257346 (0.0499554)		0.0681996** (0.0296714)		0.039305 (0.0339268)	0.0982148** (0.0422935)
albbm	-0.0019722 (0.0058711)		-0.0175365 (0.0133072)		-0.0229682 (0.0160741)		-0.0102611 (0.0130606)	-0.0082052 (0.0125667)
fbm	0.0079171 (0.0227087)		0.014857*** (0.0057249)		0.0232364*** (0.0084937)		0.0179207* (0.0106079)	0.0315963*** (0.0091442)
nabmgrowth	-0.0287952 (0.112436)		-0.0500182 (0.0821607)		-0.0306226 (0.0588742)		-0.0401678 (0.0679873)	0.0225142 (0.0833611)
nacmgrowth	-0.0119642 (0.0217654)		0.0101599 (0.01872)		0.0217012 (0.0199947)		0.0058311 (0.0154254)	0.0253989 (0.0235691)
bzscore				-0.0010519 (0.0010794)		0.0004686 (0.0009333)	-0.0002405 (0.001061)	-0.0000295 (0.0028472)
blad				0.0243626 (0.0277593)		-0.00738 (0.030455)	0.1087933** (0.0527224)	0.1457264** (0.0742752)
bcir				-0.0069775 (0.0242017)		0.0170294 (0.0218487)	-0.0134823 (0.0477755)	-0.0040506 (0.0591406)
bcbdgrowth				0.0046127 (0.0287661)		-0.0450635* (0.0255488)	0.0948751** (0.0474538)	0.0373996 (0.0621099)
birgrowth				0.0013458 (0.0060612)		-0.0007015 (0.005031)	0.0078942 (0.0071827)	-0.0038529 (0.0071855)
bocgrowth				0.0017794 (0.004059)		0.0002398 (0.0031035)	-0.0028862 (0.0069934)	0.0077479 (0.0063642)
broagrowth				-0.0004477*** (0.0001419)		-0.0002944 (0.0002389)	-0.0006596 (0.0007133)	-0.0002836 (0.0017469)
broegrowth				0.0004906 (0.0002369)		0.0003945 (0.0003574)	-0.0009372** (0.0004834)	-0.0009462 (0.0010007)
bnligrowth				0.0030568 (0.0038255)		0.006726 (0.0053187)	-0.0027288 (0.0081468)	0.0092825 (0.0079925)
gdpcgrowth					-0.5417252*** (0.1715628)	-0.2941261*** (0.1002504)		-0.4885438*** (0.1702417)
log(invest)					0.0174829 (0.0382102)	-0.0491252** (0.0216805)		-0.0245387 (0.0390432)
log(openness)					-0.0441593 (0.0531323)	0.0321389 (0.033069)		-0.0189727 (0.0520589)
log(expend)					-0.0094685 (0.0484091)	-0.0619035** (0.0173825)		-0.0641023 (0.0508738)
log(inflat)					0.0019193 (0.0071391)	0.0011427 (0.0030246)		0.0021149 (0.0056324)
GLPmgrowth					0.0408349 (0.0753818)			-0.0944768 (0.1665862)
amgrowth					-0.1852412* (0.1096623)			-0.2424529* (0.131776)
bcpsgrowth						0.0251714 (0.0166058)		0.0154731 (0.0401224)
bagrowth						0.0895291*** (0.0298016)		0.1184364** (0.0582241)
cons	2.873333*** (0.9251937)		1.868838*** (0.2616868)		1.590837*** (0.2901794)		1.787507*** (0.1899818)	

Values in parentheses are robust standard errors. ***, **, and * denote significance respectively at 1%, 5%, and 10%.

Table A4: GMM results with Human capital as channel transmission (for GDP)

	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
log(humancap)	0.7464875***	0.743383***	0.7237053***	0.7675235***	0.6451037***	0.6329079***	0.7169851***	0.7095116***
log(humancapL1.)	(0.0516822)	(0.0803266)	(0.1169859)	(0.0600039)	(0.1305909)	(0.0893108)	(0.0921661)	(0.0862186)
ygpm		0.0187093	0.0233322		0.034428		0.0051978	0.0336198
		(0.0116811)	(0.0259312)		(0.0232618)		(0.0238111)	(0.0327539)
roam		-0.0691583	0.0801538		-0.0291536		0.1186801**	-0.0659914
		(0.0929378)	(0.1221316)		(0.0691886)		(0.0568631)	(0.0952503)
oelpm		-0.0287613	-0.0515978		0.0029363		-0.0317495	0.0274405
		(0.0169491)	(0.0418633)		(0.0420677)		(0.0454771)	(0.051063)
ossm		-0.0099301	-0.0082911		-0.0050305		0.0074752	0.0039331
		(0.0121065)	(0.0688157)		(0.0750687)		(0.0360009)	(0.04416)
plim		-0.0104368	0.1307255		0.0330782		0.1502891	0.0041839
		(0.0337826)	(0.2421394)		(0.2835429)		(0.3017374)	(0.2511628)
pmm		0.0100675	-0.0096764		-0.0142743		-0.0250795	-0.0131888
		(0.0098337)	(0.0577765)		(0.0621089)		(0.036488)	(0.0306095)
albbm	-0.0021796		-0.008546		-0.0061805		-0.0111641	-0.0036831
	(0.0032764)		(0.0065244)		(0.0057635)		(0.0081557)	(0.0090105)
fbm	-0.000984		0.0119632		0.0152523		0.022491	0.0244879
	(0.0166009)		(0.0107163)		(0.0177552)		(0.0205772)	(0.0178815)
nabmgrowth	0.0097054		0.0057732		0.1385496***		0.0189884	0.1784837***
	(0.0129746)		(0.0362138)		(0.0510255)		(0.0311751)	(0.0586623)
nacmgrowth	-0.0122543		-0.0144985		-0.0281899		-0.0180244	-0.0287566
	(0.0117953)		(0.0170076)		(0.0196461)		(0.0224004)	(0.0252016)
bzscore				-0.0002944			0.0000831	0.0005246
				(0.0006259)			(0.0004966)	(0.0017418)
blad				-0.0546699***			0.0250767	0.061466*
				(0.0211854)			(0.039133)	(0.0348414)
bcir				-0.0141466*			-0.0384755	-0.0540106
				(0.007622)			(0.0088121)	(0.0406355)
bcbdgrowth				-0.0249792***			-0.0103799	0.0821961
				(0.0092699)			(0.01112)	(0.0511882)
birgrowth				-0.0047086**			-0.0016105	0.0047
				(0.0019792)			(0.002413)	(0.0064617)
bocgrowth				0.001401			0.0003976	-0.0007343
				(0.0013182)			(0.0012382)	(0.0046335)
broagrowth				70.03e-06			0.0000113	-0.0011766
				(0.0000294)			(0.0000348)	(0.000971)
broegrowth				-0.0000579			-0.0001056	0.000314
				(0.0001175)			(0.0001001)	(0.0008632)
bnligrowth				70.06e-06			-0.0007197	0.0021077
				(0.001725)			(0.0020161)	(0.0088387)
gdpcgrowth					-0.2234578**		-0.0296046	-0.3016836**
					(0.1039033)		(0.034533)	(0.1200848)
log(invest)					0.0050295		0.0177812*	0.0018816
					(0.0251418)		(0.0094448)	(0.0275643)
log(topeness)					0.0230787		0.0120776	0.0324263
					(0.0258488)		(0.0093258)	(0.0283562)
log(expend)					-0.0137418		0.0055048	-0.0261784
					(0.0327103)		(0.0069862)	(0.0371737)
log(inflat)					0.0037853		-0.000152	0.004565
					(0.0041041)		(0.001206)	(0.004423)
GLPmgrowth					-0.27002**			-0.3169089***
					(0.1211835)			(0.1181277)
amrgrowth					0.1007663*			0.1210782
					(0.0556206)			(0.0758041)
bcpsgrowth						0.0015232		-0.0111977
						(0.0042625)		(0.0216632)
bagrowth						-0.0143679**		-0.0215177
						(0.0062393)		(0.0293374)
cons	0.3545372***		0.4088179***		0.4253384		0.3974427***	
	(0.0734773)		(0.1983741)		(0.262504)		(0.1455582)	

Values in parentheses are robust standard errors. ***, **, and * denote significance respectively at 1%, 5%, and 10%.

Table B1: GMM results with GNI per capita growth

gnicgrowth	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
gnicgrowthL1.	-0.3069777*** (0.0637947)	0.0072625 (0.0613325)	-0.3667292*** (0.0684999)	0.0371122 (0.0644264)	-0.3193412*** (0.1148345)	-0.0544096 (0.0891916)	-0.4040747*** (0.045675)	-0.9205718 (0.5657999)
ygpm		-0.0171679 (0.0211525)	0.0023623 (0.0310664)		-0.0368747 (0.0415689)		0.0106245 (0.0319303)	-0.0684929 (0.0452276)
roam		0.0417798 (0.1008264)	-0.1171563 (0.093541)		-0.1580189 (0.2034396)		-0.0529383 (0.1102403)	0.2113532 (0.5362593)
oelpm		0.0204408 (0.0170443)	0.0116393 (0.0587244)		0.1199689 (0.0827891)		0.0043055 (0.0462948)	-0.0481015 (0.1630611)
ossm		0.0336946 (0.0296117)	-0.0513046 (0.0440401)		-0.0571466 (0.0979818)		-0.0297601 (0.0232933)	0.1497071 (0.2244414)
plim		-0.1279265 (0.114989)	0.0459325 (0.43898)		0.636276 (0.7348584)		0.195605 (0.3133179)	-0.4145338 (1.363618)
pmm		-0.0016264 (0.0245342)	0.1237523* (0.0717609)		0.098337 (0.0981176)		0.0622647 (0.0404007)	-0.187777 (0.1886303)
albbm	0.0041394 (0.0028308)		0.0004643 (0.0067419)		0.0095628 (0.0087184)		-0.004129 (0.0066176)	-0.0204751 (0.0231432)
fbm	0.0047565 (0.00841)		0.0022905 (0.0060272)		0.009795 (0.0080336)		0.0110039 (0.0114544)	0.005145 (0.0082591)
nabmgrowth	0.0038245 (0.0297537)		0.1737106 (0.1837914)		0.3416191* (0.2062443)		0.1915592 (0.1434532)	0.0703404 (0.411081)
nacmgrowth	-0.0278565* (0.0158751)		-0.0138667 (0.017774)		-0.0004886 (0.0169515)		-0.0346182** (0.0146773)	0.0077977 (0.0233201)
bzscore				-0.0002006 (0.0011916)		-0.0004505 (0.0010875)	-0.0010258 (0.0012071)	-0.00082 (0.002104)
blad			0.0543166** (0.0270921)			0.0715065* (0.0399512)	0.0028108 (0.0409901)	0.0536352 (0.0514228)
bcir			-0.0296622 (0.0198548)		-0.0208925 (0.0436703)	-0.0208925 (0.0462623)	0.0364248 (0.0748298)	-0.0228742 (0.1133169)
bcbdgrowth			0.0760215*** (0.0281261)		0.0670112* (0.0501016)	0.0670112* (0.0490073)	0.0748298 (0.0490073)	0.0906676 (0.073842)
bigrowth			-0.005644 (0.00814)		-0.0055555 (0.009362)	-0.0055555 (0.009362)	0.0046852 (0.0041697)	0.0261188** (0.0130568)
bocgrowth			-0.0060145* (0.0035732)		-0.0033073 (0.005079)	-0.0033073 (0.005079)	-0.0051358 (0.0032792)	-0.0064569 (0.0048046)
broagrowth			0.0000585 (0.0002776)		-0.0000256 (0.0003391)	-0.0000256 (0.0003391)	0.0009093 (0.0013447)	0.0019809 (0.001896)
broegrowth			0.0001093 (0.0003246)		0.0001519 (0.0004252)	0.0001519 (0.0004252)	-0.0009845 (0.0007727)	0.0003279 (0.0017589)
bnilgrowth			0.0034396 (0.00338)		0.0051681 (0.0059845)	0.0051681 (0.0059845)	0.0138819 (0.0104095)	-0.0036816 (0.0149834)
log(invest)					0.0736605*** (0.0246126)	0.0587987** (0.0276354)		0.0805349** (0.0365253)
log(topenness)					-0.0407634 (0.059173)	0.0124948 (0.0304809)		-0.2267468 (0.1588783)
log(expend)					-0.0438341 (0.0413101)	-0.0288607 (0.0314059)		0.0809354 (0.1107339)
log(humancap)					-0.0558987 (0.0778613)	-0.0856994* (0.0454159)		0.112577 (0.1745101)
log(tfp)					0.0015219 (0.0649449)	-0.006428 (0.0342769)		-0.0145665 (0.0578981)
log(inflat)					-0.0045483 (0.0055986)	-0.0018618 (0.0037509)		-0.0067707 (0.0072506)
Log(consump)					-0.1192534 (0.0835873)	-0.0065525 (0.0702922)		-0.1069016 (0.1322214)
GLPmgrowth					-0.236691 (0.2988474)			2.030485 (1.368223)
amgrowth					0.2039489 (0.2185837)			-1.845136 (1.536914)
bcpsgrowth						0.0268691 (0.0271625)		-0.0159065 (0.0251275)
bagrowth						-0.1036361* (0.0590453)		-0.0531919 (0.0424399)
cons	0.0458607*** (0.0070263)	-0.0047437 (0.0326215)	0.1040133*** (0.0342948)				0.0680776* (0.0409088)	

Values in parentheses are robust standard errors. ***, **, and * denote significance respectively at 1%, 5%, and 10%.

Table B2: GMM results with Investment as channel transmission (for GNI)

	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
log(invest)	0.9562739***	0.734681***	1.075028***	0.6799862***	0.4193527*	0.6548508***	0.9598189***	1.243841*
log(investL1.)	(0.1704064)	(0.1124245)	(0.1522894)	(0.0822785)	(0.2204412)	(0.1156321)	(0.1060979)	(0.7229031)
yghm		-0.0204075 (0.0473243)	0.1254641 (0.1146123)		0.1245398 (0.1841026)		0.1240163 (0.1111182)	0.2903676 (0.7444551)
roam		-0.2967757 (0.3161873)	0.0367056 (0.3079762)		-1.378976 (2.386067)		-0.2672603 (1.155153)	2.165184 (2.332036)
oelgm		-0.0631066 (0.0574979)	-0.0746602 (0.1114412)		-0.636969 (0.6136075)		-0.170144 (0.1954037)	0.0466023 (1.005796)
ossm		0.2094297*** (0.076168)	0.2883065 (0.180259)		-0.0825378 (1.177751)		0.2666137 (0.186102)	1.306646 (1.206373)
plim		-0.7072554* (0.3741572)	-1.243655* (0.6812218)		0.9077301 (3.534652)		-1.446029* (0.8776202)	2.901402 (4.37203)
pmm		-0.1548252* (0.0682604)	-0.3624229 (0.239944)		0.2884126 (1.199101)		-0.331499 (0.3216241)	-2.142212* (1.191997)
albbm	0.0093368 (0.0119097)		0.0322322 (0.0385692)		-0.0167676 (0.0700555)		0.0392008 (0.060367)	0.1584146** (0.0737803)
fbm	-0.0163705 (0.0592529)		-0.0749331 (0.0725389)		-0.1425468** (0.0638989)		-0.1003775 (0.0840906)	-0.1578142** (0.0755267)
nabmgrowth	-0.0729864 (0.1092862)		-0.3304248** (0.1500123)		-0.4948041 (0.5724495)		-0.3157292 (0.2854351)	-1.440792 (1.090911)
nacmgrowth	-0.0477597 (0.0712731)		-0.0765068 (0.0480045)		-0.0246725 (0.0565956)		-0.0579842 (0.0831544)	-0.0628341 (0.1567637)
bzscore				-0.0029016 (0.0035545)		-0.000403 (0.0035044)	-0.0102174 (0.0089397)	-0.0077959 (0.0147416)
blad				-0.1089332 (0.0722801)		-0.1080009 (0.1273497)	0.0811895 (0.2615232)	0.4711691 (0.9884927)
bcir				-0.1178102** (0.0530038)		0.0571745 (0.1242347)	0.0067547 (0.1218327)	0.8182236 (0.8394829)
bcbdgrowth				0.1395384** (0.0682929)		0.0060229 (0.3458418)	0.0648579 (0.2656284)	0.2173032 (0.5282168)
birgrowth				0.017021 (0.0191739)		0.0061036 (0.0175636)	-0.0003415 (0.0299491)	0.0325922 (0.0546663)
bocgrowth				-0.0186956 (0.0151633)		-0.0038231 (0.0130017)	0.0003235 (0.0168029)	-0.0129151 (0.0302268)
broagrowth				-0.0007389 (0.0005703)		-0.000737** (0.0003399)	-0.0002921 (0.0035962)	0.0058772 (0.0190109)
broegrowth				0.0022546*** (0.0007782)		0.0022898*** (0.000643)	0.0013531 (0.0021113)	0.0092214** (0.0040032)
bniigrowth				-0.0056389 (0.0090051)		-0.0129886 (0.0141845)	0.0038584 (0.0409472)	-0.0088713 (0.1243954)
gnicgrowth					0.7923269 (0.5579007)	1.145689*** (0.3853164)		2.0423 (1.278233)
log(topeness)					0.4893514** (0.1949547)	0.2579465 (0.2337753)		0.5941635* (0.3121723)
log(expend)					0.0527404 (0.1502793)	-0.2783258 (0.3178946)		-0.2379058 (0.4276792)
log(humancap)					-0.0582099 (0.4269855)	0.1362163 (0.3344456)		0.7935674 (1.414485)
log(tfp)					0.0523993 (0.1431303)	0.0626393 (0.2808981)		-0.693035 (0.4830413)
log(inflat)					0.0009107 (0.0181882)	0.0046888 (0.0098373)		0.0158033 (0.0641589)
GLPmgrowth					0.1322042 (1.237917)			1.970119 (2.463659)
amgrowth					0.7252223 (1.150016)			0.0602148 (3.040383)
bcpsgrowth						0.1069416 (0.1180351)		0.1562683 (0.1960645)
bagrowth						-0.0224735 (0.139625)		0.3354854 (0.2451052)
cons	0.1673644 (0.5161636)		-0.4643592 (0.5679682)					-6.488513* (3.604571)

Values in parentheses are robust standard errors. ***, **, and * denote significance respectively at 1%, 5%, and 10%.

Table B3: GMM results with Human Capital as channel transmission (for GNI)

	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
log(humancap)	0.7472979***	0.7383928***	0.6256769***	0.7659175***	0.4750904***	0.6329256***	0.6263956***	0.5197691***
log(humancapL1.)	(0.2580125)	(0.094301) 0.0230644* (0.0132173)	(0.1064102) 0.0178782 0.0246004	(0.0715203) 0.0178782 0.0246004	(0.1658928) 0.0307937 (0.0308093)	(0.1284296) 0.0173248 (0.0220991)	(0.1366855) 0.0173248 (0.0220991)	(0.1017661) 0.0450734 (0.0365301)
yghm								
roam		-0.0406095 (0.0883884)	0.1241607* 0.0679808	-0.0718223 (0.0747624)	-0.0718223 (0.0747624)	0.0970915 (0.0750737)	-0.0909466 (0.1684556)	-0.0909466 (0.1684556)
oelgm		-0.0233026 (0.017313)	-0.0611471** 0.0261934	-0.0136678 (0.014908)	0.0161446 (0.0538678)	-0.0299341 (0.0508379)	0.0003166 (0.0468898)	0.0003166 (0.0468898)
ossm		-0.0179573 (0.0195007)	-0.0136678 0.062995	-0.0156751 (0.0723897)	-0.0156751 (0.0723897)	-0.0364512 (0.0648669)	-0.0069236 (0.0718915)	-0.0069236 (0.0718915)
plim		0.0027633 (0.035751)	0.1364182 0.2537278	0.1541561 (0.2271963)	0.1541561 (0.2271963)	0.11504 (0.2861514)	0.1471928 (0.4027182)	0.1471928 (0.4027182)
pmim		0.0162443 (0.0149565)	-0.0030327 0.0307283	0.0130608 (0.0663004)	0.0130608 (0.0663004)	0.007033 (0.0615255)	-0.0102684 (0.0397528)	-0.0102684 (0.0397528)
albbm	-0.0005726 (0.0031904)		-0.010629* 0.0059892	-0.0099655 (0.0063208)	-0.0099655 (0.0063208)	-0.0132694** (0.0060553)	-0.0075253 (0.0084181)	-0.0075253 (0.0084181)
fbm	0.0073538 (0.0208646)		0.0260034 0.0192223	0.0234736 (0.014908)	0.0234736 (0.014908)	0.0279035* (0.0163515)	0.0226566 (0.0159488)	0.0226566 (0.0159488)
nabmgrowth	-0.009382 (0.0257551)		-0.0210598 0.0486835	0.0946999 (0.065234)	0.0946999 (0.065234)	-0.0333029 (0.092833)	0.0733067 (0.0857308)	0.0733067 (0.0857308)
nacmgrowth	-0.0105546 (0.0134667)		-0.0162431 0.0147634	-0.0247477 (0.0228024)	-0.0247477 (0.0228024)	-0.020778 (0.0141336)	-0.0348439*** (0.0178129)	-0.0348439*** (0.0178129)
bzscore				-0.0003211 (0.0006388)		-0.0000255 (0.0007317)	60.43e-06 (0.001642)	0.0005415 (0.0018179)
blad				-0.0429485* (0.0243545)		-0.0352817 (0.0268698)	0.0254231 (0.0386188)	0.0419605 (0.0368081)
bcir				-0.0077094 (0.0073317)		0.0021863 (0.013208)	-0.0377399 (0.0399017)	-0.0382391 (0.0405288)
bcbdgrowth				-0.0210278** (0.0095956)		0.0012169 (0.0147811)	0.0610786 (0.0479393)	0.0569115 (0.0390401)
birgrowth				-0.0031536** (0.0015454)		-0.0015855 (0.0024219)	0.0023862 (0.0054518)	0.002981 (0.0064289)
bocgrowth				0.0009846 (0.0010952)		0.0005388 (0.0013609)	-0.0018108 (0.0045654)	-0.0022119 (0.0039431)
broagrowth				20.23e-06 (0.0000125)		-90.27e-06 (0.0000503)	-0.0011692 (0.0008282)	-0.0007322 (0.0010317)
broegrowth				-0.0000535 (0.0000834)		-0.0000431 (0.0001287)	0.0001006 (0.0005572)	-0.0001417 (0.0008872)
bnligrowth				0.0000139 (0.0016245)		-0.0006396 (0.0024418)	0.0000519 (0.0118615)	0.0065144 (0.0118512)
gnicgrowth					-0.1146571 (0.0908614)	-0.0569403 (0.040165)		-0.1060347 (0.096421)
log(invest)					0.0073312 (0.0237587)	0.0200307* (0.0097603)		-0.0078721 (0.0217708)
log(topeness)					0.0396279 (0.0322498)	0.0109871 (0.0123167)		0.0552977 (0.0386464)
log(expend)					-0.0017807 (0.0206074)	-0.0092621 (0.0150455)		0.0066552 (0.0314409)
log(inflat)					0.0048551 (0.0037576)	0.0005017 (0.0017281)		0.0044198 (0.0047569)
GLPmgrowth					-0.4783155*** (0.1746888)			-0.4103461 (0.32635)
amgrowth					0.2392636 (0.1664704)			0.1924748 (0.3772785)
bcpsgrowth						0.001968 (0.0061265)		0.0064733 (0.0090404)
bagrowth						-0.0230578** (0.010555)		-0.022314 (0.0249105)
cons	0.3562484 (0.3591671)				0.5680892** (0.2727667)		0.5751292** (0.2426955)	

Values in parentheses are robust standard errors. ***, **, and * denote significance respectively at 1%, 5%, and 10%.

Chapter 3

Internal Determinants of the Performance of Microfinance Institutions In Ivory Coast : A Panel Data Analysis

3.1 Introduction

The mission of microfinance institutions (MFI) — also referred to as decentralised financial systems (DFS) by regulators in West Africa — is to increase the availability of savings and credit services to people who are generally excluded from the traditional banking system. It includes a wide range of financial services such as deposits, loans, credits, payment services and, more recently, money transfers, insurance and micro insurance to both low-income households and micro-enterprises. However, because of their ability to serve a poor customer base, MFI not only aim for high-quality financial performance but also the achievement of social objectives. This duality of objectives is a subject of debate in the academic literature. Some research advocates for MFI to be focused primarily on financial goals (Jacquand, 2005), while others support the need to pursue a dual purpose, one that is both financial and social in nature (Christen, Rosenberg and Jayadev, 2006; Bédécarrats, 2010). The financial performance of MFI is apprehended by conventional financial ratios that have been harmonised at the level of the West African Economic and Monetary Union (WAEMU); these ratios are indicators of profitability, efficiency-productivity, portfolio quality and management.

The measure of social performance, meanwhile, is not unanimous. It is indeed the subject of a debate between the two main approaches, namely the "welfarist" approach and the "institutionalist" approach. For welfarists, microfinance should aim to fight against poverty and improve the well-being of populations excluded from conventional banks; in addition to providing financial services, microfinance must provide non-financial services such as training and technical assistance to microentrepreneurs, and in areas such as literacy and women's empowerment. This approach has been supported by the research of Khandker and al. (1998), Morduch (1998), Morduch and Roodman (2014) and Banerjee and al. (2015). In practice, this line of thinking is reflected in the application of MFI through lower interest rates than the market and a large dependence on public or private subsidies. For advocates of this approach, the social performance of an MFI is measured by changes in the level of income, nutrition and education of the poor, as well as access to health and insurance services. However, the welfarist approach has been criticised for two main reasons. First, MFI that have adopted this approach have faced a high level of

delinquency rates and very high operating costs, leading to the gradual disappearance of many microcredit programmes. Secondly, research in this field faces the methodological difficulty of measuring the social impact of MFI.

These criticisms have favoured the emergence of the institutionalist approach; this is based on two requirements: credit massification and institution sustainability. The corollary of these two requirements is the improvement of performance indicators and the respect of prudential ratios. This generally implies the application of higher interest rates than both MFI that have opted for the welfarist approach and even conventional banks. The goal of this approach is not to be focused on improving the overall well-being of the poor, but rather on improving access to financial services for the low-income population that are excluded from the traditional banking sector. To measure its social impact, proponents of the institutionalist approach use variables such as the number of poor people with access to banking services, the size of credit granted or the quality of services offered. The institutionalist approach seems to prevail today, even though it is not yet unanimous. It is, for example, supported by international organisations such as the World Bank through the CGAP (Consultative Group to Assist the Poor), international development banks and state regulatory agencies. Several research articles have attempted to identify the determinants of the financial and social performance of MFI; overall, the main determinants are governance, legal form, maturity and geographical coverage. In the following analysis, we consider these explanatory factors of the financial and social performance of MFI, and include two other factors, namely prudential ratios and the size of deposits. Indeed, prudential ratios and the size of deposits are important for the financial and social viability of MFI.

The rest of the article is organised as follows. Section 2 reviews the literature, Section 3 presents the data, variable choices and the econometric method, while Section 4 presents the results of the estimates and Section 5 concludes.

3.2 Literature review

3.2.1 Review of empirical studies

The purpose of the study is to identify and analyse the influence of the internal determinants of financial and social performance of MFI from a sample of institutions in Ivory Coast. A number of empirical studies have already been conducted in this field, and have identified the key performance indicators of MFI.

Empirical experiences led in developing countries have shown that microfinance can help poor people to increase their income and consumption and to start and expand viable businesses (Shahidur and al., 1998; Choudhoury, 2003; Giraud and Renouard, 2013; Banerjee and al, 2015). Moreover, other studies such as Mees (2013) and Gubert Roubaud (2005) showed that microfinance can improve Ivory Coast's welfare (health and education) and can make a positive change in the microenterprises of low-income populations, respectively. However, although microfinance is an opportunity for those most in need to have access to funding sources (Robinson and Fidler, 2001), some authors are more critical about its management, especially its governance (Guerin and Servet, 2004; Guerin and Palier 2006; Ordioni 2005; Fernando 2004). According to the work conducted by Banerjee and al. (2015) in India, microfinance has a positive impact on the creation of income-generating activities; however, Banerjee and al. (2015) argue that microfinance has no impact on social indicators such as education, health or women's empowerment. Furthermore, according to Guerin and Palier (2006) and Guerin and Servet (2005), while microfinance allows 50% of MFI clients to reduce constraints on their family budget, and 25 % to increase their income-generating entrepreneurial activities, it results in a financial and social failure for 25%. Finally, for Coleman (2008), the inefficiency of MFI is largely due to the use of products that are unsuited to the needs of their clients.

The literature on the governance of MFI remains limited, unlike the corporate governance (Van den Berghe and Levrau, 2004; Meisel, 2004; Guedri, 2008; Gillette and al., 2008) and bank-

ing governance (Eichengreen and Gibson, 2001; Aizenman and Marion, 2003; Goddard and al, 2004; Bates and al., 2009) literature. MFI literature has focused on managerial practices and its impact on MFI performance (Chrysten and al., 2003; Peck and Rosenberg, 2004; Satta, 2004; Lapenu and Pierret, 2005; Sabana, 2006; Labie, 2007, 2009). In addition, Hartarska (2005) and Mersland and Strøm (2009) have questioned the role played by governance mechanisms on the social and financial performance of MFI in Central and Eastern European countries. Additionally, Tchakoute (2011) analysed the influence of governance mechanisms on MFI performance in Sub-Saharan Africa using a sample of sixty-four African MFI between 2001 and 2005; Mersland and Strøm (2009) and Tchakoute (2011) both failed to find evidence of the influence of board size and legal form on the financial and social performance of MFI. However, Mersland and Strøm (2009) found a negative impact of MFI maturity on financial performance when measuring operational self-sufficiency and a positive influence of maturity on loan size; according to Mersland and Strøm, the volume of credit decreased when the MFI grew. Indeed, when MFI reach maturity, they tend to attract poor customers who have a low repayment capacity, hence the decline in credit size. In addition, Mersland and Strøm (2009) analysed the role played by geographic coverage on financial and social performance variables; they did not find any influence of geographic coverage on social performance, but they showed that the performance of the loan portfolio increases as MFI operate in urban areas. In sub-Saharan Africa, particularly in Ivory Coast, the microfinance sector is highly attractive to the population and is showing encouraging results; however, there are many challenges for MFI: a lack of qualified staff, insufficient external funding and, in particular, governance failures.

3.2.2 Key performance indicators for MFI

The review of MFI literature has led us to identify its key performance indicators.

Financial performance is apprehended by two indicators: the profit margin and the index of dependence on subsidies. Regarding social performance, we also used two performance indicators: the number of active MFI customers (translating the width of their customer base) and the size of the loans granted. This choice is in line with the recommendations of Manos and al. (2008) and Schreiner (2002); in fact, according to Manos and al., the subsidy dependency indi-

cator considers the direct impact of subsidies, unlike other measures of financial performance, such as Return on Equity (ROE) and Return on Asset (ROA), which only partly take it into account. In addition, Schreiner (2002) shows that the width indicator corresponding to the number of customers served should not be examined alone but in conjunction with that of the depth corresponding to the size of the loans granted (because a shallow depth can be compensated by more width and vice versa). If there is no consensus in the literature about the amount from which a loan from an MFI can be classified as social, we adopt the same approach as the Consultative Group to Assist the Poorest Populations (CGAP), which proposes the following definition: an MFI targets a poor customer base if the amount of credit granted to its customers is less than 20% of the Gross National Product per capita (Acclassato, 2006; Ndour and Paget-Blanc, 2014). Applied to Ivory Coast, this definition gives the sum of 316 dollars per customer.

Regarding the explanatory variables, based on the literature (see the following subsections), we identify seven types of variables that can influence the financial and social performance of MFI: the legal form (public limited company, mutual institutions, savings and credit cooperative (IM-CEC), the prudential ratios they use, the size of their board, the maturity of the MFI, the number of points of service in its territory, the geographical coverage and the size of customer deposits.

3.2.3 The legal form of MFI

MFI can opt for different legal forms. Some have opted to be a non-governmental organisation (Servet, 2015). Others have the status of public limited company, which, according to some authors, makes them less dependent on donations (Hardy and al., 2003; Jansson and al., 2004; Fernando, 2004; Ledgerwood and White, 2006). For the latter, the transformation of a non-profit MFI into an LC makes it possible to raise the capital needed for their activities. For Varottil (2014), the for-profit form allows MFI to make low-cost loans, which ultimately goes in the direction of their social function. Today, some MFI are publicly traded (Littlefield and Rosenberg 2005; Ponsot 2007); other MFI have chosen a cooperative or mutual type of legal form (Lelart 2006; Servet 2015).

However, Hartarska (2005), Mersland and Strøm (2009), Sinclair (2012) and Tchakoute (2010) have not found any influence of the form of legal status on the performance of MFI. Finally,

Hansmann (1996), when analysing the advantages and disadvantages of governance systems in the framework of agency theory, shows that possessing an NGO status makes it possible to minimise agency costs related to contracts concluded by MFI with different parties, including employees, customers and donors, because of a more favourable local anchorage.

3.2.4 The size of the board

Boards of directors are at the centre of debates on economic governance reforms (Jensen 1993; Dalton and al., 1998; Hermalin and Weisbach 2003; Adams and Mehran 2003; Zhao and Peters 2009). For Jensen (1993), the size of the board plays an important role in the effectiveness of an organisation's governance system; according to Jensen, the optimal size for effective operation of a board is eight. For Hermalin and Weisbach (2003), an increase in the size of the board has a negative effect on the performance of firms. Both Dalton and al. (1998) and Adams and Mehran (2003), however, yield different results. Adams and Mehran (2003) find no negative relationship between board size and firm performance, as measured by Tobin's Q ratio. Dalton and al. (1998) believe that a broad board of directors increases the pool of expertise and resources needed for the companies.

3.2.5 The composition of the board

The composition of the board of directors has long been of particular interest, notably in the corporate governance literature (Maginson and al., 2009; Hollandts and Guedri, 2008; Kramarz and Thesmar 2013; Gillette and al., 2008). Indeed, the study of the composition of the board of directors makes it possible to evaluate, on the one hand, the effectiveness of the proper functioning of the board of directors and, on the other, its capacity to impact company performance. For Hollandts and al. (2008), the ratio of turnover to employee shareholders has no effect on corporate performance; however, Klein (1998) establishes a positive relationship between the presence of internal business people on the board's finance committee and the performance of firms. It appears that the presence of external members improves the effectiveness of decisions, i.e. the impact on strategic choices (Gillette and al., 2008). In addition, gender diversity in the

board of directors (Smith and al., 2006; Carter and al., 2003) appears to have a positive impact on corporate performance.

In general, the question of whether the composition of the board has an impact on the financial and social performance of MFI should be linked to the normative debate on the objectives of microfinance. Indeed, development agencies, social and commercial investors, individuals and NGO (Goodman, 2003) are now investing in MFI; however, all these entities, each of whom have different interests, will undoubtedly try to influence orientations and decisions in the governance of the MFI. For example, the presence of banks in the capital of an MFI may give rise to some doubts as to the MFI's mission (Köhn and Jainzik, 2007), since the MFI can then favour the achievement of financial objectives to the detriment of social objectives.

3.2.6 Prudential ratios

Prudential standards are management indicators that assess the ability of MFI managers to conduct healthy savings and lending activities. Initially, they were aimed at improving the governance mechanisms of conventional banking organisations (Macey and O'Hara, 2003) but have been adopted by bank regulators, and now constitute one of the key supervisory tools aimed at ensuring the creditworthiness and liquidity of credit institutions (Mishkin F., 2013).

At the level of microfinance, the Central Bank of West African States has published a set of prudential ratios that DFS operating in WAEMU must comply with. These ratios are instruments for managing and assessing the financial positions of MFI.

3.3 Empirical study

The objective of this study is to identify the determinants of the financial and social performances of MFI.

3.3.1 The data

We have retained a database consisting of twenty-two Ivorian MFI, observed over the period 2011-2014, including indicators relating to the internal governance of MFI (size of the board , prudential regulation, composition of the board of directors, administration and governance system), their financial performance (profit margin and subsidy dependency index) and their social performance (outstanding credit granted to customers and size of credit granted to customers). This dataset has been provided by the National Commission for Microfinance, the regulator of the microfinance sector in Ivory Coast. This commission depends on the Ministry of Economy and Finance of Ivory Coast, whose president is the General Director of the Treasury and Public Accounting. All MFI have an obligation to transmit their financial statements to the secretariat of the National Commission for Microfinance, which is the Microfinance Department (MD). The data collected by the MD is subject to several statistical treatments before being validated and submitted to the BCEAO; in other words, the data we have is identical to that of the BCEAO. Initially, the sample consisted of approximately sixty MFI, but some observations were missing. Thus, we made a selection of the MFI that provided the maximum amount of information in the financial statements submitted and whose various reports were available.

The variables selected and the descriptive statistics of the sample are presented in Tables 1 and 2.

Table 2 demonstrates that Ivorian MFI have negative profit margins due to their high operating costs. Negative profit margins can be explained by the opening of many agencies by MFI, overstaffing and the high overhead costs necessary to carry out their savings and credit activities. However, we note specificities depending on the area of activity; indeed, the profit margin for MFI operating only in rural areas is more degraded than for MFI operating only in the Ivorian capital city. This result may be due to a size effect of the market. It could also be caused by a difference in the managerial quality of agency managers and/or a difference in the skills of MFI employees.

Ivorian MFI, however, are trying to reduce their staffing costs, following the injunctions and recommendations of the National Commission for Microfinance. In fact, dangerously fast growth

Table 1: List of variables

IDENTIFICATION	VARIABLE CODE	DEFINITION AND MEASUREMENT
Microfinance Institutions	MB	Ratio A / B with A = Net Exploitation Result and B = Exploitation Products. The standard to be respected is Ratio A / B > = 20%
Grant Dependency Index	IDS	Ratio A / B with A = Amount of grants and B = Income from loans. The lower the ratio. the better the independence of grants
Total Number of Customer	CLTS	Number of customers of the institution
Credit size	<i>tacdts</i>	Amount of the size of the credits granted = A / B ratio with A = outstanding credits and B = total number of clients
Maturity of the institution	MATUR	Number of years of activity of the MFI
Liquidity ratio	LQ	Prudential Ratio A / B with A = Realizable values available in amounts and B = Liabilities payable. The standard to be respected is Ratio A / B > = 100 %
Limitations of the risks to which an MFI is exposed ratio	LRI	Prudential ratio A / B with A = Risks borne by an institution: Net amounts of provisions and deposits of guarantees B = resources. The standard to be respected is Ratio A / B > = 200 %
Ratio of medium and long-term employment coverage by stable resources	CEMLT	Prudential A / B ratio with A = stable resources and B = medium and long-term jobs. The standard to be respected is Ratio A / B > = 100 %
The size of the deposits	LOG(TADEP)	Ratio Ln (A / B) with A = deposit amounts of the period and B = Total number of customers
Points of service	PTS	Number of points of service throughout the national territory
Number of board members	<i>nca</i>	Number of MFI board members
Governance system or legal status	SGV	Ratio Ln (A / B) with A = deposit amounts of the period and B = Total number of customers
MFI activity area inside the country	RINTER	Binary variable; 1 if the MFI is a public limited company and owns institutional entities (banks. investment funds. development agencies) in its board of directors (SA). 0 otherwise
Activity area in the economic capital	RABIDJ	Binary variable; 1 if the MFI practices in the economic capital (Abidjan). 0 otherwise

in MFI credit activity leads to a rapid increase in staff costs and overheads. In addition, most MFI do not receive operating subsidies, so they utilise other sources of funding outside of farm subsidies to carry out their activities.

Descriptive statistics show that Ivorian MFI, on average, possess a depressed capitalisation ratio, and some even have negative equity. The average capitalisation ratio is 5%, well below the prudential standard of 15%.

Table 2: Quantitatives variables

Variables	Number of Observations	Average	Standard deviation	Médian	Minimum	Maximum
MB	88	-194.46	975.36	-6.28	-8691.88	2.35
IDS	88	8.28	44.32	0	0	399.42
MATUR	88	7.91	4.06	7	1	16
CAP	88	0.05	9.77	0.23	-18.85	5.03
LQ	88	0.67	1.7	0.79	-14.11	3.92
CEMLT	88	1.33	4.47	1.13	-16.91	19.89
LRI	88	0.976	0.93	0.82	0.003	7.29
<i>tacdts</i>	88	359040	2300404	56315	751	21618273
CLTS	88	32405	113615	3310	95	594010
PTS	88	11	28	1	1	126
<i>nca</i>	88	9	6	7	3	36

In addition, Ivorian MFI do not have the capacity to cope with an urgent demand for credit, as shown by the average LQ ratio of 67.62%, which is well below the norm (which is 80% for IMCEC and 100% for SA). We also observe that medium and long-term jobs are sufficiently covered by the stable resources of Ivorian MFI, as shown by the average CEMLT ratio of 133.75%, and above the norm (100% in the WAEMU area). Their credit risk exposure is also insufficiently provisioned, as shown by the 97.58% LRI ratio, which is below the 200% norm imposed by regulators.

Table 3: Qualitatives variables

Variables	Number of Observations	Mode	Frequency
SGV	88	1	26.14%
		0	73.86%
RINTER	88	1	37.5%
		0	62.5%
RABIDJ	88	1	72.72%
		0	27.28%

Table 3 indicates that the vast majority (73.86%) of MFI in Ivory Coast have opted for a mutual or cooperative legal form. A relatively small number (26.14%) chose the status of a "public limited company" and have institutional investors (banks, insurance companies and investment funds) sitting on the board of directors. Legislation on the creation of public limited company is more recent; this is an innovative approach that has been introduced in Central and Eastern European countries (Lelart, 2006), before being transposed to sub-Saharan Africa, particularly in Ivory Coast. Finally, we note that MFI are mainly concentrated in the Ivorian economic capital (Abidjan) and its surrounding areas, which is a challenging finding because one of the primary objectives of MFI is to improve the financial inclusion of rural populations.

3.3.2 Performance Analysis Model for Microfinance Institutions

Our objective is to identify the determinants of the financial and social performances of MFI. We are using a panel model with individual unobserved heterogeneity taken into account by specifying the error term ϵ_{it} as the sum of an individual specific effect α_i and a random term u_{it} . Specifically, we consider the following model:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \dots + \beta_p X_{pit} + \epsilon_{it}$$

With :

$$\epsilon_{it} = \alpha_i + u_{it}$$

In this model, α_i represents the unobserved heterogeneity.

We tested the following four models:

$$\begin{aligned} \text{Model(1)} : MB_{it} = & \beta_0 + \beta_1 MATUR_{it} + \beta_2 LQ_{it} + \beta_3 CAP_{it} + \beta_4 LRI_{it} + \beta_5 CELMT_{it} + \beta_6 \log(TADEP)_{it} + \beta_7 PTS_{it} \\ & + \beta_8 nca_{it} + \beta_9 SGV_{it} + \beta_{10} RINTER_{it} + \beta_{11} RABIDJ_{it} + \epsilon_{it} \end{aligned}$$

$$\begin{aligned} \text{Model(2)} : IDS_{it} = & \beta_0 + \beta_1 MATUR_{it} + \beta_2 LQ_{it} + \beta_3 CAP_{it} + \beta_4 LRI_{it} + \beta_5 CELMT_{it} + \beta_6 \log(TADEP)_{it} + \beta_7 PTS_{it} \\ & + \beta_8 nca_{it} + \beta_9 SGV_{it} + \beta_{10} RINTER_{it} + \beta_{11} RABIDJ_{it} + \epsilon_{it} \end{aligned}$$

$$\begin{aligned} \text{Model(3)} : \log(CLTS)_{it} = & \beta_0 + \beta_1 MATUR_{it} + \beta_2 LQ_{it} + \beta_3 CAP_{it} + \beta_4 LRI_{it} + \beta_5 CELMT_{it} + \beta_6 \log(TADEP)_{it} + \beta_7 PTS_{it} \\ & + \beta_8 nca_{it} + \beta_9 SGV_{it} + \beta_{10} RINTER_{it} + \beta_{11} RABIDJ_{it} + \epsilon_{it} \end{aligned}$$

$$\begin{aligned} \text{Model(4)} : \log(TACDTS)_{it} = & \beta_0 + \beta_1 MATUR_{it} + \beta_2 LQ_{it} + \beta_3 CAP_{it} + \beta_4 LRI_{it} + \beta_5 CELMT_{it} + \beta_6 \log(TADEP)_{it} + \beta_7 PTS_{it} \\ & + \beta_8 nca_{it} + \beta_9 SGV_{it} + \beta_{10} RINTER_{it} + \beta_{11} RABIDJ_{it} + \epsilon_{it} \end{aligned}$$

Where MB represents the profit margin, defined as the ratio of net operating income, excluding grants, to operating income; IDS is the grant dependency index of a microfinance institution; CLTS represents the number of clients of a microfinance institution; and *tacdts* represents the size of the credit granted (i.e. the average credit granted to clients).

The four models differ in their dependent variables. Models (1) and (2) focus on the internal determinants of financial performance, with two types of financial performance indicators: profit margin and dependence on subsidies. Models (3) and (4) aim at identifying the internal determinants of social performance, with two types of social performance indicators: the total number of clients and the average amount of credit granted to clients.

3.4 Econometric tests, analysis of results and discussion

3.4.1 Preliminary econometric's test

Table 4: Pearson's Correlation Matrix

	MATUR	LQ	CAP	LRI	CEMLT	log(TADEP)	PTS	nca	SGV	RINTER	RABIDJ
MATUR	1										
LQ	-0,045	1									
CAP	-0,0081	0,23**	1								
LRI	0,12	0,34***	0,11	1							
CEMLT	-0,21*	0,66***	0,44***	0,16	1						
log(TADEP)	0,24**	0,07	-0,0012	0,12	0,056	1					
PTS	0,44***	-0,087	-0,029	-0,032	-0,056	0,12	1				
nca	0,21**	-0,12	-0,022	0,15	-0,073	-0,019	-0,12	1			
SGV	-0,44***	0,26**	0,1	0,11	0,34***	0,062	-0,11	-0,26**	1		
RINTER	0,31***	-0,053	-0,041	0,21*	-0,14	0,18*	0,33***	0,14	-0,44***	1	
RABIDJ	-0,18	-0,078	0,015	-0,15	0,1	-0,13	0,15	-0,3***	0,35***	-0,7***	1

and *** are significant at 10%, 5% and 1%, respectively.

Before performing the econometric tests, we will check, using a Student's test, whether the relations between the variables are too important, which could distort the variance-covariance matrix of the estimated parameters and raise questions about the reliability of the variables. We

note (see Table 4) that, in general, the explanatory variables do not seem to have strong correlations with each other. There are only 20 significant correlations out of 55 possible correlations; these significant correlations have amplitudes in absolute value lower than 0.7.

Table 5: Presence of individual specific effect

Models	p-value
Model (1)	0.00
Model (2)	0.00
Model (3)	0.00
Model (4)	0.00

To verify the existence of individual specific effects in a panel model, we used Fisher's test to choose between a pooled model (MCO model) or a specific effects model. For Models (1), (2), (3) and (4), the basic assumption is rejected at the 1% threshold. The choice of the individual effect model seems appropriate. It remains to be seen whether this specific effect is random or fixed; this is the objective of the Hausman test.

Table 6: Hausman's test results

Models	P-value
Model (1)	0.00
Model (2)	0.00
Model (3)	0.00
Model (4)	0.8718

The Hausmann test allows a study to determine whether there is a correlation in the random effects model between the specific effect α_i and the independent variables. Moreover, the Hausmann test allows the researcher to choose the most suitable model between the random effect model and the fixed effect model. For Models (1), (2) and (3), the basic assumption is rejected at the 1% threshold; this argues for a fixed-effect model. As for Model (4), the high p-value indicates that we cannot reject the basic assumption.

In sum, three out of four models favour a fixed effects model. The final argument seems to be in favour of a fixed effects model (Trognon 2003; Greene 2011; Wooldridge 2015). Indeed, unlike Hartarska (2005), Hartarska and Nadolnyak (2007), Mersland and Strøm (2009) or Tchakoute (2011), who worked on samples drawn randomly from a population, our sample is almost exhaustive in the sense that it covers almost all (80%) of the population of MFI in Ivory Coast.

In addition, we performed heteroscedasticity and autocorrelation tests to ensure the validity of the Within estimator.

Table 7: Heteroscedasticity and autocorrelation tests

Models	Heteroscedasticity tests (P-value)	Auto-correlation tests (P-value)
Model (1)	0.00	0.55
Model (2)	0.00	0.17
Model (3)	0.00	0.00
Model (4)	0.00	0.46

The results of the Breusch-Pagan tests show that the p-values associated for all the models with these tests are less than 1%. As for the results of the Wooldridge tests, in the models (3) the the p-value associated with these tests are less than 1%, contrary to the model (1), (2) and (4), in which the p-values are greater than 10%. We conclude that the errors are only heteroscedastic for model (1), (2) and (4). Otherwise, the errors are only heteroscedastic and self-correlated for the model (3). To control heteroscedasticity and autocorrelation of errors, we use a robust standard estimator.

3.4.2 Results of econometrics tests

Results related to financial performance

According to Model (1), legal form and geographical coverage have a significant influence on profit margin. According to our results, profit margin increases when the MFI is a public limited company (which is in line with Ledgerwood and White (2006), who investigated the financial viability of private MFI).

Our results show that the profit margin of MFI operating in rural areas is very poor; however, we note specificities depending on the area of activity. Indeed, the profit margin for MFI operating in the country (in the provinces) alone is weaker than that of MFI operating only in the Ivorian capital. This result may be due to the size effect of the market. It could also be caused by a difference in the managerial quality of agency managers and/or a difference in the skills of MFI

Table 8: Estimation of MFI Performance

Models	Financial Performance		Social Performance	
	MB (1)	IDS (2)	Log(CLTS) (3)	Log(<i>tacfts</i>) (4)
MATUR	-0.88 (30.97)	1.07 (1.55)	1.79* (0.03)	-0.73 (0.08)
LQ	0.12 (22.44)	0.97 (1.12)	0.38 (0.02)	-0.23 (0.06)
CAP	0.68 (5.81)	-0.88 (0.79)	-1.13* (0.02)	2.1** (0.04)
LRI	-0.26 (73.49)	-1.42 (3.68)	-0.74 (0.09)	-0.17 (0.19)
CEMLT	-1.64 (11.13)	1.02 (0.55)	0.88 (0.01)	0.07 (0.02)
Log(TADEP)	0.82 (37.42)	-0.43 (1.87)	-18.73*** (0.04)	8.61*** (0.1)
PTS	-0.06 (4.57)	-0.08 (0.22)	0.29* (0.005)	-0.06 (0.01)
<i>nca</i>	1.92 (15.15)	-0.91 (0.75)	0.3 (0.02)	0.1 (0.04)
SGV	3.76*** (329.01)	-24.09*** (16.49)	-3.95*** (0.41)	-1.61*** (0.88)
RINTER	-14.47*** (567.83)	1.11 (28.46)	2.26** (0.71)	0.94*** (1.51)
RABIDJ	-12.12*** (672.93)	0.89 (33.73)	2.17** (0.84)	0.76** (1.80)
R-Squared	92.76%	92.53%	89.27%	64.54%
Adj. R-Squared.	88.55%	88.18 %	83.02%	43.91%
Observations	88	88	88	88
Numbers of MFI	22	22	22	22

Values in parentheses are robust standard errors and *, ** and *** are significant at 10%, 5% and 1%, respectively

employees.

The results of Model (2) show that legal form also plays a role in subsidy dependence. Indeed, private companies have fewer and fewer state subsidies; this has led to them turning towards private capital. These results confirm the arguments of Hardy and al. (2003), Janson and al. (2004) and Fernando (2004), as well as those of Ledgerwood and White (2006), who argue that MFI with a public limited company's status are independent of donations and have the facility to obtain private resources. IMCECs require subsidies because subsidies are not a burden on their financial resources when carrying out their activities.

Results related to social performance

The results of Model (3) show that the maturity of MFI positively influences one of the social performance variables, namely the number of customers. However, this could also be the result of the learning effect, i.e. MFI learn over time to be effective, in particular by better controlling their environment and their activity. It could also be an institutional effect; indeed, institutions such as the NCM (through its injunctions and recommendations), the World Bank and AFD (through their methodological seminars) contribute to the effectiveness of MFI over time.

Aside from their maturity, MFI with broad geographic coverage are those with a large number of customers. In addition, we observe that the number of customers decreases as the size of their deposits increases. This result is explained by the fact that deposit rates in MFI are not attractive; in fact, customers with a large amount of money to deposit prefer to do so in banks that charge more attractive rates. We also observe a negative relationship between number of clients and MFI capital. Indeed, MFI whose shareholders (individuals or businesses) can quickly mobilise their resources do not implement strategies (e.g. marketing) to attract new customers and capture their deposits. Of course, these deposits will be then transformed into microcredits for customers.

Model (4) shows that the capitalisation ratio (CAP) and the size of deposits in an MFI have a positive impact on the size of loans granted to customers. In other words, MFI increase the size of credits as and when their own funds and the deposits of their clients increase, which could be interpreted as a "mission drift" phenomenon; however, this is difficult to demonstrate. According to Armendariz and al. (2009), MFI can increase the size of loans by making soft loans, i.e. MFI increase the size of new loans as the client repays the previous loan. In addition, MFI can use the cross-subsidisation technique of targeting a well-off segment of the population to allow them to finance a poor section. Moreover, our results show that over time, MFI increase the amount of credit given to customers across the country. Lastly, the size of the board, the points of service and the prudential ratios (excluding the capitalisation ratio) do not seem to play any role in the evolution of the size of the loans granted over the period studied.

3.5 Conclusion

We have shown in this article that the legal form chosen by an MFI has a significant influence on their financial performance: MFI with the status of public of limited company have higher financial performance. On the other hand, prudential ratios, the maturity of MFI, the size of deposits and the number of points of service do not appear to have any influence on financial performance. Our conclusions about the determinants of social performance are mixed: the maturity of the MFI, the points of service and the geographical coverage of the MFI play a positive role in the attractiveness of customers. Lastly, capitalisation ratio, geographical coverage and deposit size play a major role in the evolution of the size of loans granted to customers.

Beyond analysing the determinants of performance, our article provides evidence that Ivorian MFI are faced with many difficulties, which have a negative impact on their financial and social performance. These difficulties are due to the weakness of their financial income and high operating expenses. This is attributable to the fact that almost all MFI reach poor customers in the sense that they granted loans to less than 20% of the Ivorian gross national product per capita over the period studied (i.e. less than 316 dollars, on average, per customer). Lending activity to this segment of the population generates low margins since the granting of small loans involves relatively high operating costs compared to the granting of large loans.

APPENDIX

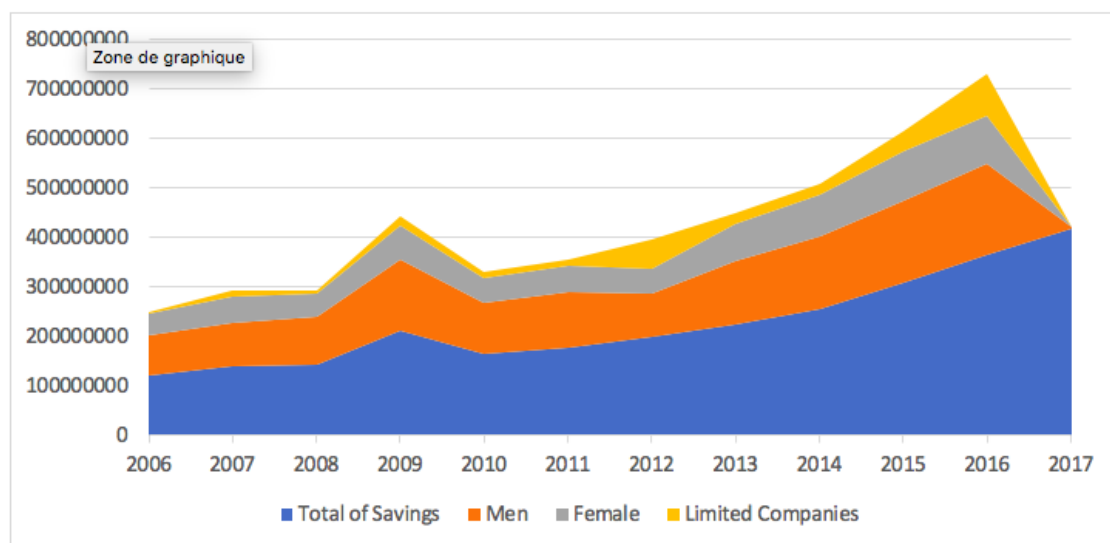


Figure 3.1: Evolution of savings outstanding between 2006-2017
Source: Phd Student work (in \$/US)

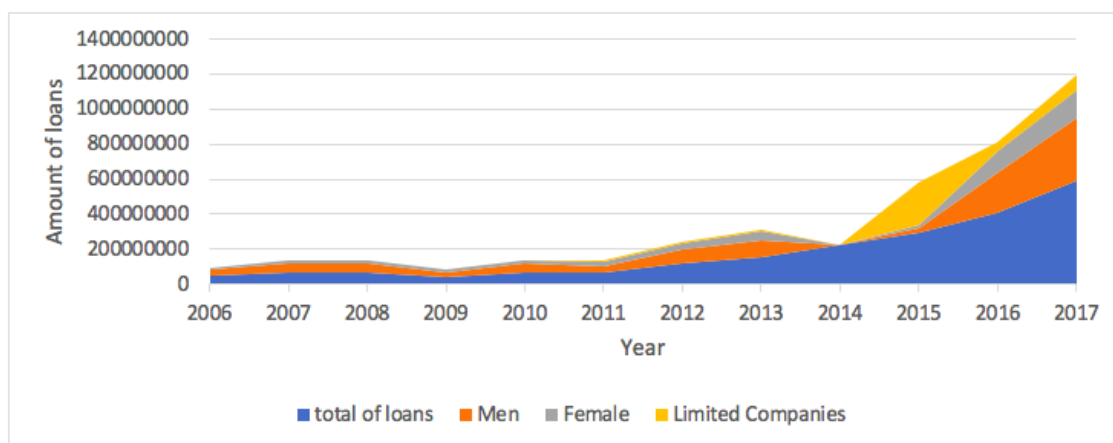


Figure 3.2: Evolution of outstanding loans between 2006-2017
Source: Phd Student work (in \$/US)

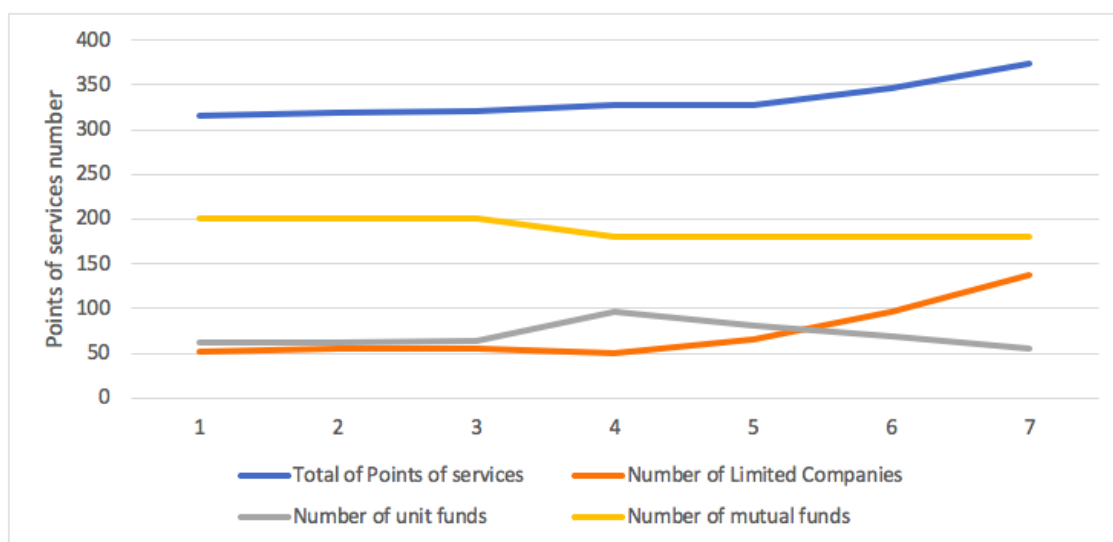


Figure 3.3: Evolution of the number of MFIs by legal status between 2006-2017
Source: Phd Student work

Chapter 4

The Impact Of The Capital Structure On Microcredit Activity In Ivory Coast

4.1 Introduction

Microfinance is a financial activity that allows a socio-professional segment of the population, precisely those excluded from the traditional banking system, to have access to sources of finance. It now appears as an essential tool in development of cooperation policies (Hudon & Ouro-Koura, 2008) and has experienced strong growth in terms of customers, outstanding loans and outstanding deposits. The number of clients served by MFIs was 7.6 million in 1997 (Reed, 2013) and reached 132 million in 2016, according to the 2017¹ microfinance barometer. Outstanding loans increased from \$4 billion in 2001 to \$25 billion in 2006 (Dieckmann and al., 2007). In 2016, total outstanding loans were estimated at \$102 billion, with various and growing non-credit offers, including deposit services (+55%), voluntary insurance services (+18%) and non-financial services (+42%).

Despite this rapid growth in the microfinance sector, microfinance institutions are facing a growing demand for financing from their clients. This demand can be expressed in two ways: a request for short-term funding and a request for medium- and long-term funding. MFIs generally offer short-term loans to their clients in order to be an alternative to loan sharks (Lelart, 2006), as well as to meet their own operating costs as quickly as possible. This practise has been strongly criticised by Hollinger (2004), Niyongabo and Perilleux (2010) and Servet (2015). Hollinger (2004) found that access to longer-term loans for small- and medium-sized producers was extremely rare or non-existent, even in countries that pursued active financial sector development policies and experienced a boom in the microfinance industry. Niyongabo and Perilleux (2010) argued that the majority of loans granted by MFIs were short-term loans, and that the contribution of microfinance to the development of the rural world was severely limited. Medium- and long-term loans are essential to enable the agricultural sector to become more professional and to adapt the rural environment to new realities and constraints, such as climate change, changes in world markets or the fight for food sovereignty. As for Servet (2015), he found that the majority of loans were short-term. This temporal nature of loans limits the effectiveness of microcredit for the poorest economic activities since investment in production units does not have an immediate return. In addition, MFIs tend to require credit collection almost immediately, while the income

¹The microfinance barometer is published by the Convergences platform. It promotes the Sustainable Development Goals (SDGs) and the fight against poverty, exclusion and climate change in both developed and developing countries. <http://www.convergences.org/>

generated by the activity on a plantation does not fully appear until after six months, three years or five years.

According to Christen and Pearce (2005) and Wamba and Nimpa (2014), there is a high unmet demand for medium- and long-term financing. Christen and Pearce (2005) argued that farmers need longer-term loans to finance their capital goods and renew their means of production. As for Wamba and Nimpa (2014), medium and small companies from their growth perspective needed MFI financial services on an ongoing basis either to build up their working capital ² or to purchase equipment or spare parts.

This lack of interest on the part of MFIs in financing microcredit activities in the medium- and long-term has led us to reflect on the following questions: What is the impact of the capital structure on microcredit activity in the Ivory Coast?

What are the elements that make up the capital structure of MFIs in the Ivory Coast? How can these elements impact microcredit activity? Can they finance medium- or long-term activities that require significant capital?

Thus, the main objective of our article is to identify and analyse the impact of the capital structure of MFIs on the size of credit in general (through a first elaborate equation) and on the size of credit granted in the short and medium and long term (through two other established equations). To this end, the database we used consisted of twenty-six MFIs over a period from 2011-2014 taken from the Microfinance Department in the Ivory Coast (Ministry of Economy and Finance). This article is organised as follows: Section 2 presents the literature review, while Section 3 deals with methodology and data. Section 4 discusses the results of econometric tests and Section 5 provides conclusions.

4.2 Literature review

The capital structure of MFIs has been the subject of several studies in the academic literature (Fernando, 2004; Coleman, 2007, 2008; Bald, 2008; Bogan, 2012; Mersland & Urgeghe, 2013; Tchuigoua, 2015). For example, Fernando (2004) advocated a transformation of non-profit MFIs

²Purchases of raw materials, goods....

into for-profit MFIs in order to better capture the financial resources needed (bank loans, equity) for microcredit activity. Coleman (2007) examined the determinants of the capital structure of fifty-two microfinance institutions (MFIs) in Ghana and showed that the MFIs were heavily indebted and that their capital structure was explained, in part, by standard financial theory and other non-conventional variables. More specifically, the study confirmed that small MFIs used short-term debt, while large MFIs used long-term debt. It also showed that the reputation and independence of MFI boards of directors significantly and positively affected their capital structure decisions. Bogan (2012) examined existing funding sources on a sample of MFIs from Africa, East Asia, Eastern Europe, Latin America, the Middle East and South Asia between 2003 and 2006, and explored how changes in the capital structure could facilitate future growth and improve the efficiency and financial viability of MFIs. The study linked the capital structure to key measures of MFI success, and found causal evidence supporting the assertion that increased use of subsidies by MFIs reduces operational self-sufficiency.

Mersland and Urgeghe (2013) constituted a database of 319 MFIs from 68 countries and analysed the link between international financing and financial and social performance. They showed that commercial financing seemed to correspond to the negative screening approach because it was mainly motivated by the financial performance and professionalisation level of MFIs, while subsidised financing was mainly motivated by the targeting of women and not by the level of professionalisation or financial performance of the MFI. This led them to make two suggestions. First, they suggested that MFIs further professionalise their operations and ensure good financial performance in order to attract international trade finance. Second, they argued that MFIs that provide subsidised funding needed to rethink their targeting strategy because even if they target women more than non-subsidised MFIs, this can easily lead to a dependency trap. These authors also deplored the fact that MFIs with good international relations received more subsidies than MFIs with professional and efficient operations.

Our interest is in the impact of the capital structure of MFIs on microcredit activity, an area that has not been the subject of attention in the literature. To this end, we identified three main sources of financing that can influence microcredit activity in the Ivory Coast: bank loans, shareholder/member contributions and MFIs' outstanding deposits (savings). As MFIs do not have access to the refinancing window of the Central Bank of West African States (CBWAS), this last

source of financing was excluded from our study.

First of all, bank loans are increasingly accessible as a source of financing for MFIs. According to Tchakoute and Kouao (2011), short-term domestic debt is the main financing instrument for microfinance institutions (63% for the Consultative Group to Assist the Poor [CGAP] in 2008 and 85% for the Non-Governmental Organization [NGO] Soutien au Developpement Autonome [ADA]). However, according to the 2017 microfinance barometer, deposits were the main source of funding for MFIs (57%), followed by loans (23%) and equity (20%) in 2016. The Latin America and Caribbean region has better deposit coverage (29%), while Eastern Europe and Central Asia have the lowest coverage (5%). Africa has a higher deposit coverage (71%), followed by an equity coverage rate of 17% and 11% for loans. MFIs in South Asia are mainly financed by loans (43%). In addition, there is collaboration between the banking and microfinance sectors. This collaboration is limited to demand and term deposits with banks that market financial products on behalf of insurance companies. It should also be noted that banks have been reluctant to finance microfinance institutions. This reluctance is due, among other things, to the crisis in this sector, particularly that of poor governance, the lack of professionalism of these players and innovation in terms of financial products adapted to Coleman and Kofi clients (2008), and the inefficiency of regulation. Where such financing exists, it is set up at market rates.

Customer deposits (savings) are also of crucial importance for a microfinance institution. Indeed, credit can only be viable if it is based in advance on savings collection and not on external debt. As a result, deposits are a source of funding that allows MFIs to be less dependent on donors and commercial lenders (banks, financial institutions). For Bald (2008), the deposits collected cost MFIs very little and people preferred sight deposits, which are unremunerated but more liquid than term deposits. Urgeghe (2009) argued that savings allowed MFIs to be more responsible about the level of interest rates.

Finally, equity consists of contributions from members/clients and institutional partners, such as national, regional and, especially, international development agencies. There are also contributions from banks and insurance companies. The most interesting aspect is the growing presence of microfinance investment vehicles (Labie, 2007; Labie & Urgeghe, 2011; Servet, 2015). These financial partners make available a considerable amount of the money needed by MFIs at below-market rates. To these should be added the operating subsidies that are added to the profit

result. Indeed, they refer to the global notion of cold money characterised by subsidies, bank refinancing, external credit lines and bank guarantees. The idea here is to know if microfinance institutions can be viable by using grants as a source of funding in their activities. According to Paxton and Fruman (1998), subsidies are very important in the microcredit activity of MFIs because credit must be financed by something other than savings, especially by external funds such as subsidies. This credit is cheap and can significantly reduce inequalities. It has an impact on economic growth and employment through low-capital investment with maximum return on capital. While grants allow MFIs to increase their small loan portfolios in order to reach poor clients and break the vicious circle of poverty, Ledgerwood (2000) admitted that, in the long run, MFIs must finance their microcredit activities only through savings. According to Morduch (1999), the success of the Grameen Bank was based in part on subsidies, while Armendariz and Morduch (2005) indicated that microfinance was pro-poor only through subsidies. Morduch (2005) advocated greater donor involvement in the use of these grants by, for example, helping MFIs to finance specific and effective projects.

According to Reille and Foster (2008), foreign capital tripled between 2004 and 2006, from \$4 trillion to \$6 trillion. Reille and al. (2011) found that this capital quadrupled in 2010 to \$13 trillion. Servet (2015) noted that Africa has attracted fewer for-profit placements than other regions of the world, such as the Caribbean (37%) and Central Asia and Europe (34%).

In view of the above, we relied on hierarchical financing theory, as did Tchuigoua and Kouao (2011), to carry out our work. Indeed, hierarchical financing theory is based on an asymmetry of information in the relationship between the principal and the agent. This relationship involves an actor, called the principal, engaging another actor, the agent, to work or provide services that serve their interests. This relationship can lead to conflicts of interest in terms of governance in the company. According to Myers and Majluf (1984), funding choices are mainly driven by the level of this information asymmetry; hence the importance given by the agent to significantly reducing the costs associated with this information asymmetry in the implementation of funding policies. This prioritises the various sources of financing: i.e, self-financing; then non-risky debt and risky debt; and finally, capital increases (Myers, 1984).

4.3 Data and Methodology

4.3.1 Methodology

The main objective of our article is to identify and analyse the impact of the capital structure of MFIs on microcredit activity that is measured by the size of credit in general, as well as by the size of credit granted in the short, medium and long-term in the Ivory Coast. For this purpose, two estimates were made to carry out our analyses.

First, we used the random-effects model to account for the unobserved heterogeneity among microfinance institutions in the sample to analyse the impact of MFI capital structure on microcredit measured by the size (amount) of credits granted to clients.

Next, we used the simultaneous equation method, in this case, the SUR (seemingly unrelated regression) method, to analyse the impact of MFI capital structure (short-term or medium- and long-term) on the activity. Microcredit was also measured by the size of the credits granted (short, medium and long term). Finally, just like Schullet and Schwarts (2010), we introduced the effect model (fixed and random) because it allowed us to detect unobserved heterogeneity biases and compare the model results with fixed/random effect and that of the SURE model to highlight to what extent this bias is important. First, we used a panel model with individual unobserved heterogeneity taken into account by specifying the error term as the sum of a specific effect and a random term. More precisely, we considered the following model:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \dots + \beta_p X_{pit} + \epsilon_{it}$$

$$\text{With : } \epsilon_{it} = \alpha_i + u_{it}$$

In this so-called compound error model with a component, α_i represents the unobserved individual heterogeneity. So, we will test the following model:

$$tacdts_{it} = \beta_0 + \beta_1 emb_{it} + \beta_2 cap_{it} + \beta_3 tadeps_{it} + \beta_4 nca_{it} + \beta_5 matur_{it} + \beta_6 tcs_{it} + \beta_7 \log(assets)_{it} + \epsilon_{it}$$

This model analysed the impact of the capital structure of MFIs on their ability to grant credit. The variable *tacdts* represented the credit outstanding for the period compared to the total number of active customers.

We adopted the same methodology as Knar and al. (2017) to estimate the impact of MFI capital structure on microlending activity in the short, medium and long term. Indeed, we used Zellner's seemingly unrelated regression method (1962) that applies to models with seemingly unrelated equations, notably the "production costs" model because there is a correlation of the errors between the equations by observing the matrix of correlation of residues. According to Perron and Moon (2005), the SUR method makes it possible to gain efficiency in the estimation by combining information on the different equations and imposing and/or testing restrictions involving parameters in the different equations. As for Ordinary Least Square [OLS], the SUR method assumes (strong) that the explanatory variables are exogenous variables.

If the explanatory variables are identical for each equation (in our case), and if we do not impose a linear constraint (which is not the case here), then the equation [OLS] estimator is identical to the SUR estimator, even if interequation hazards are correlated to the same period.

Here, the system has constraints on the parameters, so the estimator SUR differs from the OLS estimator (unconstrained and constrained). The SUR³ model is written in the following form:

$$With : Y_g = X_g \beta_g + u_g \text{ with } g = 1, 2, \dots, G$$

but Y_g is a vector of order n of the observations of the endogenous variable response g , X_g is an $n \times K_g$ ⁴ matrix of observations of the exogenous K_g variables of the age equation, β_g is a vector of order K_g of the regression coefficients of the age equation and u_g is a vector of order n of regression errors for the age equation.

The matrix form of the equation is as follows:

³We assume that the explanatory variables are outside the model.

⁴Note that $K_g \leq K$.

$$\begin{bmatrix} Y_1 \\ Y_2 \\ \cdot \\ \cdot \\ \cdot \\ Y_{n-1} \\ Y_n \end{bmatrix} = \begin{bmatrix} X_1 & 1 & \cdot & \cdot & \cdot & 0 & 0 \\ 0 & X_2 & \cdot & \cdot & \cdot & 0 & 0 \\ \cdot & & & & & & \\ \cdot & & & & & & \\ \cdot & & & & & & \\ 0 & 0 & & & X_{n-1} & 0 & 0 \\ 0 & 0 & \cdot & \cdot & 0 & X_n & \end{bmatrix} \begin{bmatrix} \beta_1 \\ \beta_2 \\ \cdot \\ \cdot \\ \cdot \\ 0 \\ \beta_n \end{bmatrix} + \begin{bmatrix} u_1 \\ u_2 \\ \cdot \\ \cdot \\ \cdot \\ u_{n-1} \\ u_n \end{bmatrix}$$

$$With : Y = X\beta + u$$

Where Y is a vector of order G_n of the observations G of the variable endogenous response,

X is a matrix $G_n * \sum_{i=1}^G * K_i$ observations of G matrices of exogenous variables,

β is a vector of order $G_n * \sum_{i=1}^G * K_i$ regressions coefficients of G equations and u is a vector of order

G_n des erreurs de regression pour les G equations.

This model further assumes that observations from different experimental units are independent and that those from the same experimental unit are correlated. This results in :

$$\sum_{sur} = Var(uu') = \begin{bmatrix} X_1 & 1 & . & . & . & 0 & 0 \\ 0 & X_2 & . & . & . & 0 & 0 \\ . & & & & & & \\ . & & & & & & \\ . & & & & & & \\ 0 & 0 & & & X_{n-1} & 0 \\ 0 & 0 & . & . & 0 & X_n \end{bmatrix}.$$

The variance-covariance matrix of the whole system is given by:

where \oplus represents the matrix product of Kronecker. The most accurate estimator of β is obtained by applying the least squares generalized method

$$\hat{\beta} = (X'(S^{-1} \oplus I)X)^{-1}(X'(S^{-1} \oplus I)Y)$$

With

$$E[\hat{\beta}] = \beta \text{ et } \widehat{Var}(\hat{\beta}) = (X'(S^{-1} \oplus I)X)^{-1}$$

And S, an estimator of \sum The SUR method normally uses the residuals obtained following the application of the linear regression to each of the G equations to estimate the matrix elements \sum . This gives the following estimates:

$$S_{gh} = \left(\frac{\hat{u}'_g \hat{u}'_h}{\sqrt{(n - K_g)(n - K_h)}} \right) \forall g, h = 1, 2, \dots, G$$

$$u_g = Y_g - X_g \hat{\beta}_g^*$$

Where

$$\hat{\beta}_g^* = (X'_g X_g)^{-1} X'_g Y_g$$

It will be in our case to estimate these two equations:

$$\begin{cases} cdtst_{it} = \beta_0 + \beta_1 emb_{it} + \beta_2 cap_{it} + \beta_3 tadepts_{it} + \beta_4 nca_{it} + \beta_5 matur_{it} + \beta_6 tcs_{it} + \beta_7 \log(ass) \\ cdtst_{it} = \beta_0 + \beta_1 emb_{it} + \beta_2 cap_{it} + \beta_3 tadepts_{it} + \beta_4 nca_{it} + \beta_5 matur_{it} + \beta_6 tcs_{it} + \beta_7 \log(ass) \end{cases}$$

In our model, the variable *cdtsct* represents the short-term credit outstanding relative to the total number of active customers and the variable *cdtsat* represents the outstanding amount of medium- and long-term credit compared to the total number of active customers. Model (1) measures short-term credit activity, while model (2) measures the medium- and long-term credit activity of MFIs. We used the R software to make our estimates using the *plm* command for the fixed effect model and the *systemfit* command for the simultaneous equation models.

4.3.2 Data

The database we used in our study was derived from that of the Microfinance Directorate, now the Directorate for the Regulation and Supervision of Decentralized Financial Systems in the Ivory Coast (DRSSFD). It is a decentralised service of the General Directorate of Treasury and Public Accounting, which itself is under the supervision of the Ministry of Economy and Finance

of the Ivory Coast. In addition, it provides the secretariat of the National Commission for Micro-finance (CNM) by preparing the documents and executing the decisions that emerge from these working sessions.

The data collected by the DRSSFD is subjected to several statistical checks by these services. Once validated, the data is transmitted to the national headquarters of the Central Bank of West African States (BCEAO) which, in turn, makes several verifications. Finally, all the validated data are sent to BCEAO headquarters in Dakar, Senegal.

We encountered difficulties in analysing the data. Some MFIs in the overall sample, starting at about fifty-three, did not have all the necessary information, particularly related to the number of board members. The final database contained a sample of twenty-six MFIs with two existing legal forms in the Ivory Coast; namely, the mutual institution and cooperative savings and credit form (IMCEC) and the limited company form (SA). These MFIs are nearly 80% representative in terms of savings, asset credit and number of clients.

4.4 Empirical results

4.4.1 Results of Charts 1, 2 and Descriptive Statistics

evolution of the capital structure of MFIs in Ivory coast between 2011 and 2014.

Figure 1 shows a disparity in the capital structure of MFIs. Indeed, the amounts of subsidies are very low or almost non-existent. Bank loans are relatively limited in amount. As for equity, it is negative. However, not all MFIs have negative equity. This result is due to the two main networks, UNACCOPEC-CI and RCMEC, which had equity of - \$38.81 million and -\$6.55 million, respectively, as of 31 December 2014.

Evolution of the different outstanding loans of MFIs in Ivory coast between the period 2011 - 2014.

Through Figure 2, we observe that the level of funding for medium- and long-term activities is higher than that for short-term activities. This result is contrary to microcredit activity worldwide

and the assertions of Servet (2015), Hollinger (2004), and Niyongabo and Perilleux (2014). We note that medium- and long-term financing is constantly increasing and can be explained by firm regulation and the entry into the microfinance sector of MFIs with institutional investors, such as banks, insurance companies, development agencies and investment funds. These actors have a long experience in the field of microfinance and are familiar, a priori, with the concerns in terms of financing MFI clients.

Table (1) shows the choice of variables.

First of all, we compiled three (3) dependent variables: the average size of the outstanding loans for the (tacdts) period, the short-term loans (cdtsct) and the medium- and long-term loans (cdtsat). The outstanding credit for the period was, above all, a social performance indicator (Mersland & Strom, 2009; Tchuigoua, 2011; Beisland, 2014; Dato and al., 2018). The standard stipulates that MFIs target clients excluded from the mainstream banking sector by providing small amounts of credit in order to create an income-generating activity and break the vicious cycle of poverty. Cull and al. (2007) and Mersland and Strøm (2010) argued that an increase in average loan size indicated that an MFI was targeting a clientele that was better-off financially. However, Schreiner (2002) recommended that the size of the loans and the number of clients be simultaneously considered in concluding that the MFI was deviating from its mission. The major innovation of our work comes in the consideration of the short-term outstanding loans of the period (cdtsct) and the medium- and long-term period (cdtsat). These two indicators have not been analysed in the literature and their use will help to better capture the dynamics of microcredit activity.

We established the following as explanatory variables of the microcredit activity: the index of operating subsidies (ids), the ratio of bank loans to assets (emb), the capitalisation ratio (cap) and the average size of deposits (tadepts).

First, the ids subsidy index measures the level of subsidies needed to support microcredit activity (Schreiner & Yaron, 1999). Subsidies, on the other hand, refers to the global notion of cold money characterised by subsidies, bank refinancing, external credit lines and bank guarantees.

The idea here is to know if microfinance institutions can be viable by using grants as a source of funding for their activities. According to Paxton and Fruman (1998), subsidies are very important in the microcredit activity of MFIs. They indicated that credit must be financed by something other than savings, in particular by external funds such as grants. This credit is cheap and can significantly reduce inequalities. It has an impact on economic growth and employment through low-capital investment with maximum return on capital. For Ledgerwood (1999), grants allowed MFIs to increase the portfolio of small loans in order to reach poor clients. However, Ledgerwood argued that in the long run, MFIs should finance their microcredit activities only through savings. Similarly, Morduch (1999) argued that the success of the Grameen Bank is partly due to subsidies. Armendariz and Morduch (2005) argued that microfinance is pro-poor only through subsidies. Morduch (2005) advocated greater donor involvement in the use of these grants. For example, they can help MFIs in financing specific and effective projects.

As did Schepens (2016), Valencia (2016) and Hugonnier and Morellec (2017), we chose the debt/asset ratio (*emb*)⁵. This ratio measures a company's ability to generate cash with new debt. The higher this ratio, the more leverage it provides. However, in the event of a decrease in income, the payment of receivables may be affected. As a result, the company may have difficulty in taking out new bank loans.

In addition to the *emb* ratio, we opted for the *cap* ratio (capitalization ratio) or solvency ratio. This has been an international standard since the work of the Bank for International Settlements (BIS) in the 1970s. Credit institutions must comply with the Cooke ratio, which requires them to hedge at least 8% of their weighted assets against their net equity. This standard is generally considered insufficient in microfinance because the receivables taken into account in the numerator of the ratio in the absence of registered guarantees cannot be favourably weighted and must be fully taken into account. At the WAEMU level, the minimum standard to be met is 15%.

Finally, unlike Bogan (2012), who used the deposit-to-total assets ratio to analyse the effect of changes in capital structure on the efficiency and sustainability of MFIs, we adopted the *tadeps* ratio. This ratio measures the average size of customer deposits outstanding.

Apart from the explanatory variables, we retained several control variables in our model, namely, the number of board members (*nca*), the maturity of the institution, the delinquency rate (*tcs*) and

⁵*emb*: bank debts as a percentage of total assets

the total size of the log (assets) ratio. The Board of Directors is the main management body of an MFI regardless of its legal status. Its ability to function effectively depends in part on its size and the quality of its members. Although the optimal number of board members is an important and much discussed variable in the literature (Mersland & Strom, 2009; Tchakoute, 2011), it must be a function of the volume of activity and capable of integrating all possible skills for better performance (Bassem, 2009).

The maturity of an MFI measures the number of years an MFI has been in existence. It is commonly used in the literature as a control variable (Hartarska, 2005; Mersland & Strom, 2009, Lensink and al., 2017). Hartarska (2005) analysed the impact of MFI internal governance mechanisms (diversity, remuneration, board independence) and external governance mechanisms on their financial and social performance in Eastern and Central European countries. Harstarska (2005) showed that maturity has a positive influence on social performance, particularly the number of clients. Mersland and Strom (2009) questioned the role played by MFI governance mechanisms in their financial and social performance with a sample of MFIs collected from microfinance rating agencies. They noted that maturity had a negative impact on the financial and social performance of MFIs, and found that the level of operational self-sufficiency deteriorated as the MFI gained in performance maturity. The same applied to the average loan size. Lensink and al. (2017), contrary to Mersland and Strom (2009) did not find an influence from maturity on social performance measured by the average size of loans and the number of clients served. However, they did find a positive impact from maturity on the portfolio at risk at 30 days. In other words, the level of delinquencies within 30 days increased as MFIs matured.

In addition, Fernando (2004) found that the capital structure of MFIs evolved according to their institutional and organisational life cycle, and suggested that the capital structure of MFIs is mainly explained by their level of maturity. More specifically, young MFIs (under 4 years old) are financed by grants, while mature MFIs (over 4 years old) structure their financing around customer deposits, bank debt and equity. This approach makes no sense for MFIs in the form of a public limited company. Indeed, they are created *ex-nihilo* (Lelart, 2006) without having undergone an institutional transformation; that is, they have not moved from NGO status to public limited company status.

The delinquency rate (tcs) is a financial performance indicator that measures the portfolio quality

of MFIs' at 30 days, 90 days, and 180 days at risk and provisions for delinquent and uncollectible receivables. Unlike Mersland and Strom (2009), Tchakoute (2011) and Knar and al. (2017), who used the 30 day portfolio at risk indicator, we opted to use the overall delinquency rate (self-built), which measures all delinquent receivables over the period (for each year) of MFIs.

Finally, like Tchuigoua (2011), Beisland (2014), and Knar and al. (2017), we opted for the logarithm of total log (assets) . This indicator measures the total size of an MFI's assets during its microcredit activity. Tchuigoua (2011) found a positive and significant relationship between the total size of assets and financial and social performance. In other words, increasing the level of MFI assets improved its return on asset (ROA), operational self-sufficiency (OSS), the number of clients served and the average size of loans granted. Beisland and al. (2014) found a negative and significant relationship between the log (assets) ratio and the return on equity ratio (ROA). Knar and al. (2017) showed a positive and significant relationship of the log (assets) ratio to deposit requests of for-profit MFIs; however, they did not find a significant relationship on not-for-profit MFIs.

Descriptive statistics of the quantitative variables in our model.

It can be seen that the average size of MFI credit (tacdts) is \$560. This ratio has a high standard deviation estimated at \$3,665.44 due to the legal and spatial diversity of MFIs. We therefore used the median of this ratio estimated at \$51.26. This amount is low and less than 20% of Ivory Coast's per capita gross national product estimated at \$247.7 on average over the period 2011-2014. Consequently, we can affirm that the MFIs in our sample reached a poor clientele (Ndour & Paget-Blanc, 2014)⁶

In addition, the average outstanding bank loans as a percentage of total assets is estimated at 40.76%. This result, which is below 100%, shows a mistrust on the part of banks to finance MFIs, resulting in a low level of debt that is unlike MFIs established in other countries.

The cap ratio is 12%, below the 15% standard (in the WAMU space)⁷. Ivory Coast MFIs, in

⁶According to Ndour and Paget-Blanc (2014), an MFI targets a poor clientele if the amount of credit granted to its clients is less than 20% of the Gross National Product per capita. Their conclusions were based on the work of the Consultative Group to Assist the Poorest Populations (CGAP), the World Bank body responsible for working to ensure that the poor have access to financial services around the world. through their microcredit activity. The same is true for the cdtstct ratio and the cdtstst ratio, which have a median \$30.69 and \$118.13, respectively. This result did not allow us to deduce a possible deviation from the social mission of MFIs in the Ivory Coast.

⁷WAMU: West African Monetary Union

general, are undercapitalized. However, it is important to qualify this result, as it is influenced by two MFIs with degraded capitalisation ratios. These are the mutual and cooperative institutions UNACOOPEC-CI and RCMEC, which had equity capital of \$-35.24 million and -\$4.28 million, respectively, as of 31 December 2014.

In addition, we note a sustained and strong growth in deposits of customers (tadepts) of MFIs with a median deposit amount of \$116.93, which is significantly higher than the minimum wage per month of \$109.92. This result is explained by a need to secure the financial resources of clients and by the growing trust that clients have in microfinance institutions in the Ivory Coast. The number of people on the board in our sample is relatively small, with an average of 6 people on the board. In 2014, the MFIs studied were almost mature, including UNACOOPECI, RCMEC, REMUCI and GESCI, which had more than 10 years of microcredit activities in the Ivory Coast. The average delinquency rate (tcs) was 19%. This threshold falls within a risky range because it is recommended to have a delinquent debt rate of less than 10%.

Finally, the assets of log(active) MFIs grew by 96.87% over the period studied, from \$170,51 million to \$335,70 million. This observation is explained by both the external and internal growth of MFIs in the microfinance market in the Ivory Coast.

The Pearson correlation matrix

Before performing the econometric tests, we checked whether the links between the explanatory variables of our model were too important. This could distort the variance-covariance matrix of the estimated parameters and call into question the reliability of the tests of significance of the explanatory variables (Student test). Our results show that the explanatory variables selected do not seem to have strong correlations between them. We note five (5) significant correlations out of thirty-six (36).

4.4.2 Econometric test results

The results of our econometric tests for Tables 4, 5 and 6 present significant regression models as shown by the coefficients of determination (R^2 within and R^2 within adjusted) and the p-

value associated with the Fischer test statistics of the different models studied is less than 5%. Finally, the covariance matrix of the residues is not symmetrical. Therefore, our choice of the simultaneous equation method (Table 5) was correct.

Results of the tests of the fixed versus random effect model of the average credit size

According to Table 5, the p-value associated with the Fischer test statistic is less than 1%, confirming the presence of a fixed or random individual specific effect in our sample. In addition, the Hausman test statistic that allows the choice between the fixed effect model and the random effect model is greater than 5%. In this case, it was preferable to use the random model with respect to the statistics associated with the Hausman test (>5%) because it is difficult for the Hausman test to distinguish between the fixed effect and the random effect model.

We observed a significant influence of the ids operating subsidy index, the ratio of bank loans to assets (emb) and the size of deposits on microcredit activity in general. For example, the ids grant expenditure index and the bank loan ratio have a negative and significant influence on microcredit activity (tadcts). More precisely, the amount of microcredit decreased by 1.91% and 55.38%, respectively, for an additional 1% increase in the subsidy index and bank loans. These results mean that an increase in operating subsidies and bank loans made it possible to target poor customers. These results support the assertions of Hudon and Traca (2011) and Nawaz (2012). Hudon and Traca (2011) argued that subsidised MFIs are more productive and suggested that small (smart) subsidies allowed MFIs to increase the productivity of their staff; but above a certain threshold, they reduced productivity because of the risk of moral hazard. As for Nawaz (2012), he showed that subsidies and grants from MFIs had an impact on their outreach activities, as the institutions that received the most subsidies tended to be closer to the poor (by providing small amounts). In addition, the legal status of an MFI may be a determining factor in whether or not to maintain dependence on subsidies, as well as the selection of potential borrowers (McIntosh & Wydick, 2005).

Indeed, for-profit MFIs will aim to improve financial performance indicators, reduce dependence on subsidies and maintain exposure to low-risk loans (Copestake, 2007). Not-for-profit MFIs, on the other hand, focus on subsidy dependency in order to pursue their social objective. In the

case of bank loans, Hudon and Traca (2011) also found that MFIs that have a higher proportion of funds from private donors (banks, investment funds) compared to public grants have lower rates in terms of portfolios at risk and loans in arrears, and their overall portfolios were less risky. Unlike the subsidy index and emb bank loans, customer deposits had a positive influence on tacit microcredit activity in general. The amount of microcredit increased by 153.84% for an additional 1% increase in customer deposits. This result suggests that MFIs will increase the amount of financing as they collect client savings. Saving from activities that required significant capital for customers with, for example, a better credit collection history increased their ability to finance at lower cost.

Results of the tests of the SUR long-term credit model - Table 6

Only the ratio of bank loans to assets had a negative impact on short-term credit activity $cdtsct$. Grants and equity did not have a significant impact on short-term microcredit activity. Short-term credit amounts were down by 51.09% for a 1% increase in bank loans. This result attests to the important role of borrowing in financing MFIs, particularly in the short term, and confirms the observations of Bogan (2012) and Mersland and Urgeghe (2013). According to Mersland and Urgeghe (2013), commercial financing (emb bank loans) allows MFIs to improve their financial viability and level of professionalism. As for Bogan (2012), he argued that the use of subsidies is associated with a reduction in the level of profitability of MFIs, particularly operational self-sufficiency.

We also observed that the amount of short-term loans increased by 101.13% when the level of deposits increased by 1%. This result shows that MFIs use client deposits to finance activities that require significant amounts of money, and is very interesting from the perspective that MFIs can be more responsible in terms of interest rates. According to Urgeghe (2009), MFIs are more responsible in terms of interest rates when loans are based on deposits because collecting deposits costs very little (Bald, 2008) and savings is a prerequisite before granting a possible loan to several MFIs.

We cannot conclude that there is a deviation from the MFI's social mission, as Armendariz and Szafarz (2009) showed. They argued that MFIs can finance a rich clientele and then finance a

poor one. This is called the cross-subsidy technique and will result in an increase in the size of the credits granted or the making of progressive loans; that is, increase the amount of credits as the client repays the loan.

Results of the tests of the SUR long-term credit model - Table 7

Our results show that the operating subsidy dependency index and bank loans are the only variables that have a negative and significant impact on microcredit activity in the medium and long term. In other words, MFIs grant medium- and long-term loans based on grants and bank loans. This interest of MFIs in using medium- and long-term subsidies suggests a rationing of microcredit in the medium and long term, or even a change in the targeted clientele (Robinson, 1994; CGAP, 2001). According to Robinson (1994), subsidised interest rates lead to an excess of credit demand, which would result in a rationing of the credit supply. Thus, the poorest (those offering fewer guarantees), would be marginalised to the detriment of the wealthiest, who provide more appropriate guarantees. According to CGAP (2001), subsidised interest rates are gifts to a small and wealthy clientele and lead to high default rates. They do not allow an MFI to be financially viable and make it dependent on donor support.

We note that MFIs used bank loans to finance activities that required low capital in the medium and long term. The cost of these credits was lower than credits based on short-term loans.

In addition, our results show that customer deposits make it possible to finance capital-intensive activities, the main consequence of which is the significant reduction in interest rates associated with these long-term financing operations. Indeed, the amount of medium- and long-term loans increased by 49.25% following a 1% increase in the MFI's deposit size. Microfinance could, therefore, consider financing activities that are almost non-existent to date, such as financing housing, renewable energy and agriculture in the Ivory Coast at reasonable rates. However, this method of financing long-term projects suggests the need for both rigorous management of microcredit activity for MFIs and a loan recipient with the technical and managerial capacity to carry out the project and repay the loan (Servet, 2015).

Finally, we note that the amount of medium- and long-term loans increased by 2.84% when the level of MFI assets increased by 1%. This confirms the assertions of Mersland and Strom

(2009) and Tchakoute (2011) for medium- and long-term loans, but is not obvious for short-term loans. As for points of service, our results show that the size of medium- and long-term loans decrease as a result of a 1% increase in points of service. This result can be explained by medium- and long-term risk aversion, as many MFIs are not sure of their future financing (Armendariz, D’Espallier, Hudon & Szafarz, 2011). This has a negative impact on their social mission of poverty eradication and leads them to grant larger loans (to reduce their transaction costs) rather than smaller loans (see Mersland & Strøm, 2010).

4.5 Conclusion

Ultimately, microfinance institutions (MFIs), although they have a dual financial and social objective, must face the problem of financing their activities beforehand. Our contribution through this article will be to enrich the literature by analysing the impact of the capital structure of MFIs on microcredit activity in general, and to verify to what extent these same resources can have an impact on microcredit activity in the short term or in the medium and long term.

After observing twenty-six Ivory Coast microfinance institutions over the period 2011-2014, we find that MFIs use bank loans to target poor clients, with the result that interest rates on the granted loans rise. The financing of medium- and long-term activities of capital-intensive projects is done solely through deposits and is invariant over time (short term or medium and long term). These results show that MFIs prioritise the use of funding sources. For risky activities, particularly the granting of small amounts, they use bank loans; for low-risk activities, they use deposits (by granting relatively large amounts). This confirms the theory of hierarchical financing of Myers and Majluf (1984) and Myers (1984).

We suggest, therefore, the financing of capital-intensive activities of clients with a good repayment profile by MFIs. For example, they could offer financing for housing, agriculture and renewable energy, which are in high demand by those customers excluded from the traditional banking sector, at responsible rates as long as these loans come from deposits.

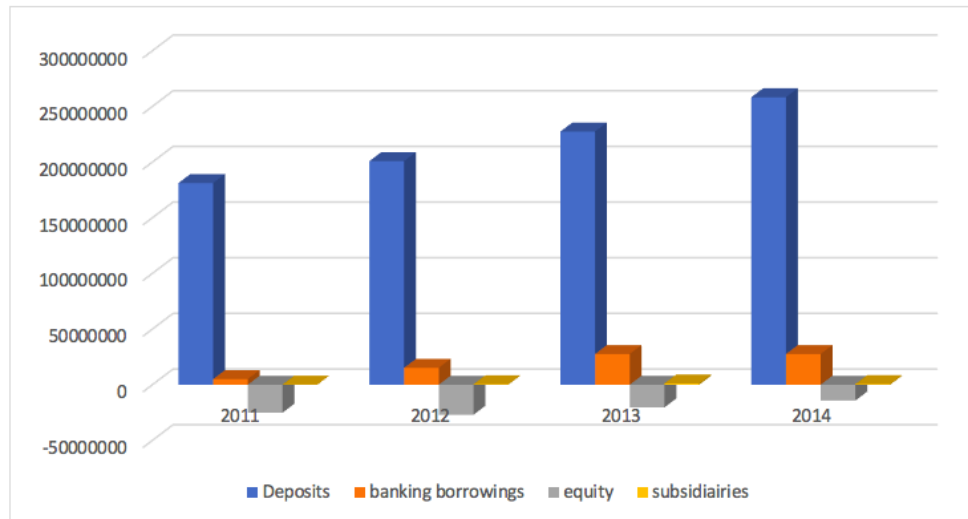


Figure 4.1: The capital structure of MFIs in Ivory coast between 2011-2014
Source: Phd Student work (in \$/US)

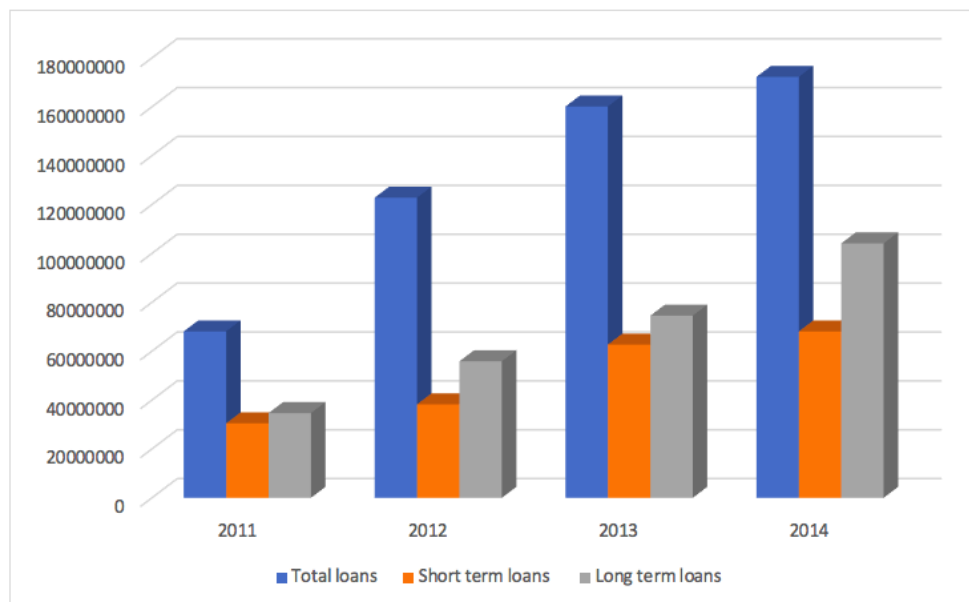


Figure 4.2: Evolution of outstanding loans in Ivory coast between 2011-2014
Source: Phd Student work (in \$/US)

APPENDIX

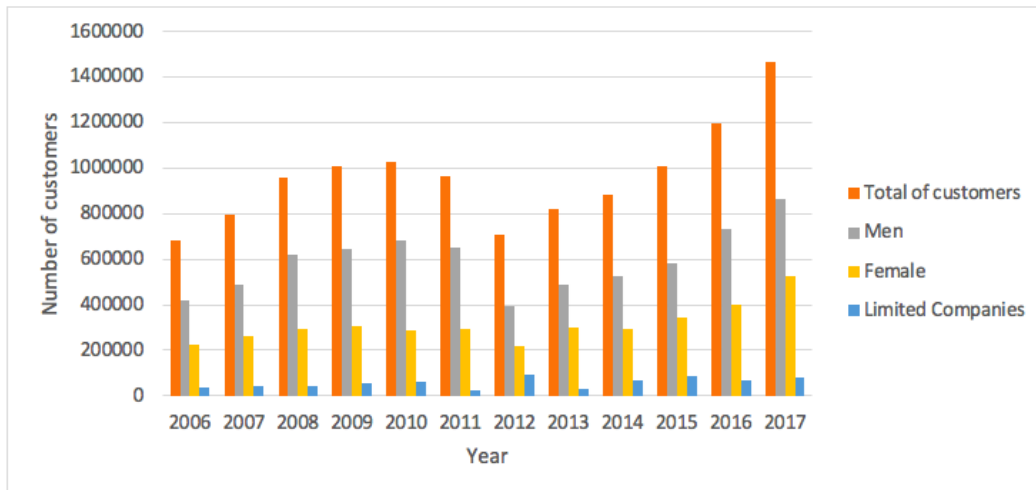


Figure 4.3: Evolution of customers 2006-2017
Source: Phd Student work

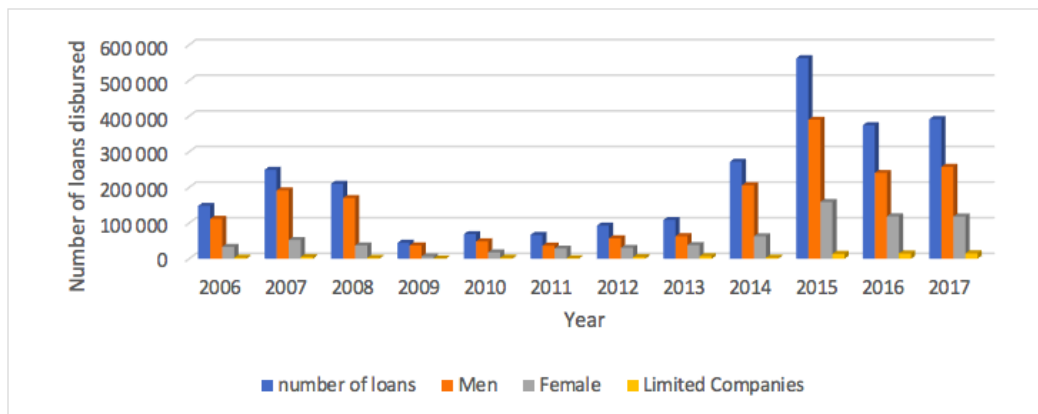


Figure 4.4: Evolution of the number of credits disbursed 2006-2017
Source: Phd Student work

Table 1: List of variables

Identification	Variable Code	Definition and Measurement
Microfinance institutions	imf	Microfinance institutions name
Dependent Variables		
Size of Credits granted to customers	<i>tacdts</i>	Ratio A / B with A = Outstanding credit period and B = Number of active customers
Size of Credits granted to customers in short term	<i>cdtsct</i>	Ratio A / B with A = Short-term credit outstanding and B = Number of active customers
Size of Credits granted to customers in long term	<i>cdtsat</i>	Ratio A / B with A = Long-term credit outstanding and B = Number of active customers
Independent variables		
Subsidiaries	<i>cap</i>	Ratio A / B with A = Amount of grants and B = Income from loans. The lower the ratio, the better the independence of grants
Bank borrowings	<i>emb</i>	Ratio A / B with A = Total amount of bank borrowings (short, medium and long term) and B = end of period asset totals in amounts
Capitalization ratio	<i>cap</i>	Ratio A / B with A = Equity and B = End-of-period active totals in amounts. The standard to be respected is Ratio A / B >= 15%
Size of Customer Deposits	<i>tadepts</i>	Ratio (A / B) with A = Total deposits (short, medium and long term) and B = Number of active customers
Independent variables		
Number of the board members	<i>nca</i>	Number of the board members
Maturity of the institution	<i>matur</i>	IMF age
Total assets	<i>assets</i>	Total assets of microfinance institution
Delinquent credit rate	<i>tcs</i>	Ratio A / B with A = Delinquent credit (30 Days, 90 Days and 180 Days) and B = outstanding credits granted for the period

Table 2: Descriptive statistics of quantitative variables

Variables	Observations	Mean	Standard-Deviation	Median	Minimum	Maximum
<i>tacdts</i>	104	560.57	3 665.44	51.26	0	37 393.16
<i>cdtsct</i>	104	442.44	3 335.14	30.69	0	34 036.26
<i>cdtsat</i>	104	9.33	387.01	118.13	0	3 356.9
<i>cap</i>	104	11.64055	49.37548	0	0	399.4243
<i>emb</i>	104	0.4076	2.69	0	0	27.4873
<i>cap</i>	104	0.12	1.02	0.22	-18.85	17.34
<i>tadepts</i>	104	901.42	5 440.16	116.93	0	55 221.37
<i>nca</i>	104	5.74	4.06	5	0	28
<i>matur</i>	104	7.34	4.06	7	1	16
<i>tcs</i>	104	0.19	0.37	0.10	0	3.36
<i>assets</i>	104	7 883 880.66	26 201 748.03	381 020.95	9 241.53	167 288 308.78
<i>pts</i>	104	8.78	24.78	1	1	126

Table 3: Pearson Correlation Coefficients

Variables	<i>cap</i>	<i>emb</i>	<i>cap</i>	<i>tadeps</i>	<i>nca</i>	<i>matur</i>	<i>tcs</i>	log(asset)	<i>pts</i>
<i>cap</i>	1								
<i>emb</i>	-0.0340	1							
<i>cap</i>	0.0239	-0.0090	1						
<i>tadeps</i>	-0.0151	0.2002**	0.0376	1					
<i>nca</i>	-0.0377	-0.0451	-0.0100	-0.0169	1				
<i>matur</i>	-0.1038	-0.0844	-0.0243	0.1149	0.2038**				
<i>tcs</i>	-0.0202	-0.0558	0.0160	-0.0700	-0.0409	-0.1130	1		
log(asset)	0.0776	0.0231	0.0691	0.1364	0.0251	0.2649***	-0.1213	1	
<i>pts</i>	0.0042	-0.0241	-0.030	-0.0386	-0.0992	0.4383***	-0.0524	0.5277***	1

*, **, *** significant at 10%, 5% and 1% respectively

Table 4: Results of Fixed and Random Effect Models of Credit Size Tests *tacdts*

Variables	Fixed Effect Model	Random Effect Models
constant	0.70 (685162.8)	-0.69 (244387.2)
<i>cap</i>	-1.59 (431.5902)	-1.91* (363.9406)
<i>emb</i>	-73.01*** (2381.772)	-55.38*** (3078.064)
<i>cap</i>	-0.98 (21470.35)	-0.94 (22138.51)
<i>tadeps</i>	172.27*** (0.0112621)	153.84*** (0.0125)
<i>nca</i>	-0.30 (3886.553)	-0.55 (3023.386)
<i>matur</i>	2.01* (17945.31)	1.06 (5675.09)
<i>tcs</i>	-1.13 (40669.6)	-0.68 (29081.74)
log(asset)	-0.97 (37889.77)	0.66 (12800.45)
<i>pts</i>	0.03 (28220.75)	-1.25 (821.1101)
<i>R²_within</i>	99.17 %	99.12 %
<i>R²_between</i>	95.69 %	98.16 %
<i>R²_overall</i>	98.27 %	98.87 %
Fischer test	F(25, 69) = 2.24	
	p-value = 0.0046	
Breusch-Pagan test		chibar2(01) = 6.36
		Prob > chibar2 = 0.0058
Hausman test	chi2(8) = 6.12 Prob>chi2 = 0.6338	

The values in brackets represent the robust and *, **, *** significant standard deviations at 10 %, 5 % and 1 % respectively / VD : Dependent variables / VI : Independent variables

Table 5: Residuals Correlation Matrix

Variables	<i>cdtsct</i>	<i>cdtsat</i>
<i>cdtsct</i>	1	
<i>cdtsat</i>	-0.1408	1

*, **, *** significant at 10%, 5% and 1% respectively

Table 6: Results of Within / Random / Model versus SUR Model Tests on Short Term Credits *cdtsct*

Variables	Fixed Effect Model	Random Effect Models	SUR Model
constant	1.05 (737935.6)	0.25 (231559.1)	0.05 (185626.3)
<i>cap</i>	-0.84 (419.8192)	-1.32 (277.2461)	-1.10 (268.0261)
<i>emb</i>	-58.13*** (2749.788)	-51.09*** (3035.611)	-45.90*** (3368.834)
<i>cap</i>	-1.06 (20386.6)	-1.03 (21063.2)	-1.20 (19831.64)
<i>tadeps</i>	125.91*** (0.0140207)	121.83*** (0.014489)	101.13*** (0.0175386)
<i>nca</i>	-1.47 (10604.52)	-0.87 (5744.969)	-0.75 (3700.233)
<i>matur</i>	2.20** (21841.89)	0.48 (8538.177)	0.02 (6423.568)
<i>tcs</i>	-1.00 (44284.29)	-0.34 (32812.47)	0.07 (25562.9)
log(asset)	-1.42 (39017.17)	-0.32 (11765.46)	-0.10 (9919.791)
<i>pts</i>	0.35 (16259.28)	-0.29 (1088.642)	-0.16 (819.3893)
<i>R² _within</i>	99.09%	98.98 %	
<i>R² _between</i>	91.44%	98.36 %	
<i>R² _overall</i>	97.04 %	98.80 %	
Fischer test	F(25, 69) = 2.12 p-value = 0.0074		
Breusch-Pagan test		chibar2(01) = 2.49	
		Prob > chibar2 = 0.0573	
Hausman test	chi2(8) = 14.09 Prob>chi2 = 0.0794		

The values in brackets represent the robust and *, **, *** significant standard deviations at 10 %, 5 % and 1 % respectively / VD : Dependent variables / VI : Independent variables

Table 7: Results of Within / Random / Model versus SUR Model Tests on long term Credits *cdtsat*

Variables	Fixed Effect Model	Random Effect Models	SUR Model
constant	-0.87 (333389.1)	-2.29** (115478.6)	-2.94*** (92143.78)
<i>cap</i>	-3.92*** (84.81156)	-2.38** (125.5883)	-2.34** (115.1559)
<i>emb</i>	-14.96*** (938.8177)	-13.14*** (1141.93)	-14.52*** (1027.079)
<i>cap</i>	0.23 (2077.891)	0.07 (1862.927)	0.08 (1699.327)
<i>tadeps</i>	59.18*** (0.0029542)	66.07*** (0.0026331)	49.25*** (0.0034477)
<i>nca</i>	1.09 (13209.59)	0.70 (5209.792)	0.45 (3273.516)
<i>matur</i>	-1.14 (10382.79)	0.02 (4903.744)	0.42 (4657.04)
<i>tcs</i>	-0.16 (10126.46)	-0.25 (10781.57)	-0.08 (16343.95)
log(asset)	1.62 (11370.81)	2.42** (6072.532)	2.84** (5345.784)
<i>pts</i>	-0.17 (27940.69)	-1.27** (549.9113)	-1.78*** (503.1716)
<i>R²_within</i>	79.64 %	78.33 %	
<i>R²_between</i>	21.62 %	66.93 %	
<i>R²_overall</i>	50.61%	74.89 %	
Fischer test	F(25, 69) = 1.86		
	p- value = 0.0229		
Breusch-Pagan test		chibar2(01) = 2.35	
		Prob > chibar2 = 0.0624	
Hausman test	chi2(8) = 6.63 Prob>chi2 = 0.5766		

The values in brackets represent the robust and *, **, *** significant standard deviations at 10 %, 5 % and 1 % respectively / VD : Dependent variables / VI : Independent variables

General Conclusion

This thesis is in line with the research entitled ‘macroeconomics of microfinance’ and ‘microeconomics of microfinance’. These two main approaches in microfinance were examined through four chapters: the transmission of monetary policy towards the interest rates of microfinance institutions; the effect of growth on the financial and social performance of microfinance institutions and banks; the internal determinants of the performance of microfinance institutions; and, finally, the impact of the capital structure on microcredit activity in the Ivory Coast. Our work consisted in examining the relationship between monetary policy and microfinance, on the one hand, and economic growth and the microfinance sector on the other. The work on the transmission of monetary policy to MFI interest rates has not been the subject of empirical work. Those analysing the link between the microfinance sector and economic growth were partly addressed by Ahlin and Jiang (2008), Thapa (2008), Krauss and Walter (2009), Buera, Kaboski and Shin (2012), Yusupov (2012), Assefa et al. (2013), Vanroose and D’Espallier (2013), Lopatta and Tchikov (2016, 2017) and Adonsou and Sylwester (2016, 2017).

In Chapter 1, we explore the extent to which monetary policy can have an impact on microfinance interest rates through the bank interest rate channel. This channel was chosen because there is a very close link between the banking and microfinance sectors. Microfinance institutions regularly refinance themselves with commercial banks, sometimes at preferential rates. This allows them to carry out their microcredit activity, especially in the event of a drying up of operating subsidies or insufficient collection of deposits. To this end, we estimate the GMM panel var model, which combines the traditional VAR approach treating all system variables as endogenous with panel data estimation techniques and allows unobserved individual heterogeneity by

introducing fixed effects (Love and Zicchino, 2006). Our results show that the key rates have a negative and significant impact on the interest rates of *loanr_p* and non-commercial *loanr_np* MFIs delayed by a period at the 1% threshold. More precisely, the rates of commercial and non-commercial MFIs decrease by 11.92% and 7.77%, respectively, when the key rates, delayed for a period, increase by 1%. This result is identical to the effect of monetary policy on bank rates (Agur and Demertzis, 2019). Moreover, impulse response functions show that a rise in the key interest rate has an immediate impact on the interest rates of commercial and non-commercial MFIs. However, the magnitude of the shock on commercial MFIs is greater than that on non-commercial MFIs, estimated at 1.5% and 0.1%, respectively. This positive shock then results in a negative impact with a peak in the first year estimated at 2% that disappears at the end of the third year. In addition, we observe that the variance in the forecast error of the rate of *loanr_p* commercial MFIs is due to 69% of its own innovations, 16.71% of key rate innovations, 10.86% of bank rate innovations and 3.1% of *loanr_np* non-commercial rate innovations.

Our results are in line with Peter's (2013) assertions that for-profit MFIs are considered part of the movement towards a more commercial microfinance sector. They are expected to set more appropriate loan prices and operate more effectively in terms of financial sustainability and sustainable social impacts (Callen et al., 2003; Hermès and Lensink, 2007; Chakravarty and Pylypiv, 2015), making it easier for them to attract the necessary investments in the microfinance sector. Our results then show that 83% of the variance in the forecast error of the rate of *loanr_np* non-commercial MFIs is due to its own innovations and 10.4% to innovations in the rates of *loanr_p* commercial MFIs. The *centralbir* key rates and *bankir* bank rates are not significant because their contributions to the variance of the forecast error of the rates of *loanr_np* non-commercial MFIs are estimated at 2.5% and 3.8%, respectively. These last two results show that *loanr_np* non-commercial MFI interest rates are less sensitive to monetary policy than those of *loanr_p* commercial MFIs, whose contribution to the variance of the error is estimated at 16%.

The purpose of Chapter 2 was to analyse the relationship between economic growth and the financial sector on a non-cylindrical panel of seventy five (75) countries between 1999 and 2016. We estimated a GMM panel model to determine the contribution of MFIs and commercial banks to economic growth. Our results show that an increase in the size of *albbm* loans,

the percentage of female fbm borrowers and the number of active nabm borrowers contribute to the increase in economic growth. We note, however, that an increase in overall credit outstanding reduces the level of economic growth. This result confirms Servet's (2015) assertions that microfinance can act as an expansion factor in countries that produce goods through these loans. The real beneficiaries are those who will receive the financial flows through the interest on loans or dividends paid by microcredit institutions. We also observe that financial performance, particularly the ratio of bank credit to deposits, banks' liquid assets on deposits and short-term financing, return on assets, the ratio of non-interest income of banks to total income and bank credit granted to the banking sector have a positive effect on economic growth. The last result, that of the bcps ratio, is contrary to the assertions of Donou-Adonsou and Sylvester (2017), who found that only MFI loans have significant and positive effects on growth. However, the effect is not significant. In Claire, a 1% increase in the MFIs' credit growth rate only increases economic growth by about 0.1%. The coefficients for bank loans remain statistically insignificant. In addition, we have identified several channels for transmitting economic growth to MFIs and banks. Indeed, microfinance institutions affect economic growth through two transmission channels: investment and consumption, while investment, consumption and human capital are for banks towards economic growth.

In Chapter 3, we look at the internal determinants of the financial and social performance of microfinance institutions. Our work is based on observations from Hartarska (2005, 2009) and Mersland and Strøm (2009) in Central and Eastern European countries and from Tchakoute (2011), Barry and Tacneng (2014) and Wamba et al. (2014) which analyse the influence of governance mechanisms on the performance of microfinance institutions in Sub-Saharan Africa on a sample. Thus, we selected a sample of microfinance institutions observed during the period 2011 to 2014. This information comes from the database of the National Commission for Microfinance, the regulatory body for the microfinance sector. This commission is under the authority of the Ministry of Economy and Finance of the Ivory Coast, whose chairman is the Director General of the Treasury and Public Accounting. We highlight the effect of some original variables on financial and social performance. In this way, we show a positive influence of the legal form on financial performance. More specifically, we show that MFIs with 'public limited company' status

generate higher profit margins than mutual and cooperative savings and credit institutions (IM-CEC). On the other hand, prudential ratios, the MFI's maturity, the size of client deposits, the size of the board of directors and the number of points of service do not seem to have any influence on its financial performance. Regarding social performance, the maturity of the MFI, the points of service and the geographical coverage of the MFI play a positive role in the attractiveness of the clientele. Finally, the capitalisation ratio, geographical coverage and deposit size play a major role in the evolution of the size of loans granted to customers.

Finally, Chapter 4 examines the impact of the capital structure in microfinance, the founding work of which is that of Kyereboah-Coleman (2007), who studied the impact of the capital structure on the performance of 52 Ghanaian MFIs between 1995–2004. In the case of the Ivory Coast, we have built a database of twenty-six (26) MFIs between 2011–2014. As in Chapter 3, this database comes from the Directorate of Regulation and Supervision of Decentralized Financial Systems (formerly the Microfinance Directorate DM), which provides the secretariat of the National Commission for Microfinance (CNM), the regulatory body for the microfinance sector in the Ivory Coast. We find that bank loans have a negative impact on the amount of short-term and long-term loans granted by MFIs. In other words, MFIs reduce the amount of credit they provide to their clients when they use bank loans. This practice allows them to target a low-income clientele with a consequent increase in the cost of credit, which will allow them to improve their financial viability and their level of professionalism Mersland and Urgeghe (2013). Also, our results show that client deposits have a positive impact on the size of loans granted by MFIs in the short and long term. More specifically, MFIs increase the amount of credit when they use client deposits, which will allow them to be more accountable for Bald lending rates (2008). In addition, we observe that subsidies have no effect on short-term microcredit activity. However, we note that subsidies negatively affect the size of loans granted in the medium and long term. Precisely, MFIs reduce the amount of loans when they are based on operating subsidies. This result suggests a short-term rationing for medium- and long-term use, reinforcing the assertions of Robinson (1994) and CGAP (2001). Indeed, Robinson (1994) argued that subsidised interest rates lead to an excess of credit demand that would result in a rationing of credit supply. Thus, the poorest, those offering fewer guarantees, would be marginalised to the detriment of the wealth-

iest, who provide more appropriate guarantees. According to CGAP (2001), subsidised interest rates are gifts to a small and wealthy clientele and lead to high default rates. They do not allow an MFI to be financially viable and subject to donor dependency.

All this work has highlighted some problems that have not been very well addressed in the academic literature on microfinance and would open up other avenues of research, such as the effect of monetary policy on MFI performance, the dynamic relationship between economic growth and MFI credit or the analysis of external governance on MFI performance.

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Introduction générale en Français

Pertinence de cette recherche en microfinance

Les IMF se caractérisent par la recherche conjointe d'objectifs financiers et sociaux (Ndour et Paget-Blanc, 2014 ; Dorfleitner et al., 2017, Caserta et al., 2018). Elles ont permis d'accroître le niveau de vie des populations exclues du secteur bancaire classique (Banerjee et al., 2015 ; Guérin, 2015), de réintégrer des personnes marginalisées dans la société, notamment les femmes (D'Espallier et al., 2011 ; Boehe et Cruz, 2013). Par ailleurs, d'après le baromètre 2018 de la microfinance basé sur les données de 2016-2017, les IMF ont atteint 139 millions de clients (soit une progression de 5.6%) pour un portefeuille de crédits de 114 milliards de \$ (soit une progression de 15.6%). Ces données statistiques révèlent un fort potentiel de croissance pour la microfinance dans le monde et témoignent du dynamisme d'un secteur qui soutient un nombre grandissant de clients vulnérables et de microentreprises grâce à l'offre combinée de services financiers et non financiers. Ainsi, la microfinance est au cœur de l'activité économique et sociale et la question de son impact au niveau macroéconomique devient de plus en plus pertinente (Raihan et al., 2017) notamment ses conséquences sur la croissance économique. Cependant, bien que la microfinance ait permis d'améliorer la santé, la nutrition, la création d'emplois et la cohésion sociale (Khetker, 2005 ; Afrane, 2002 ; Beck et al., 2004, Hietalahti et Linden, 2006 ; Hossain et Knight, 2008 ; Odell, 2010), elle est largement critiquée en raison de sa faible performance financière et sociale (Roodman, 2012 ; Simanowitz, 2011). Aussi, sa pratique de taux d'intérêts élevés aux clients (Servet, 2015) a suscité la désapprobation de dirigeants politiques internationaux (Hudon, 2007). Par exemple, le président Ortega du Nicaragua avait demandé aux clients des IMF de son pays de cesser le remboursement de leurs dettes (Gonzalez, 2010).

Il en est de même pour les pouvoirs politiques indiens suite à la crise du microcrédit dans l'Etat d'Andhra Pradesh, où la pression du microcrédit solidaire sur les emprunteurs avait entraîné des faillites (Servet, 2015).

De plus, de par sa capacité à rechercher à la fois des objectifs financiers et sociaux, la microfinance fait l'objet de débat entre deux grandes approches à savoir l'approche welfariste et l'approche institutionnaliste. Contrairement à l'approche Welfariste qui privilégie l'octroi des prêts à des taux en dessous du marché tout en s'appuyant sur les subventions (Mayoux, 1998), les IMF ayant adopté l'approche institutionnaliste (Hermes et Lesink, 2007 ; Noël et Ayayi, 2009 ; Dehejia et al., 2012) appliquent des taux d'intérêts sur les prêts qui sont largement supérieurs aux taux pratiqués dans le secteur bancaire (Mallick, 2012). Ces taux d'intérêts sont en général de l'ordre de 20% à 80% par an ; certaines IMF ont octroyé des taux d'intérêt supérieurs à 100% notamment l'IMF Compartamos et Te creemos (environ 125%) au Mexique et ont connu un large succès (Epstein et Smith, 2007 ; Danel et Labarthe, 2008 ; Malkin, 2008 ; Adams, 2008). Plusieurs raisons peuvent expliquer ces taux excessifs notamment le coût de la collecte de ressources estimé environ à 10%, les dotations aux provisions pour créances douteuses, avoisinant le taux de 2%, les charges d'exploitations pour un taux de 6% et enfin la prise en compte d'un bénéfice pour un taux de 6%. Ensuite, les IMF n'ont pas accès au guichet de refinancement des banques centrales, contrairement aux établissements de crédits. Elles sont obligées de se financer, en partie, auprès des banques commerciales. Enfin, très peu d'IMF sont cotées en bourse ; on peut citer quelques cas, notamment la BRI en Indonésie, la BRAC Bank au Bangladesh, l'Equity Bank au Kenya, Compartamos au Mexique, SKS en Inde et Kaliko Microcredit Development Bank au Népal (Servet, 2015).

Contexte de cette recherche en microfinance

Dans les pays en développement, l'histoire du microcrédit rime avec la création de la Grameen Bank dont le fondateur est l'illustre Professeur Mohammad Yunus. En effet, au milieu des années

1970, monsieur Yunus se livrait à des enquêtes, auprès des paysans situés dans les villages pauvres du Bangladesh, sur les effets du recours aux usuriers (Blondeau, 2006 ; Lélart, 2006). Son attention fut retenue en particulier par une femme qui essayait de survivre en fabricant des chaises en bambou. La fabrication de ces chaises lui rapportait quelques centimes de dollars après la déduction faite du prêt nécessaire pour l'achat de la matière première : le bambou. En s'inspirant de cette situation, il met en place un système de crédit basé sur les crédits solidaires. Cette pratique consiste à octroyer des prêts à des emprunteurs organisés en petits groupes de cinq personnes généralement des femmes qui se connaissent et se regroupent d'ailleurs selon leur affinité. Ainsi, chaque membre du groupe reçoit un prêt individuel à condition qu'il accepte la responsabilité du remboursement des crédits accordés aux autres membres du groupe s'ils sont dans l'incapacité ou s'ils refusent d'honorer volontairement leur dette. Les prêts sont octroyés pour une période d'un an et renouvelables. Sur chaque crédit est prélevée une somme destinée à une épargne obligatoire restituée le jour où le client décide de ne plus recourir à la banque.

Partant de ce fait on pourrait définir la microfinance comme un domaine d'activité financière qui regroupe une diversité d'acteurs financiers également appelés Systèmes Financiers Décentralisés (SFD) en Afrique de l'Ouest ou institutions de microfinance (IMF) dont la mission est de mettre à la disposition des populations généralement exclues du système bancaire classique (aux ménages pauvres et à bas revenus ainsi qu'aux micro-entrepreneurs) des services d'épargne, de crédit, d'assurance et depuis peu de transfert. Demandé pour divers motifs, le microcrédit est principalement octroyé pour financer une activité génératrice de revenu. C'est un prêt accordé à des personnes pauvres donnant lieu à un remboursement du crédit avec un taux d'intérêt (Benedetto, 2011). Le remboursement du prêt s'effectue sur une période relativement courte allant de quelques jours/semaines à trois ans. Dans la pratique, le microcrédit recouvre des formes variées, entre les microcrédits individuels et les microcrédits collectifs ou solidaires fondés sur la caution solidaire d'un groupe, leur montant varie selon les pays, les populations ciblées, de même que les échéances de remboursement et le niveau des taux d'intérêt. Parmi les microcrédits solidaires, il convient encore de distinguer les prêts où l'institution entretient une relation directe avec chaque membre du groupe de ceux où c'est le groupe qui gère le prêt et sa répartition. Dans un cas comme dans l'autre, ces microcrédits peuvent être conçus comme une

phase d'apprentissage avant l'octroi de prêts individualisés. Des IMF offrent les deux possibilités en proposant de commencer par le premier, les meilleurs clients pouvant ensuite solliciter ou se voir proposer un crédit individuel.

Une fois présentées les caractéristiques générales de la microfinance, il importe de distinguer la microfinance pratiquée dans les pays développés de celle dans les pays en voie de développement notamment en Côte d'Ivoire au regard de sa finalité.

Dans les pays développés, l'État providence rencontre des limites dans le traitement du chômage de masse et de longue durée. D'où la nécessité de permettre aux chômeurs de créer leur propre emploi à travers la création de micro entreprises. Ainsi, le microcrédit est conçu comme un instrument de lutte contre le chômage de longue durée, la précarité sociale et économique, mais aussi de promotion de la microentreprise. Selon le baromètre 2018 de la microfinance se basant sur les données de l'année 2016-2017, une étude récente a été commandée par le Réseau Européen de la Microfinance (REM) et le Centre de Microfinance (MFC) pour Evers & Jung évalue le potentiel total du marché du microcrédit aux entreprises à 2,7 millions de demandes de prêts dans l'Union Européenne (UE-28), soit un volume total de 17,4 milliards d'euros de demande potentielle en 2016 (Evers & Jung, 2017). Ces données montrent les besoins en termes de financements des petites entreprises européennes. De plus, En 2017, 157 IMF issues de 28 pays membre de l'UE ont affirmé l'octroi d'environ 700 000 microcrédits pour un encours brut de crédit estimé à plus de 3.1 milliards d'euros et ont servi près d'un million d'emprunteurs actifs. Les bénéficiaires sont des autoentrepreneurs et des microentreprises dans la plupart des cas et peuvent être supérieurs à 25000 \$. C'est dans ce cadre que l'Association pour le Droit à l'Initiative Économique (ADIE) a été créée en France, avec à sa tête Madame Maria Nowak, dans le but d'adapter le système de microcrédit au contexte français. Sa mission est de financer et de soutenir les personnes sans emploi qui souhaitent créer leur propre entreprise mais qui ne sont pas admissibles à un prêt bancaire. Tout particulièrement, le microcrédit a pu apparaître aussi comme une réponse aux préoccupations autour des banlieues où force a été de constater une moindre présence des banques. A cet effet, on distingue deux

types de microcrédit en France : le microcrédit personnel, qui vise à favoriser l'employabilité des emprunteurs, et le microcrédit professionnel, qui finance une activité génératrice de revenus. La taille des crédits est plus élevée que dans les pays en voie de développement, les crédits ont des taux d'intérêt fixe, la durée maximale de 3 ans et 80% des microcrédits peuvent bénéficier de la garantie apportée par l'État dans le cadre du fonds de cohésion sociale. Les régions de l'Ouest de la France (Pays de la Loire, Poitou Charentes, Aquitaine et Bretagne) sont celles qui ont le plus de personnes bénéficiaires.

Dans le reste de l'Europe, le développement du système de microcrédit est inégal. Le microcrédit connaît davantage une expansion en Europe de l'Est qu'en Europe Occidentale. En réponse à l'inégal développement du microcrédit, mais aussi à la nécessité de sensibiliser les pays de l'Union Européenne à l'importance de la microfinance, on a assisté ces dernières années à une volonté des acteurs de mieux communiquer sur cette manière d'envisager la finance. Ainsi en 2007, la Commission de l'Union Européenne élaborait l'Initiative européenne pour le développement du microcrédit en faveur de la croissance et de l'emploi.

En Côte d'Ivoire, pays d'Afrique de l'ouest et objet de deux travaux empiriques dans notre thèse, la crise des années 80 a conduit à la disparition des banques de développement des États de l'union monétaire ouest africain (UMOA). Le secteur de la microfinance s'est révélée être la seule alternative au financement bancaire classique des opérateurs économiques et du secteur informel. A cet effet, de nombreuses réformes économiques aussi bien régionales que nationales ont favorisé l'essor et l'encadrement du secteur de la microfinance. Par exemple, la réforme de la politique de la monnaie et du crédit de 1989 a permis aux autorités de l'UMOA de mettre en œuvre les conditions des réglementations du secteur financier informel caractérisé par la pratique des tontines. D'où la mise en œuvre par la banque centrale des états d'Afrique de l'ouest (BCEAO) du Programme d'Appui à la Réglementation des Mutuelles d'Épargne et de Crédit (PARMEC), dont l'objectif est de favoriser l'émergence d'institutions financières viables et crédibles, capables de créer les conditions d'insertion progressive du secteur financier informel dans l'économie moderne. Le processus aboutit à l'adoption de la loi n° 96-562 du 22 Juillet 1996 portant réglementation des Institutions Mutualistes ou Coopératives d'Épargne et de Crédit. Les résultats enregistrés, depuis la mise en œuvre de la réglementation des IMF en 1996, sont

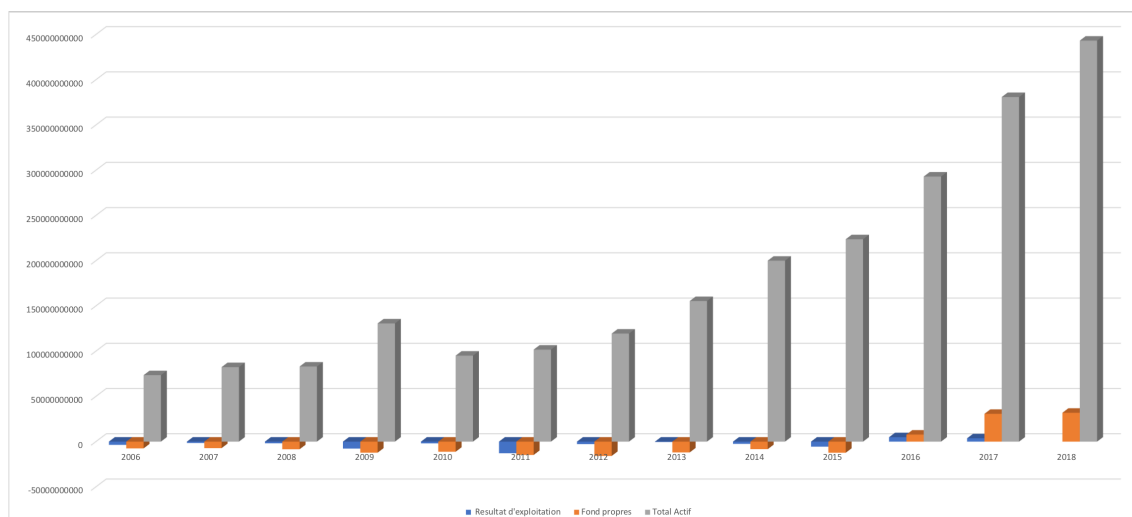


Figure 4.5: Évolution de la situation financière des IMF entre 2006-2018

Source: Travail du doctorant

*Les données relatives au résultat d'exploitation de l'année 2018 ne sont pas disponibles

encourageants. A titre d'illustration, de 3 IMF en 1996, la Côte d'Ivoire compte au 30 décembre 2018 près de 50 IMF (hors caisses affiliées), dont 33 institutions mutualistes et coopératives, 17 sociétés anonymes et 30 caisses unitaires . De plus, l'encours de dépôt est estimé à 498 millions de \$. Quant à l'encours de crédit, il atteint 525 millions de \$. L'ensemble, de ces structures, dispose d'environ 411 points de services repartis sur l'ensemble du territoire national. Sur la même période, le nombre de bénéficiaires des services des IMF est passé de moins de 100 000 personnes à 1 727 189 personnes composé de 61.81% d'hommes, de 32.21% de femmes et de 5.97% de personnes morales .

Cette croissance qui devrait permettre au secteur de la microfinance d'atteindre son objectif social qui est la lutte contre la pauvreté, voit sa pérennité menacée par divers problèmes. Des déficits importants, en termes de résultats d'exploitations et de fonds propres, ont affecté de manière négative les performances des IMF comme l'illustre la figure 1. Par exemple, au 31 décembre 2015 des fonds propres du secteur de la microfinance étaient évalués à – 20.9 millions de \$ et des résultats d'exploitations, à la même période, estimés à -9.4 millions de \$.

Selon le rapport d'inspection de la Direction de la microfinance de l'année 2016 , ces difficultés sont dues au manque de professionnalisme des IMF, à la dégradation importante du portefeuille de crédits et surtout à la mauvaise gouvernance des IMF. Autrement dit, de tous

ces facteurs précédemment énumérés qui limitent la double performance financière et sociale (Morduch, 1999 et 2000) des IMF ivoiriennes, les problèmes liés à la gouvernance sont particulièrement préoccupants notamment un conseil d'administration pléthorique, le non-respect des ratios prudentiels et une structure financière dégradée. Cette situation nous emmène à réfléchir aux déterminants de la performance financière et sociale des IMF et à l'impact de la structure financière sur l'activité de microfinance en Côte d'Ivoire.

Problématique

Dans ce contexte, la littérature académique s'est évertuée à apporter des réponses à plusieurs questions notamment : Quels sont les déterminants des taux d'intérêts des IMF ? Les crédits octroyés par les IMF améliorent-ils la croissance économique ? Quel est l'impact de la gouvernance des IMF sur leurs performances financières et sociales ? En quoi le changement institutionnel peut-il avoir des effets sur la structure financière des IMF ? La structure financière peut-elle avoir une influence sur les performances des IMF ?

Bien que des réponses ont été apportées dans la littérature académique, plusieurs questions demeurent, cependant, sans réponses. Cette thèse envisage contribuer à la littérature académique en analysant empiriquement la relation entre la politique monétaire, la croissance économique et le secteur de la microfinance sur un panel de pays en voie de développement. Il s'agira pour nous de répondre à quatre questions notamment :

1) La politique monétaire a-t-elle un impact sur les taux d'intérêts des IMF ?

Si oui peut-on affirmer que le taux d'intérêt bancaire est-il un canal de transmission de la politique monétaire vers le taux d'intérêt des IMF ? En effet, les IMF se financent auprès des banques commerciales qui elles-mêmes se refinancent auprès de la banque centrale pour mener leur activité de crédit. Par conséquent, peut-on affirmer qu'il existe un effet indirect de la politique monétaire sur les taux d'intérêts des IMF ? Au niveau macroéconomique, le taux d'intérêt

observé sur les marchés ou taux d'intérêt nominal dépend du taux d'intérêt réel et de l'inflation anticipée qui mesure la perte probable du pouvoir d'achat. D'après la théorie keynésienne, une augmentation de l'offre de monnaie par les autorités monétaires doit, par le jeu de l'offre et la demande, provoquer une baisse du taux d'intérêt. Cet effet de la politique monétaire est-il le même pour les taux des IMF commerciales et non commerciales ?

2) Au regard du rôle de plus en plus important que joue la microfinance en termes de services financiers et non-financiers à ses clients, peut-on affirmer que la microfinance améliore-t-elle la croissance économique ? En clair, il est nécessaire de savoir si les IMF contribuent à la croissance économique en se focalisant sur leurs performances financières et/ou sociales ? Les travaux analysant la relation entre la croissance économique et le développement financier ont fait l'objet de plusieurs approfondissements dans la littérature académique. Nous nous inscrivons dans les travaux de Mac Kinnon (1973) et Shaw (1973), qui suggèrent que le développement financier est indispensable à la croissance économique des pays sous-développés. Selon Mac Kinnon (1973) et Shaw (1973), la faiblesse de la croissance économiques de ces pays est due à un niveau de développement financier très faible. De plus, nous nous sommes basés sur la théorie de la croissance endogène (Romer, 1986, 1990 ; Lucas, 1988 ; Barro, 1995 ; Aghion et Cohen, 2004). En effet, la théorie de la croissance endogène propose l'abandon de l'hypothèse d'exogénéité du progrès technique et estiment qu'il existe plusieurs sources de la croissance notamment le capital humain, le capital public, le capital physique, le capital technique ...). Nous estimons que la microfinance est une innovation financière qui pourrait avoir un impact sur la croissance économique. Si oui, existe-t-il des canaux de transmissions du secteur de la microfinance vers la croissance économique ? Cette situation est-elle vraie dans un secteur financier où cohabitent ensemble les IMF et les banques commerciales ?

3) Les travaux examinant l'effet de la gouvernance des IMF sur leur performances financières et sociales ont été réalisés sur un échantillon de pays d'Europe Centrale et de l'Est (Hartarska, 2005 ; Mersland and Strom 2009) et en Afrique (Tchakouté, 2011). Toutefois, force est de constater que les travaux sur le secteur de la microfinance en Afrique de l'Ouest sont très

rare et notamment ceux analysant le secteur de la microfinance en Côte d'Ivoire sont quasiment inexistant malgré une croissance rapide de ce secteur depuis sa mise en place institutionnelle en 1996. Ainsi, nous nous sommes penchés sur la question suivante : Quels sont les déterminants de la performance financière et sociale des IMF en Côte d'Ivoire ? Il s'agit ici de savoir dans quelle mesure la gouvernance interne des IMF peut-elle affecter leurs performances ? Plus précisément, est-ce que le nombre de personnes au conseil d'administration des IMF ivoiriennes favorise-t-il l'augmentation ou la réduction de leurs performances ? Les ratios prudentiels ont-ils un effet positif ou négatif sur les performances des IMF ? Le choix de la forme juridique d'une IMF (coopérative/ mutualiste et société anonyme) est-elle une variable déterminante des performances des IMF ivoiriennes ?

En effet, la gouvernance se trouve au centre de la performance financière et sociale de toute institution de microfinance. Elle est fondée sur des règles formelles, impersonnelles et explicites et permet d'assurer un niveau élevé d'information, de pouvoir et de confiance (Meisel, 2004). Elle part du constat d'une nécessaire séparation entre la propriété de capital et la direction effective de l'entreprise (Fama et Jensen, 1983). Ce constat a abouti à un modèle actionnaire-mandant appelé (principal) et dirigeant-mandataire appelé (agent) et est analysé dans le cadre de la relation d'agence (Mackling Jensen, 1976). Rapportée aux IMF, cette séparation peut faire émerger des conflits d'intérêts en terme de gouvernance et aurait pour conséquence de dégrader leurs performances financières et sociales.

4) La structure financière des IMF a-t-elle un impact sur l'activité de microcrédit en Côte d'Ivoire à court et/ou à long terme ? En clair, Les emprunts bancaires contribuent-elles à l'augmentation du niveau de crédit octroyé aux clients ? Les dépôts des clients sont-ils une source de financement de l'activité de microcrédit ? Quel est le rôle des subventions reçues par les IMF ivoiriennes dans leur activité de microcrédit ? Qu'en est-il des fonds propres des IMF ivoiriennes ? La structure du capital est un élément important dans l'explication de la performance des entreprises depuis plus d'un demi-siècle (Modigliani & Miller, 1958). Nous nous appuyons sur la théorie du financement hiérarchique de Myers et Majluf (1984) et Myers (1984) pour combler le gap dans la littérature académique. Cette théorie suggère que les managers des entreprises procèdent à une hiérarchisation des sources de financements pour limiter

les couts liés à l'asymétrie d'information entre le principal et l'agent.

Pour mener à bien nos travaux, nous avons utilisé les méthodes quantitatives classiques en finance et notre contribution à la littérature se fait à travers quatre chapitres.

Structure de la thèse

Nos travaux se positionnent à la lisière de deux grandes thématiques en microfinance notamment celle se rapportant à la macroéconomie de la microfinance et celle relative à la microéconomie de la microfinance. La macroéconomie de la microfinance analyse le lien qu'a la microfinance avec les indicateurs macroéconomiques notamment la croissance économique, l'inflation, le revenu par habitant, le niveau de pauvreté, les inégalités de revenu. Ensuite, les travaux associés à la microéconomie de la microfinance examinent les relations entre les indicateurs de performance financière et sociale, l'impact de la gouvernance sur les performances financière et sociale, le rôle des femmes dans l'atteinte des performances des IMF. Et depuis peu, cet axe de recherche essaie d'analyser dans quelle mesure le changement de statut juridique des IMF peut affecter les différentes performances d'une part et le rôle indispensable de la structure du capital dans l'activité de microcrédit ou son impact sur les indicateurs de performances des institutions de microfinance (IMF).

Le chapitre I examine l'effet de la politique monétaire sur les taux d'intérêts des institutions de microfinance (IMF) afin de comprendre les problèmes liés à la hausse des taux d'intérêts en microfinance. En effet, les IMF n'ont pas accès au guichet de refinancement des banques centrales, contrairement aux établissements de crédits. Plusieurs hypothèses peuvent justifier cette exclusion. Tout d'abord, les financements de la banque centrale (BC) sont garantis par des titres mis en pension, et il est peu probable que les IMF en aient en portefeuille. Se pose aussi la question de la capacité de la BC à superviser des institutions nombreuses et de petites tailles. Cependant, les IMF se finançant auprès des banques commerciales qui en retour se financent

auprès de la banque centrale. Ce mécanisme nous emmène à réfléchir sur un possible effet de la monétaire indirect sur les taux d'intérêts des IMF par le biais des taux d'intérêts des banques commerciales. Il convient de rappeler que cette réflexion n'a à ce jour pas fait l'objet de travaux dans la littérature académique.

Ensuite, le chapitre II discute de la relation entre la croissance économique et les performances des banques et des IMF. Ces travaux s'inscrivent dans la lignée de recherche d'Ahlin et Jiang (2008), Maksudova (2010), Vannroose et D'esppallier (2013), Donou-Adonsou et Sylvester (2016, 2017). Par exemple, selon Ahlin et Jiang (2008), le microcrédit réduit généralement les inégalités et la pauvreté à long terme d'une part et d'autre il peut accroître ou diminuer la croissance économique à long terme. Maksudova (2010) analyse la relation de causalité au sens de Granger entre la microfinance et la croissance économique sur un échantillon transnational comprenant des données sur plus de 1 400 IMF de 102 pays entre 1995-2009. Maksudova (2010) trouve que la microfinance cause au sens de Granger la croissance économique même si les effets sont différents selon le niveau de développement des pays : la microfinance n'a un effet positif que dans les pays les moins développés. Vannroose et D'esppallier (2013) analysent la relation entre la portée et la performance des institutions de microfinance (IMF), d'une part, et le développement du secteur financier traditionnel, d'autre part entre 1997 et 2006 sur un échantillon de 1073 institutions de microfinance provenant des cinq principales régions en développement du monde . Vannroose et D'esppallier (2013) trouvent que les IMF atteignent plus de clients et sont plus rentables dans les pays où l'accès au système financier traditionnel est faible. Ce résultat est conforme à l'hypothèse de défaillance du marché : Les IMF répondent à un besoin que les banques ne comblent pas et les IMF prospèrent là où le secteur financier formel est en faillite.

Il s'agit ici de savoir dans quelle mesure les IMF contribuent à l'augmentation ou à la réduction de la croissance économiques lorsqu'elles se focalisent uniquement sur leurs performances financières, uniquement sur leurs performances sociales, ou sur les deux. De plus, nous cherchons d'une part à savoir si les performances IMF et les banques contribuent à l'amélioration de la croissance économique et d'autre part à déterminer d'éventuels canaux de transmissions vers la croissance économique notamment l'investissement, la consommation, le capital humain.

Après avoir vu les implications macroéconomiques des institutions de microfinance, nous avons, à travers le chapitre III et IV, examiné respectivement les déterminants de la performance interne des institutions de microfinance et l'impact de la structure du capital sur l'activité de microcrédit. Ces deux travaux ont été réalisées à la suite de notre stage au sein de la Direction de la réglementation et de la supervision des systèmes financiers décentralisés (DRSSFD). L'article III examine les déterminants de la gouvernance interne des IMF en Côte d'Ivoire sur un échantillon de vingt-deux (22) IMF entre 2011 et 2014. En effet, les recherches explorant l'impact de la gouvernance des IMF sur leurs performances financière et sociale ont fait l'objet de plusieurs travaux empiriques dans différentes régions du monde.

Par exemple, quelques travaux se sont intéressés à l'effet d'un conseil d'administration trop important et à la présence de membres non nationaux dans le conseil d'administration (Kyereboah-Coleman et Osei, 2008 ; Mori et al., 2015). Kyereboah-Coleman et Osei (2008) trouvent que l'indépendance et un accroissement du conseil d'administration améliorent la performance financière mesurée par le rendement sur actifs (ROA) et la performance sociale mesurée par la taille du crédit octroyée. De plus, Kyereboah-Coleman et Osei (2008) arguent que la présence d'un président-directeur général réduit le rendement des actifs mais n'a pas d'effet sur la taille moyenne des crédits octroyée aux clients. Quant à l'augmentation du mandat du président-directeur général (PDG), il a un effet négatif sur la performance financière et sociale des IMF. Mori et al. (2015), l'amélioration de la diversité au sein du conseil - généralement par l'ajout d'un plus grand nombre de membres indépendants, internationaux et/ou féminins - devrait être considérée comme un moyen d'améliorer l'expertise du conseil en matière de suivi de la gestion et de performance sociale. L'ajout d'une plus grande diversité au conseil d'administration pourrait également améliorer la compréhension des besoins des clients pauvres et fournir des liens solides avec les fournisseurs de ressources qui sont importants pour la mission de l'IMF.

Par ailleurs, des travaux ont discuté de l'efficacité des mécanismes de gouvernance, du point de vue des propriétaires (actionnaires, coopérateurs ou bailleurs de fonds), estimant leur contribution à l'efficacité financière, sociale et organisationnelle des IMF (Gohar et Batool, 2015

; Augustine et al., 2016 ; Adusei et Obeng ; 2019). Gohar et Batool (2015) évaluent l'effet de la gouvernance d'entreprise sur la performance financière, économique et sociale des institutions de microfinance (IMF) au Pakistan. L'échantillon comprend 25 IMF et couvre la période comprise entre 2005 et 2009. Gohar et Batool (2015) trouvent que la présence de femmes à des postes de direction ne joue aucun rôle dans l'amélioration de la performance économique, mais a une incidence positive sur les activités de sensibilisation. Augustine et al. (2016) mesurent la performance économique par le retour sur actif (ROA) et l'OpEx pour mesurer l'efficacité opérationnelle. Augustine et al. (2016) trouvent que la diversité du genre améliore la performance économique, notamment en Afrique et suggèrent aux décideurs et aux gestionnaires de mieux déployer la gente féminine dans le personnel des microfinances afin de pérenniser les performances économiques des IMF. Adusei et Obeng (2019) analysent l'effet de la diversité du genre au sein du conseil d'administration sur la structure du capital de 441 institutions de microfinance provenant de 69 pays. Adusei et Obeng (2019) trouvent un effet négatif, robuste et statistiquement significatif de la diversité du genre au sein des conseils d'administration sur la structure du capital. Ils concluent que la mixité au sein des conseils d'administration est un facteur important de la structure du capital des IMF et qu'elle diminue les niveaux d'endettement des IMF et, par extension, diminue leur exposition au risque de faillite.

Quant aux travaux sur la Côte d'Ivoire, ils sont quasi-inexistants malgré une expansion du secteur de la microfinance, en termes de nombre de clients, d'encours de dépôts et de crédits dans le paysage financier ivoirien. D'où l'intérêt de nos travaux qui mettent en lumière l'effet de la gouvernance interne des IMF sur leurs performances financière et sociale.

L'article IV analyse l'impact de la structure du capital sur l'activité de microcrédit.

Dans le secteur de la microfinance, plusieurs travaux s'intéressent à la relation entre la structure du capital et les performances des IMF.

Certains travaux s'intéressent à l'effet de la structure du capital sur les performances financières et sociales des IMF. Comme Shafer et Fukasawa (2011) qui déterminent les facteurs qui décrivent au mieux l'autosuffisance opérationnelle (OSS) d'une institution de microfinance (IMF) entre 2006 et 2008 sur un échantillon de 1,000 MFI. Shafer et Fukasawa (2011) montrent que le ratio déposants/emprunteurs, le ratio dépôts/ portefeuille de prêts n'ont pas d'effets significatifs

sur l'autosuffisance opérationnelle (OSS) d'une IMF. Lislevand (2012) trouve, sur un échantillon de 403 IMF issues de 73 pays, que la plupart des IMF sont fortement endettées et elles utilisent environ quatre fois plus de financement par emprunt que de fonds propres. De plus, les résultats de leurs régressions ont révélé que le ratio de la dette totale par rapport à l'actif et le ratio de la dette à court terme par rapport à l'actif ont un effet positif et significatif sur le coût des fonds. Plus précisément, d'autres travaux mettent en évidence le rôle primordial des subventions dans l'atteinte des objectifs financiers et sociaux des IMF (Hudon et Traca, 2011 ; Mukherjee, 2014 ; Lebovics et al., 2016). Par exemple, Hudon et Traca (2011), à partir d'une base de données originale d'agences de notation des données empiriques, trouvent que les subventions ont un impact positif sur leur efficacité. Toutefois, Hudon et Traca (2011) constatent que l'obtention de subventions par les IMF au-delà d'un certain seuil rend l'effet marginal sur l'efficacité négatif. Mukherjee (2014) examine le rôle des instituts de microfinance (IMF) dans l'apport de capitaux aux populations ultra pauvres et montre que les subventions excessives pourraient chasser les emprunteurs pauvres du secteur de la microfinance. Lebovics et al. (2016) utilisent un échantillon de 28 IMF vietnamiennes pour identifier l'existence d'un arbitrage entre l'efficacité financière et l'efficacité sociale dans un contexte de subventions implicites de l'État et des donateurs internationaux. Lebovics et al. (2016) constatent que, l'efficacité financière et sociale ne sont pas liées et considèrent cela comme une preuve du fait qu'il n'y a aucune raison de croire qu'il y a un tel arbitrage. De plus, Lebovics et al. (2016) trouvent que les subventions, sur la base desquelles la plupart des IMF vietnamiennes opèrent actuellement, les aident à faire preuve d'une grande efficacité financière, tout en étant en mesure d'atteindre leurs objectifs sociaux tout en soulignant que ce résultat pourrait ne pas être viable à long terme.

Comme dans l'article III, les travaux analysant le lien entre la structure du capital et la performance des IMF mesurée par l'activité du microcrédit en Côte d'Ivoire sont quasi-inexistants. De plus, ces travaux prennent en compte rarement les données associées à une dynamique à court terme et long terme de la structure du capital sur l'activité de microcrédit.

Contributions à la littérature

Cette thèse contribue à la littérature sur la microfinance en s'appuyant sur les approfondissements récents de la littérature quantitative. Ces apports sont de plusieurs ordres.

D'abord, l'article I, étudie l'impact de la politique monétaire sur les taux d'intérêts des IMF en estimant un modèle GMM panel var sur la période 2004-2013. Nous montrons que le taux bancaire est un canal de transmission de la politique monétaire vers les taux d'intérêts des IMF. De plus, les fonctions de réponse impulsionnelles font apparaître un impact positif immédiat des taux directeurs sur les taux des IMF. Toutefois, cet impact devient négatif à court terme et revient à son origine pour ensuite disparaître au bout de la deuxième année. Enfin, les résultats de la décomposition de la variance de l'erreur révèlent que les taux des IMF à vocation non commerciale sont moins sensibles à la politique monétaire contrairement à ceux des IMF à vocation commerciale. Ce résultat peut s'expliquer par la possibilité des IMF à vocation commerciale à avoir un accès plus important au financement bancaire contrairement aux IMF à vocation non commerciale.

Ensuite, à travers l'article II, nous avons analysé la signification statistique de la relation entre la croissance économique et les performances des banques et des institutions de microfinance par le biais de la méthode des moments généralisés sur données de panel entre 1999 et 2016. Nos principales contributions à la littérature antérieure sont doubles. Premièrement, nous considérons une plus grande variété d'indicateurs pour appréhender les différents aspects de l'activité des banques et des IMF. Deuxièmement, outre les canaux traditionnels de transmission tels que l'investissement et le capital humain, nous disposons d'un canal de transmission potentiel important, à savoir la consommation. Nos travaux montrent que, les performances des IMF contribuent au développement économique même si l'on tient compte des performances des banques. De plus, nos résultats suggèrent qu'en améliorant leurs performances financière et sociale, les IMF augmentent l'investissement et la consommation. Enfin, nous trouvons également que les performances financières des banques améliorent la croissance économique à

travers différents canaux de transmission notamment l'investissement, la consommation et le capital humain.

Enfin les articles III et IV étudient les effets de la gouvernance internes des IMF sur leurs performances et portent respectivement sur un échantillon de 26 et 22 IMF issu de la base de données de la Direction de la Réglementation et de la Supervision des Systèmes financiers décentralisés (DRSSFD) entre 2011 et 2014 en Côte d'Ivoire. En effet, l'article III s'intéresse aux indicateurs relatifs à la gouvernance des IMF (Taille du conseil d'administration, ratios prudentiels, statut juridique, présence d'acteurs institutionnels dans le conseil d'administration) ayant un impact sur leurs performances financière (la marge bénéficiaire, l'indice de dépendance aux subventions) et sociale (Nombre de clients des IMF, taille moyenne de crédits octroyés aux clients). Quant à l'article IV, il a pour objet d'analyser l'impact de la structure du capital sur l'activité de microcrédit. La structure du capital étant mesurée par l'indice de dépendance aux subventions, le ratio emprunts bancaires sur le total de l'actif, la taille moyenne des dépôts et le total des fonds propres sur l'actif. Quant à l'activité de microcrédit, elle est mesurée par la taille moyenne de crédits octroyés aux clients. Concernant le chapitre III, nos travaux montrent les IMF ayant le statut de « société anonyme » dégagent des marges bénéficiaires plus importantes que les institutions mutualiste et coopérative d'épargne et de crédit (IMCEC). Enfin, à travers le chapitre IV, nous constatons que les prêts aux populations à faibles revenus sont refinancés par les emprunts bancaires dont la conséquence est le renchérissement du taux prêteur. Nous montrons également que les IMF qui se refinancent par les dépôts ont une activité de prêt plus importante que celles qui se refinancent par des emprunts bancaires.

Titre: Politique monétaire, croissance économique et microfinance: une analyse théorique et empirique sur données de panel de pays en voie de développement

Mots clés: Politique monétaire, Croissance économique, Gouvernance d'entreprise, Microfinance

Résumé: Tout d'abord, cette thèse examine les relations d'une part entre la politique monétaire et la microfinance et d'autre part celles liées à la croissance économique et le secteur de la microfinance. Nos résultats montrent dans le premier cas que les taux des institutions de microfinance (IMF) à vocation non commerciale sont moins sensibles à la politique monétaire contrairement à ceux des IMF à vocation commerciale. Ce résultat peut s'expliquer par la possibilité des IMF à vocation commerciale à avoir un accès plus important au financement bancaire contrairement aux IMF à vocation non commerciale. Quant au deuxième cas, nous trouvons que la microfinance affecte la croissance économique à travers les canaux de transmission que sont la consommation et l'investissement. Ensuite, nous avons analysé l'impact des indicateurs de gouvernance notamment le nombre de personnes au conseil d'administration, le statut juridique et les ratios de prudentielles sur les performances financières et sociales des IMF dans un premier temps et dans un second temps nous examinons l'effet de la structure du capital sur l'activité de microCredita court, moyen et long terme. En ce qui concerne la gouvernance, nous trouvons que les IMF ayant le statut de « société anonyme » dégagent des marges bénéficiaires plus importantes que les institutions mutualiste et coopérative d'épargne et de Credit(IMCEC). Quant aux travaux sur la structure du capital, nous remarquons que les prêts aux populations à faibles revenus sont refinancés par les emprunts bancaires dont la conséquence est le renchérissement du taux prêteur. Enfin, nous constatons que les IMF qui se refinancent par les dépôts ont une activité de prêt plus importante que celles qui se refinancent par des emprunts bancaires.

Title: Microfinance, Growth and Monetary Policy : A Theoretical and Empirical Analysis Using Panel Data From Developing countries.

Keywords: Monetary policy, Economic growth, Corporate governance, Microfinance

Abstract: Firstly, this thesis examines the relationships between monetary policy and microfinance on the one hand and economic growth and the microfinance sector on the other. Our results show in the first case that the rates of non-commercial microfinance institutions (MFIs) are less sensitive to monetary policy than those of commercial MFIs. This result can be explained by the possibility that commercial MFIs have greater access to bank financing than non-commercial MFIs. As for the second case, we find that microfinance affects economic growth through the transmission channels of consumption and investment. Then, we analyzed the impact of governance indicators such as the number of people on the board of directors, legal status and prudential ratios on the financial and social performance of MFIs first and then we examine the effect of capital structure on microcredit activity in the short, medium and long term. With regard to governance, we find that MFIs with "public limited company" status generate higher profit margins than mutual and cooperative savings and credit institutions (IMCEC). As for the work on the capital structure, we note that loans to low-income populations are refinanced by bank loans, the consequence of which is the increase in the lending rate. Finally, we note that MFIs that refinance themselves through deposits have a higher lending activity than those that refinance themselves through bank loans.