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Microfinance institutions, banking, growth and transmission channel : A GMM panel data analysis from developing countries

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Abstract

This paper aims to analyse the statistical significance of MFIs' and banks' performance on economic development through a GMM panel analysis between 1999 to 2016. Our main contributions to previous literature are twofold. Firstly, we consider a greater variety of indicators to capture different aspects of the banks' and MFIs' performance. Secondly, besides traditional channels of transmission such as investment and human capital, we account for an important potential transmission channel, which is consumption. We mainly find that despite their relatively small size, MFIs' performance contributes to economic development even when banks' performance is taken into account. Furthermore, our results suggest that by improving their social and financial performance, MFIs increase investment and consumption. Especially, we show that women use their loans to consume rather than to invest. Finally, we also find that banks' performance improves GDP per capita through investment, consumption and human capital.

Keywords : Microfinance, Bank, Growth.

JEL codes : C51,G21, O43.

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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 (2019), the gross loan portfolio of the 762 worldwide MFIs reporting data to this institution totalled USD 112 billion at the end of 2017.

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 financial development contributes to the improvement of economic growth, the corollary of which can be the reduction of poverty levels. 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).

In addition, although some randomized field experiment have found a non-significant impact of access to microcredit on consumption (Augsburg and al. 2015; Banerjee and al. 2015; Angelucci and al. 2015; Tarozzi and al. 2015); it is interesting to note that several works confirm a significant effect (Attanasio and al.; 2015; Cai and al., 2017). Precisely, Attanasio and al.; 2015 use an randomized controlled trial to analyze the impacts of microcredit in Bosnia and Herzegovina.

Their present present some evidence of reduction in consumption and savings. In Addition, Attanasio and al. (2015) evaluate the impact on poverty of a joint responsibility microcredit programme for women in Ethiopia. They find a positive impact of access to group loans on household food consumption. Cai and al (2017) find that consumer spending increases on non-durable goods, durable services and housing services in Chinese villages. 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 Literature review

Many researchers have focused on the impact of MFIs on economic development. We will see the theoretical work in a first part and the empirical work in a second part.

2.1 Theoretical studies

Through a theoretical analysis, Ahlin and Jiang (2008) model the long-run effects of microfinance 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 a theoretical model, Buera and al. (2017) 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 microfinance 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.

2.2 Empirical studies

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.

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 primar-

ily invested as physical capital. However, microfinance loans could still augment total factor productivity.

We note that in our review of the literature there is no work that analyses the impact of both bank and microfinance institutions performances on economic growth. Second, we also note that there is no consideration of consumption as a transmission channel. Hence the interest of our work.

3 Choice of indicators

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.

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

3.2 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 opera-

tions 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; Tchougoua 2011). Note that individuals who have multiple loans or accounts with an MFI are counted as a single client. However, individuals who are not currently 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 as-**

sets of MFIs include all asset accounts net of all contra-asset accounts, such as the loan-loss allowance and accumulated depreciation (see Tchuigoua 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.

3.3 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.

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."

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 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 cyclicalities.

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 non-financial sector that banks own and that can provide future financial benefits (see Fratianni and al. 2017).

4 Methodology

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

MFI 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 5) in order to ensure reliability of data (as in Ahlin and al. 2011; Tchuigoua 2011 ; Lopatta and al. 2017).

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:

$$y_{it} = \alpha + c_i + \beta x'_{it} + \dots + u_{it} \quad (1)$$

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 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, IV² methods provide a way to nonetheless obtain consistent parameter estimates. Formally, the model is written as follows:

$$y_{it} = \beta_1 x_{it}^1 + \beta_2 x_{it}^2 + u_{it}^1 \quad (2)$$

$$x_{it}^1 = \gamma_2 x_{it}^1 + \gamma_3 x_{it}^2 + u_{it}^2 \quad (3)$$

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-

²Although 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.

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 estimator³ is more 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:

$$y_{it} = \alpha + c_i + \rho y_{it-1} + \beta_1 x'_{it} + u_{it} \quad (4)$$

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:

$$\mathbb{E}\{z_{it}u_{it}(\beta)\} = \mathbb{E}\{z_{it}(y_{it} - (\beta)x'_{it})\} = \mathbf{0} \quad (5)$$

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.

5 Results

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

³We used the stata software in our work and Blundell, Bond, and Windmeijer (2000) estimator which is also known as Arellano-Bover/Blundell-Bond system estimator.

0.943962, whereas in our sample it ranges from 0.0036 to 16.16. 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.

As regards the performance of the banks, Table 4 shows that on average the z-score ratio is 12.23, which means that the banks in our sample are low risk. Next, we note that on average the BLAD ratio is 36.72%. This is considered to be a prudent level, as reinforced by the Basel III provisions on liquidity reserves, which recommend a minimum BLAD of 10%. Table 4 shows a bank cost-to-income ratio on average of 59.67% significant that for every 100 USD of income. Generated by banks 59.67 USD are absorbed by operating expenses and reflect a good performance. Lower ratios generally indicate greater efficiency, but a number of factors can affect the ratio, including the business model and size of a bank. Bank interest income as a percentage of assets averages 6.21%. This shows that USD 100 of assets earn an average of USD 6.21 in interest income and reflects the good performance of the banks in our sample. Bank overheads as a percentage of total assets is on average 5.28% and indicates that the banks in our sample have a good management of overheads as this indicator is low, more precisely it is less than 10%. The Return on Bank Assets (broa) is estimated at 2.18% on average and reflects a good performance. This means that for every 100 USD of assets, MFIs generated on average 2.18 USD. We note that the return on equity (broe) ratio of banks is on average 21.61%. This result shows that the banks in our sample have a good capacity to attract investors because this ratio is very high. The ratio of non-interest banking income to total income (bnii) is on average 37.96%. This result that the banks generate in addition to interesting financial income (ROE, ROA), non-financial income which is very important. In other words, out of 100 USD of total income, the banks in our sample generate 37.96 USD in terms of non-financial income.

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 (DWH) 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.

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 inter-banking 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 consumption, 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, KDA 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 assets 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.

5.4 Transmission channels

5.4.1 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.

5.4.2 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 Guérin'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 undermines 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.

5.4.3 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 *bcbd* 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.

6 Robustness check

We performed several robustness checks to verify that the results are robust and that the transmission channels are appropriate.

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 Dalglis (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.

6.2 Transmission channels

6.2.1 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.

6.2.2 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 1 – GMM 6). In addition, a higher number of active borrowers decreases GNI per capita (Table 1 – 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 4, 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.

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.

Finally, our work shows that the coexistence of banks and MFIs does not harm their contribution to economic growth (see table A1 GMM(8)). Moreover, several reflections of research can emerge from this work, in particular:

- It would be interesting to know the contribution to economic growth of each legal status of MFIs. More specifically, is this contribution the same for all legal statuses?
- Also, we can break down the overall contribution of MFIs to economic growth in time and space (by large geographical areas). Clearly, the question is whether MFIs have an impact on economic growth in the short and long term in developing countries, for example in Africa, Latin America, Asia and Eastern Europe.

References

- Abubakar, A., Kassim, S. H., and Yusoff, M. B. (2015). Financial Development, Human Capital Accumulation and Economic Growth: Empirical Evidence from the Economic Community of West African States (ECOWAS). *Procedia-Social and Behavioral Sciences*, 172, 96-103. <https://doi.org/10.1016/j.sbspro.2015.01.341>
- Aebi, V., Sabato, G., and Schmid, M. (2012). Risk management, corporate governance, and bank performance in the financial crisis. *Journal of Banking and Finance*, 36(12): 3213-3226. <https://doi.org/10.1016/j.jbankfin.2011.10.020>
- Adeniyi, O. M., (2006). *Bank Credit and Economic Development in Nigeria: A Case Study of Deposit Money*[2]. Banks. University of Jos, Jos
- Ahlin, C., Lin, J., and Maio, M. (2011). Where does microfinance flourish: Microfinance institution performance in macroeconomic context. *Journal of Development Economics*, 95(2): 105-120. <https://doi.org/10.1016/j.jdeveco.2010.04.004>
- Alexiou, C., Sofoklis, V., 2009. Determinants of bank profitability: Evidence from the Greek banking sector. *Economic Annals* 54(182): 93-118. <https://doi.org/10.2298/EKA0982093A>
- Alimukhamedova, N., and Hanousek, J. (2015). What do we know about microfinance at macro glance? CEPR Discussion Paper No. 10484.
- Ang, J. B. (2008). What are the mechanisms linking financial development and economic growth in Malaysia? *Economic Modelling*, 25(1): 38-53. <https://doi.org/10.1016/j.econmod.2007.04.006>
- Armendariz de Aghion, B., and Morduch J. (2003). *Microfinance: Where do we stand?* Forthcoming in Charles Goodhart (ed.), *Financial Development and Economic Growth: Explaining the Links*. London: Macmillan/Palgrave.
- Athanasoglou, P. P., Brissimis, S. N., Delis, M. D. (2008). Bank-specific, industry specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions and Money* 18(2): 121-136. <https://doi.org/10.1016/j.intfin.2006.07.001>
- Augsburg B., De Haas R., Harmgart H. and Meghir, C. (2015). The Impacts of Microcredit: Evidence from Bosnia and Herzegovina *American Economic Journal: Applied Economics*, 7(1): 1-22 <http://dx.doi.org/10.1257/app.20130272>
- Blundell, R., Bond, S., and Windmeijer, F. (2000). Estimation in dynamic panel-data models: improving on the performance of the Standard GMM Estimator. In B. H. Baltagi, T. B. Fomby, R. Carter Hill (Eds.), *Nonstationary panels, panel cointegration, and dynamic panels* (pp. 53-91). Bingley: Emerald Group Publishing Limited.

Baltagi, B. H., Demetriades, P. O., and Law, S. H. (2009). Financial development and openness: Evidence from panel data. *Journal of Development Economics*, 89(2): 285–296. <https://doi.org/10.1016/j.jdeveco.2008.06.006>

Banerjee A., Duflo E, Glennerster R. and Kinnan C. (2015). The Miracle of Microfinance? Evidence from a Randomized Evaluation. *American Economic Journal: Applied Economics*, 7(1): 22–53. <https://doi.org/10.1257/app.20130533>

Beck, T., Demirgüç-Kunt, A., and Levine, R. (2000). A new database on the structure and development of the financial sector. *World Bank Economic Review*, 14(3): 597–605. <https://doi.org/10.1093/wber/14.3.597>

Beisland, L. A., Mersland, R., and Randøy, T. (2014). The association between micro-finance rating scores and corporate governance: A global survey. *International Review of Financial Analysis*, 35, 268–280. <https://doi.org/10.1016/j.irfa.2014.10.012>

Blundell, R., Bond, S., and Windmeijer, F. (2000). Estimation in dynamic panel-data models: improving on the performance of the Standard GMM Estimator. In B. H. Baltagi, T. B. Fomby, R. Carter Hill (Eds.), *Nonstationary panels, panel cointegration, and dynamic panels* (pp. 53-91). Bingley: Emerald Group Publishing Limited.

Brière, M., and Szafarz, A. (2015). Does commercial microfinance belong to the financial sector? Lessons from the stock market. *World Development*, 67, 110–125. <https://doi.org/10.1016/j.worlddev.2014.10.007>

Brunnermeier, M. K., Dong, G. N. and Palia, D. (2011). Banks' non-interest income and systemic risk. Working Paper, Princeton University. <https://dx.doi.org/10.2139/ssrn.1786738>

Buera, F., Kaboski, J., and Shin, Y. (2017). The macroeconomics of microfinance (NBER Working Paper No. 17905). Retrieved from the National Bureau of Economic Research website: <https://www.nber.org/papers/w17905>

Cai S., Park, A., Wang S. (2017). Microfinance Can Raise Incomes: Evidence from a Randomized Control Trial in China. Working paper https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=RESConf2017&paper_id=103

Caporale, M. G., Raul, C., Sova, R., and Sova, A. (2015). Financial development and economic growth: Evidence from ten new EU members. *International Journal of Finance and Economics*, 20(1):48-60. <https://doi.org/10.1002/ijfe.1498>.

Chaia A., Dalal, A. , Goland, T., Gonzalez, M.J., Morduch, J, and Schiff, R (2009). *Half the World is Unbanked*. Financial Access Initiative Framing Note, New York, Cambridge, New Haven.

Copstake, J., and Williams, R. (2011). What is the impact of microfinance, and what

does this imply for microfinance policy and for future impact studies? Oxford: Oxford Policy Management.

Cournède, B. and O. Denk (2015), *Finance and Economic Growth in OECD and G20 Countries*. OECD Economics Department Working Papers, No. 1223, OECD Publishing, Paris.

Cournède, B., O. Denk and P. Hoeller (2015a). *Finance and Inclusive Growth*. OECD Economic Policy Papers, No. 14, OECD Publishing, Paris.

Devarajan S., V. Swaroop, and H. Zou, (1996). Composition of public spending and economic growth. *Journal of Monetary Economics*, 37(2): 313–344.
[https://doi.org/10.1016/S0304-3932\(96\)90039-2](https://doi.org/10.1016/S0304-3932(96)90039-2)

Dietrich, A., Wanzenried, G., (2011). Determinants of bank profitability before and during the crisis: Evidence from Switzerland. *Journal of International Financial Markets, Institutions and Money*, 21(3): 307-327. <https://doi:10.1016/j.intfin.2010.11.002>.

Donou-Adonsou C. F. and Sylwester K., (2015). Macroeconomic Effects of Microfinance: Evidence from Developing Countries. *Journal of Economic Insight (formerly the Journal of Economics (MVEA))*, Missouri Valley Economic Association, vol. 41(1): pages 21-35.
<https://doi.org/10.1016/j.qref.2016.11.001>

De Gregorio, J., and Guidotti, P. E. (1995). Financial development and economic growth. *World Development*, 23(3): 433–448. [https://doi.org/10.1016/0305-750X\(94\)00132-I](https://doi.org/10.1016/0305-750X(94)00132-I)

Fahlenbrach, R., and Stulz, R. M. (2011). Bank CEO Incentives and the Credit Crisis. *Journal of Financial Economics*, 99: 11-26. <https://doi.org/10.1016/j.jfineco.2010.08.010>

Fратиани M. and Marchionne F. (2017). Bank asset reallocation and sovereign debt, *Journal of International Financial Markets, Institutions and Money*, 47, 15-32.
<https://doi.org/10.1016/j.intfin.2016.11.011>

García-Herrero, A., Gavilá, S., Santabárbara, D. (2009). What explains the low profitability of Chinese banks? *Journal of Banking and Finance* 33, 2080-2092.
<https://doi.org/10.1016/j.jbankfin.2009.05.005>

Guérin I. (2015). *La microfinance et ses derives. Emanciper, discipliner ou exploiter ?* Paris, Démopolis.

Gul, F. A., Podder, J., and Shahriar, A. Z. M. (2017). Performance of microfinance institutions: Does government ideology matter? *World Development*, 100, 1–15.
<https://doi.org/10.1016/j.worlddev.2017.07.021>

Hartaska, V. (2005). Governance and Performance of Microfinance Institutions in Central and Eastern Europe and the Newly Independent States. *World Development* 33(10):1627–1643. <https://doi.org/10.1016/j.worlddev.2005.06.001>

Hassan, M., Sanchez, B., and Yu, J. (2011). Financial development and economic growth: New evidence from panel data. *The Quarterly Review of Economics and Finance*, 51(1): 88-104. <https://doi.org/10.1016/j.qref.2010.09.001>

Hasan, I., Koetter, M., Lensink R., Meesters, A. (2009a). Bank efficiency, financial depth, and economic growth, Available at SSRN: <http://ssrn.com/abstract=1475415>. <https://dx.doi.org/10.2139/ssrn.1475415>

Hermes, N., Lensink, R., and Meesters, A. (2011). Outreach and Efficiency of Microfinance Institutions. *World Development*, 39(6): 938–948. <https://doi.org/10.1016/j.worlddev.2009.10.018>

Hossain, Mahabub. (1998). Credit for alleviation of rural poverty: The Grameen Bank of Bangladesh. IFPRI Research Report No. 65. Washington, D.C.: International Food Policy Research Institute.

Hudon, M., and Périlleux, A. (2014). Surplus distribution and characteristics of social enterprises: Evidence from microfinance. *The Quarterly Review of Economics and Finance*, 54(2): 147-157. <https://doi.org/10.1016/j.qref.2013.10.002>

Hulme D. and Paul M. (1996). *Finance Against Poverty*, London, Routledge, 221-451

Hulme, D. (1991). The Malawi Mudzi Fund: Daughter of Grameen. *Journal of International Development* 3(4): 427-431. <https://doi.org/10.1002/jid.4010030315>

Jalilian, H., and Kirkpatrick, C. (2002). Financial development and poverty reduction in developing countries. *International Journal of Finance and Economics*, 7(2): 97–108. <https://doi.org/10.1002/ijfe.179>

Johnson, S. (2004). Gender norms in financial markets: Evidence from Kenya. *World Development* 32(8): 1355-1374. <https://doi.org/10.1016/j.worlddev.2004.03.003>

Khan, M., and Senhadji, A. (2000). Financial development and economic growth: An overview. IMF Working Paper 00/209. <https://dx.doi.org/10.5089/9781451874747.001>

Khander, Shahidur R., Baqui Khalily, and Zahed Khan. (1995). *Grameen Bank: Performance and Sustainability*. World Bank Discussion Paper No. 306. Washington, D.C.: World Bank.

Khandker, S. R. (2005). Microfinance and poverty: Evidence using panel data from Bangladesh. *The World Bank Economic Review*, 19(2): 263–286. hdl.handle.net/10986/16478

Khandker, S. R., and Samad, H. A. (2014). Dynamic effects of microcredit in Bangladesh. Policy Research Working Paper No. 6821, World Bank. <https://doi.org/10.1596/1813-9450-6821>

King, R., and Levine, R. (1993a). Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics*, 108(3): 713–737. <https://doi.org/10.2307/2118406>

King, R., and Levine, R. (1993b). Finance, entrepreneurship, and growth: Theory and evidence. *Journal of Monetary Economics*, 32(3): 513–542. [https://doi.org/10.1016/0304-3932\(93\)90028-E](https://doi.org/10.1016/0304-3932(93)90028-E)

Knar Khachatryan, Valentina Hartarska and Aleksandr Grigoryan (2017). Performance and Capital Structure of Microfinance Institutions in Eastern Europe and Central Asia, *Eastern European Economics*, 55(5): 395-419. <https://doi.org/10.1080/00128775.2017.1336064>

Lacalle-Calderon, M., Chasco, C., Alfonso-Gil, J., and Neira, I. (2015). A comparative analysis of the effect of aid and microfinance on growth. *Canadian Journal of Development Studies*, 36(1): 72–88. <https://doi.org/10.1080/02255189.2015.984664>

L., Nys, E., Rous, P., Tarazi, A. (2008). Bank income structure and risk: an empirical analysis of European banks. *Journal of Banking and Finance* 32(8): 1452–1467. <https://doi.org/10.1016/j.jbankfin.2007.12.002>

Levine, R., Loayza, N., and Beck, T. (2000). Financial intermediation and growth: Causality and causes. *Journal of Monetary Economics*, 46(1): 31–77. [https://doi.org/10.1016/S0304-3932\(00\)00017-9](https://doi.org/10.1016/S0304-3932(00)00017-9)

Lopatta, K., and Tchikov, M. (2016). Do microfinance institutions fulfill their promise? Evidence from cross-country data. *Applied Economics*, 48(18): 1655–1677. <https://doi.org/10.1080/00036846.2015.1105924>

Lopatta, K., Tchikov, M., Jaeschke, R., and Lodhia, S. (2017) Sustainable Development and Microfinance: The Effect of Outreach and Profitability on Microfinance Institutions' Development Mission. *Sustainable Development* 25(5): 386–399. <https://doi.org/10.1002/sd.1663>

Maksudova, N. (2010). Macroeconomics of microfinance: How do the channels work? CERGE-EI Working Paper Series No. 423.

Meslier, C., Morgan, D.P., Samolyk, K., Tarazi, A. (2016). The benefits and costs of geographic diversification in banking. *Journal of International Money and Finance*, 69(C):287–317. <https://doi.org/10.1016/j.jimonfin.2016.07.007>

Meslier, C., Tacneng, R., Tarazi, A. (2014). Is bank income diversification beneficial? evidence from an emerging economy. *Journal of International Financial Markets, Institutions and Money*, vol. 31(C):97-126. <https://doi.org/10.1016/j.intfin.2014.03.007>

Mersland, R., Øystein Strøm R. (2009). "Performance and governance in microfinance institutions," *Journal of Banking and Finance*, vol. 33 (4): 662- 669. <https://doi.org/10.1016/j.jbankfin.2014.01.014>

Moore, W., (2010), How do financial crises affect commercial bank liquidity? Evidence from Latin America and the Caribbean. MPRA Paper, No. 21473,.

Nwanyanwu, O.J., (2010). An Analysis of Bank Credit on the Nigeria Economic Growth (1992-2008). *Jos Journal of Economics*, [60]. 4: 43-58.

Odedokun, M. O. (1996). Alternative econometric approaches for analyzing the role of the financial sector in economic growth: time-series evidence from LDCs. *Journal of Development Economics*, 50(1): 119–146. [https://doi.org/10.1016/0304-3878\(96\)00006-5](https://doi.org/10.1016/0304-3878(96)00006-5)

Pasiouras, F. and Kosmidou, K., (2007). Factors influencing the profitability of domestic and foreign commercial banks in the European Union. *Research in International Business and Finance* 21(2): 222–237. <https://doi.org/10.1016/j.ribaf.2006.03.007>

Philippe, L., and Baesens B. (2013). Do for-profit microfinance institutions achieve better financial efficiency and social impact? A generalised estimating equations panel data approach. *Journal of Development Effectiveness*, 5(3): 359-380. <https://doi.org/10.1080/19439342.2013.822015>

Pitt, Mark M., and Shahidur R. Khandker. (1998). The impact of group-based credit programs on poor households in Bangladesh: Does the gender of participants matter? *Journal of Political Economy* 106(5):958-996. <https://dx.doi.org/10.1086/250037>

Pitt, Mark M., Shahidur R. Khandker, Omar Haider Chowdhury, and Daniel L. Millimet. (2003). Credit programs for the poor and the health status of children in rural Bangladesh. *International Economic Review* 44(1):87-118. <https://doi.org/10.1111/1468-2354.t01-1-00063>

Praet, P., Herzberg, V., (2008), Market liquidity and banking liquidity: linkages, vulnerabilities and the role of disclosure. In *Banque de France Financial stability Review*. Paris: Banque de France, 2008. pp. 95–109. ISSN 1637-4681.

Prior, F., and Argandoña, A. (2009). Credit accessibility and corporate social responsibility in financial institutions: The case of microfinance. *Business Ethics: A European Review*, 18(4): 349-363. <https://doi.org/10.1111/j.1467-8608.2009.01568.x>

Quayes, S. (2012). Depth of outreach and financial sustainability of microfinance institutions. *Applied Economics*, 44(26): 3421–3433. <https://doi.org/10.1080/00036846.2011.577016>

Rosenberg, R. (2009). Measuring results of microfinance institutions -minimum indicators that donors and investors should track. A technical guide, Consultative Group to Assist the Poor CGAP. Washington, World Bank.

Rychtarik, (2009). Liquidity Scenario Analysis in the Luxembourg Banking Sector. BCDL Working Paper, No. 41.

Servet, J-M.(2015). La Vraie Revolution du Microcredit. Editions Odile Jacob.

Shleifer, A., and Vishny, R. (2010). Unstable Banking. *Journal of Financial Economics*, 97(3): 306-318. <https://doi.org/10.1016/j.jfineco.2009.10.007>

Sodokin, K., and Donou-Adonsou, C. (2010) “Banks, microfinance institutions and economic growth in the West African Economic and Monetary Union” *African Development Review*, 22(4): 495-510. <http://doi.org/10.1111/j.1467-8268.2010.00245.x>

Soedarmon, W., Machrouh, F., Tarazi, A. (2011). Bank market power, economic growth and financial stability: evidence from Asian banks. *Journal of Asian Economics*. 22(6): 460–470. <http://doi.org/10.1016/j.asieco.2011.08.003>

Strøm, R. O, D’Espallier B. , Mersland R. (2014). Female leadership, performance, and governance in microfinance institutions, *Journal of banking and finance*, 42(C): 60–75. <http://doi.org/10.1016/j.jbankfin.2014.01.014>

Tarozzi, A., Desai J., and Johnson K. (2015). *American Economic Journal: Applied Economics*, 7(1): 54–89 <http://dx.doi.org/10.1257/app.20130475>

Tchuigoua, H. T. (2011). Gouvernance et Performance Sociale des Institutions de Microfinance. Le Cas de l’Afrique Subsaharienne. *Revue Française de Gouvernance d’Entreprise*, 9,95-113.

Vanroose, A., and D’Espallier, B. (2013). Do microfinance institutions accomplish their mission? Evidence from the relationship between traditional financial sector development and microfinance institutions’ outreach and performance, 45(15): 1965-1982. <https://doi.org/10.1080/00036846.2011.641932>

Van Damme, P., Wijesiri, M. and Meoli M.,(2016). Governance and efficiency of microfinance institutions : empirical evidence from Sri Lanka South Asia *Economic Journal*. 17(2):236-247. <https://doi.org/10.1177/1391561416650102>

Yusupov, N. (2012). Microcredit and development in an occupational choice model. *Economics Letters*, 117, 820–823. <https://doi.org/10.1016/j.econlet.2012.08.015>

Williams, B., and Prather, L. (2009). Bank risk and return: The impact of bank non-interest income. *International Journal of Managerial Finance* 6(3): 220–244.
<https://doi.org/10.1108/17439131011056233>

World Bank (2011) News and Broadcast, www.worldbank.org

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

*Time span of the data are between 1999 and 2016

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

*Time span of the data are between 1999 and 2016.

Table 3 – Macroeconomic Indicators

Code	Definitions and Measurement	Sources
Endogenous variables		
GDPc	GDP per capita, PPP (constant 2011 international) \$	WDI
GNIc	GNI per capita, PPP (constant 2011 international) \$	WDI, UNDP
GDPcgrowth	GDP per capita growth (annual %)	WDI
GNIcgrowth	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
HumanCap.	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	Number of observations	Mean	Std. Dev.	Min	Max
Microfinance Indicators					
Yield on gross portfolio (ygpm)	815	0.19	0.15	-0.20	1.70
Return on assets (roam)	1051	0.01	0.07	-0.91	0.66
Operating expense / loan portfolio (oelpm)	1052	0.27	0.54	0.0004	14.65
Operational self-sufficiency (oss)	1095	1.11	0.30	0.07	4.35
Provision for loan impairment / assets (plim)	1026	0.01	0.02	-0.065	0.45
Profit margin (pmm)	1087	-0.01	0.64	-13.28	0.77
Average loan balance per borrower / GNI per capita (albbm)	1100	0.94	1.26	0.0036	16.16
Percent of female borrowers (fbm)	1080	0.48	0.25	0.0001	1.8714
Number of active borrowers growth (nabmgrowth)	1101	625489.5	2270618	2	2.72e+07
Number of Active growth (nacmgrowth)	1101	189688.8	1044554	0	1.79e+07
Assets of microfinance institutions (am)	1101	6.37e+08	2.23e+09	0	4.24e+10
Gross Loan Portfolio (glpm)	1101	4.89e+08	1.38e+09	0	1.85e+10

Descriptive statistics : continued

Variables	Number of observations	Mean	Std. Dev.	Min	Max
Banking indicators					
Banking system z-scores (bzscore)	1088	12.23	8.38	1.54	47.83
Bank credit as percent of bank deposits (cbcd)	1089	0.36	0.183	0	1.44
Bank liquid assets to deposits and short-term funding (blad)	1089	0.36	0.18	0	1.44
Bank cost to income ratio, in percent (bcir)	1089	0.59	0.13	0	1.39
Bank interest revenue, percent of interest-bearing assets (bir)	1083	0.06	0.02	0	0.21
Bank overhead costs, percent of total assets (boc)	1083	0.05	0.04	0	0.83
Bank return on assets, in percent (broa)	1083	0.02	0.02	-0.5154	0.24
Bank return on equity, in percent (broe)	1083	0.21	0.18	-0.4812	2.26
Bank non-interest income to total income, in percent (bnii)	1089	0.37	0.13	0	0.87
Bank credit to the private sector as percent of GDP (bcps)	1086	29.36	21.69	0.45	140.15
Bank assets, percent of GDP(ba)	1087	35.12	26.14	0.63	170.58
Macroeconomic indicators					
GDP per capita growth (annual %) gdpgrowth	1101	0.03	0.04	-0.19	0.33
Gross capital formation as a % of GDP (invest)	1078	23.16	8.14	0	60.15
Inflation (inflat)	1071	55.13	913.29	-8.97474	24411
Trade openness (topeness)	1089	74.19	29.06	22.106	199.67
Government expenditures (expend)	1081	13.82	4.95	2.05	32.23
Human capital (humancap)	999	4.32	1.60	0.89	10.95
Total factor productivity (tfp)	695	0.45	0.20	0.10542	1.15
Household consumption as percent of GDP (Consump)	1063	72.45	13.51	28.79	133.11

Table 5 – The Pearson correlation coefficients

Variables	gdpcgrowth	ygpm	roam	oelpm	ossm	plim	pmm	albbm	fbm	nabmgrowth	nacmgrowth	GLPmgrowth	amgrowth
gdpcgrowth	1												
ygpm	-0.09 *	1											
roam	0.07	0.18 *	1										
oelpm	-0.02	0.58 *	-0.14 *	1									
ossm	0.13 *	0.0046	0.62 *	-0.14 *	1								
plim	-0.13 *	0.33 *	-0.25 *	0.09 *	-0.23 *	1							
pmm	0.04	0.04	0.68 *	-0.15 *	0.62 *	-0.29 *	1						
albbm	0.08 *	-0.18 *	0.01	0.17 *	0.04 3	-0.02	0.02	1					
fbm	-0.03	0.23 *	-0.0061	0.07	-0.06	0.03	-0.07	-0.29 *	1				
nabmgrowth	-0.0005	-0.01	0.02	0.04	-0.02	-0.01	-0.01	-0.02	-0.06	1			
nacmgrowth	-0.0011	0.05	0.15 *	0.16 *	-0.01	0.05	-0.0093	-0.0033	0.005	0.61 *	1		
GLPmgrowth	0.08 *	-0.04	0.02	0.15 *	-0.01	-0.0044	-0.03	0.0028	-0.06	0.38 *	0.48 *	1	
amgrowth	0.09 *	-0.05	0.01	0.09 *	-0.04	-0.0090	-0.08*	-0.0080	-0.05	0.24 *	0.44*	0.84*	1
bzscore	-0.0024	0.03	0.09 *	-0.06	0.10 *	0.01	0.05	-0.03	0.07	0.09 *	0.04	-0.013	-0.003
blad	0.0083	0.01	-0.0072	0.11 *	-0.06	0.02	-0.10 *	0.10 *	0.01	0.03	0.04	0.13*	0.10*
bcir	-0.18 *	0.15 *	-0.03	0.06	-0.11 *	0.07	-0.02	0.07	-0.03	-0.007	0.03	-0.05	-0.07
bcbdgrowth	0.15 *	-0.03	-0.02	-0.06	0.04	0.04	0.02	0.04	-0.11 *	-0.02	-0.07	-0.03	-0.05

Values in parentheses are robust standard errors.

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

The Pearson correlation coefficients : continued 1

Variables	gdpcgrowth	ygpm	roam	oelpm	ossm	plim	pmm	albbm	fbm	nabmgrowth	nacmgrowth	GLPmgrowth	amgrowth
birgrowth	-0.07	-0.06	-0.01	0.03	-0.0071	-0.0070	-0.03	-0.01	-0.05	0.009	0.02	0.15*	0.08*
bocgrowth	-0.07	-0.03	-0.02	0.23 *	-0.0069	0.01	-0.02	-0.01	-0.03	0.008	-0.05	0.14*	0.08*
broagrowth	0.07	0.02	0.01	0.01	0.01	-0.01	0.008	-0.02	0.01	0.007	-0.0009	0.02	-0.008
broegrowth	-0.07	0.0081	-0.0016	0.01	-0.0091	-0.0096	-0.01	-0.01	0.01	0.009	0.01	0.15*	0.08*
bniigrowth	-0.01	0.0055	-0.0052	0.04	-0.0036	0.04	-0.0037	0.0043	0.02	-0.012	0.009	-0.01	0.04
bcpsgrowth	0.14 *	-0.01	0.0046	-0.04	0.07	-0.08 *	0.04	0.09 *	-0.09 *	-0.009	-0.05	0.03	0.006
bagrowth	0.03	-0.05	0.01	-0.11 *	0.0070	-0.04	0.03	0.11 *	-0.11 *	-0.014	-0.07	0.0003	-0.04
log(invest)	0.33 *	-0.17 *	-0.0014	-0.14 *	0.07	-0.04	0.03	-0.0006	-0.03	-0.004	-0.09	-0.09*	-0.05
log(topeness)	0.14*	-0.06	-0.01	-0.0079	-0.05	-0.0052	-0.02	0.2027*	-0.13 *	0.04	-0.009	0.005	-0.0007
log(expend)	-0.04	-0.003	-0.17 *	0.01	-0.09 *	0.0153	-0.09 *	0.0987*	-0.14 *	-0.0134	0.006	-0.027	-0.001
log(humancap)	0.09 *	0.07	0.07	-0.03	0.05	0.02	-0.02	0.0076	-0.13 *	0.02	0.02	-0.001	0.02
log(tfp)	0.05	0.12 *	0.11 *	-0.09	0.11 *	0.03	0.01	-0.29 *	-0.04	0.04	0.04	-0.03	-0.04
log(inflat)	-0.04	-0.12 *	0.04	0.05	0.03	0.0020	0.02	0.06	0.01	-0.01	0.04	0.08 *	0.07
log(consump)	-0.22 *	0.05	-0.01	0.07	-0.09 *	0.02	0.01	0.09 *	0.08 *	-0.04	-0.03	-0.03	-0.08 *

Values in parentheses are robust standard errors.

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

The Pearson correlation coefficients : continued 2

Variables	bzscore	blad	bcir	cbcdgrowth	birgrowth	bocgrowth	broagrowth	broegrowth	bniigrowth	bcpsgrowth	bagrowth	log(invest)	log(topeness)
bzscore	1												
blad	-0.14 *	1											
bcir	-0.13 *	0.02	1										
cbcdgrowth	-0.02	-0.06	-0.10 *	1									
birgrowth	-0.02	0.12 *	-0.05	-0.05	1								
bocgrowth	-0.02	0.12 *	-0.05	-0.05	0.99 *	1							
broagrowth	0.07	0.01	0.05	-0.01	0.08	0.05	1						
broegrowth	-0.01	0.12 *	-0.05	-0.06	0.99 *	0.99 *	0.71 *	1					
bniigrowth	0.05	0.10 *	0.06	-0.08 *	-0.08 *	0.08 *	-0.01	-0.006	1				
bcpsgrowth	-0.10 *	0.08 *	-0.03	0.40 *	-0.13 *	-0.12 *	0.004	-0.12 *	-0.07	1			
bagrowth	-0.12 *	0.07	-0.06	0.46 *	-0.04	-0.03	-0.03	-0.03	-0.09 *	0.55 *	1		
log(invest.)	0.19 *	-0.26 *	-0.22 *	0.19 *	-0.14 *	-0.14	-0.02	-0.14 *	-0.09 *	0.02	0.09 *	1	
log(topeness)	0.14 *	-0.0001	-0.10 *	0.002	0.007	0.008	-0.02	0.006	-0.02	0.1 *	0.15 *	0.15 *	1
log(expend)	0.03	-0.04	0.15 *	-0.01	0.03	0.04	-0.02	0.03	0.03	-0.004	0.05	0.05	0.02
log(humancap)	0.04	0.0014	0.01	0.08 *	0.01	0.01	-0.02	0.01	0.0143	0.0081	-0.04	-0.03	0.11 *
log(tfp)	0.24 *	-0.23 *	-0.22 *	0.006	-0.007	-0.009	-0.03	-0.01	-0.04	-0.08	-0.06	0.15 *	-0.07
log(inflat)	-0.18 *	0.23 *	0.006	0.05	0.12 *	0.12 *	-0.04	0.11 *	0.05	-0.01	-0.0051	-0.22 *	0.0003
log(consump)	-0.06	0.23 *	0.13 *	-0.06	0.02	0.02	0.05	0.02	0.001	0.03	0.01	-0.27 *	0.02

Values in parentheses are robust standard errors.

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

The Pearson correlation coefficients : continued 3

Variables	log(expend)	log(humancap)	log(tfp)	log(inflat)	log(consump)
log(expend)	1				
log(humancap)	0.04	1			
log(tfp)	-0.11 *	0.34 *	1		
log(inflat)	-0.17 *	0.11 *	-0.03	1	
log(consump)	-0.10 *	-0.18 *	-0.47 *	0.14 *	1

Values in parentheses are robust standard errors.

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

Table 6 – Other tests

GDP per capita growth (annual %) gpcgrowth	(1) FE model	(2) RE model	(3) IV model
Yield on gross portfolio (ygpm)	-0.01 (0.02)	-0.02 (0.02)	-0.02 (0.09)
Return on assets (roam)	-0.32 *** (0.11)	-0.15 (0.09)	-1.01 (2.20)
Operating expense / loan portfolio (oelpm)	0.16*** (0.03)	0.10*** (0.02)	0.13 (0.15)
Operational self-sufficiency (oss)	-0.01 (0.07)	-0.030 (0.033)	0.18 (0.38)
Provision for loan impairment / assets (plim)	0.28 (0.27)	-0.0002 (0.23)	0.30 (1.009)
Profit margin (pmm)	0.05 (0.07)	0.077** (0.03)	0.10 (0.32)
Average loan balance per borrower / GNI per capita (albbm)	0.011 (0.010)	0.008* (0.004)	-0.02 (0.04)
Percent of female borrowers (fbm)	0.02 (0.01)	0.01 (0.01)	0.02 (0.04)
Number of active borrowers (nabm)	0.37*** (0.06)	0.25*** (0.05)	0.40 (0.37)
Number of Active (nacm) nacmgrowth	-0.01 (0.01)	-0.01 (0.01)	-0.08* (0.05)
Banking system z-scores (bzscore)	0.0008 (0.0009)	-0.0001 (0.0004)	0.003 (0.005)
Bank liquid assets to deposits and short-term funding (blad)	0.082 (0.052)	0.059*** (0.021)	0.22 (0.22)
Bank cost to income ratio, in percent (bcir)	-0.018 (0.04)	0.015 (0.03)	-0.12 (0.15)
Bank credit as percent of bank deposits growth: bcbdgrowth	0.087** (0.04)	0.082** (0.03)	0.18 (0.27)
Bank interest revenue growth, percent of interest-bearing assets (bir) birgrowth	-0.001 (0.006)	0.0002 (0.006)	-0.03 (0.04)
Bank overhead costs growth, percent of total assets: bocgrowth	0.006 (0.005)	0.0001 (0.004)	0.04 (0.04)

Values in parentheses are robust standard errors.

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

Other tests: continued

GDP per capita growth (annual %) <i>gdpcgrowth</i>	(1) FE model	(2) RE model	(3) IV model
Bank return on assets growth, in percent : <i>broagrowth</i>	-0.002 (0.001)	-0.001 (0.001)	0.001 (0.02)
Bank return on equity growth, in percent : <i>broegrowth</i>	0.00009 (0.0009)	-0.0003 (0.0009)	-0.009 (0.03)
Bank non-interest income to total income growth, in percent : <i>bniigrowth</i>	0.018* (0.01)	0.003 (0.009)	0.05* (0.03)
log(Gross capital formation as a % of GDP): <i>log(invest)</i>	0.04* (0.02)	0.04*** (0.01)	0.07 (0.1)
log(Trade openness) : <i>log(topeness)</i>	0.02 (0.02)	0.009 (0.01)	-0.18 (0.22)
Log(Government expenditures): <i>log(expend)</i>	-0.07** (0.03)	-0.02** (0.013)	0.03 (0.17)
log(Human capital): <i>log(humancap)</i>	-0.08 (0.06)	0.02** (0.009)	-0.22 (0.21)
Log(Total factor productivity): <i>log(tfp)</i>	0.0008 (0.028)	0.005 (0.01)	0.11 (0.09)
Log(inflation): <i>log(inflat)</i>	-0.04 (0.004)	0.0001 (0.003)	0.0004 (0.022)
Log(Household consumption as percent of GDP)	-0.02 (0.05)	-0.03 (0.02)	-0.50 (0.44)
Gross Loan Portfolio growth: <i>glpmgrowth</i>	-0.55 (0.11)	-0.35*** (0.09)	-0.53 (0.55)
Assets of microfinance institutions growth: <i>amgrowth</i>	0.22** (0.09)	0.18** (0.08)	0.044 (0.34)
Bank credit to the private sector as percent of GDP's growth: <i>bcpsgrowth</i>	0.006 (0.013)	-0.0008 (0.01)	0.06 (0.05)
Bank assets, percent of GDP's growth: <i>bagrowth</i>	-0.03 (0.03)	-0.04 (0.037)	-0.17 (0.15)
<i>cons</i>	0.18 (0.33)	0.047 (0.13)	2.75 (1.96)
R-sq:	0.42	0.34	0.15
	Test that all $u_i=0$: F(39,97)=3.55 Prob>F= 0.00	Breusch-Pagan test F(30,136)=60.09 Prob>F= 0.00	Durbin-Wu-Hausman test F(30,64)=2.89 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

GDP per capita growth (annual %)	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
GDP per capita growth (annual %) lag 1: gdpcgrowthL1.	-0.00 (0.10)	0.24 *** (0.09)	-0.04 (0.08)	0.22*** (0.07)	-0.17 (0.19)	0.002 (0.06)	-0.02 (0.10)	-0.58 (0.53)
Yield on gross portfolio (ygp)		-0.01 (0.02)	0.0293709 (0.0203839)		0.02 (0.02)		0.04 (0.02)	-0.008 (0.032)
Return on assets (roa)		0.05 (0.06)	-0.02 (0.10)		-0.14 (0.35)		-0.08 (0.14)	-2.32 (1.54)
Operating expense / loan portfolio (oelp)		0.02 (0.02)	-0.01 (0.03)		0.01 (0.07)		-0.04 (0.03)	0.03 (0.08)
Operational self-sufficiency (oss)		0.02 (0.02)	-0.009 (0.02)		-0.03 (0.11)		-0.01 (0.02)	0.2 (0.23)
Provision for loan impairment / assets (plim)		-0.14 (0.099)	-0.427** (0.192)		-0.20 (0.48)		-0.36 (0.25)	0.23 (0.69)
Profit margin (pmm)		0.018 (0.019)	0.018 (0.01)		0.004 (0.13)		0.02 (0.02)	0.29 (0.23)
Average loan balance per borrower / GNI per capita (albbm)	0.0009 (0.001)		0.002 (0.006)		0.01 (0.01)		-0.001 (0.006)	0.04* (0.02)
Percent of female borrowers (fbm)	-0.003 (0.008)		0.008 (0.005)		0.01* (0.01)		0.010* (0.006)	0.01** (0.007)
Number of active borrowers growth (nabmgrowth)	0.01 (0.02)		-0.01 (0.07)		0.15 (0.25)		0.04 (0.10)	0.65** (0.32)
Number of Active clients growth (nacmgrowth)	-0.005 (0.009)		-0.01 (0.008)		-0.01 (0.01)		-0.008 (0.009)	0.02 (0.02)
Banking system z-scores (bzscore)				-0.0005 (0.0007)		-0.0004 (0.0007)	-0.001 (0.001)	0.001 (0.0014637)
Bank liquid assets to deposits and short-term funding (blad)				0.03* (0.01)		0.06** (0.03)	-0.01 (0.03)	0.20* (0.10)
Bank cost to income ratio, in percent (bcir)				-0.01 (0.01)		0.01 (0.01)	-0.02 (0.03)	0.10 (0.08)

Values in parentheses are robust standard errors.

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

GMM results with GDP per capita growth : continued

GDP per capita growth (annual %)	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
Bank credit as percent of bank deposits growth: bcbdgrowth				0.05*** (0.014)		0.051 (0.03)	0.04* (0.02)	0.06 (0.04)
Bank interest revenue growth, percent of interest-bearing assets: birgrowth				0.0008 (0.004)		0.001 (0.006)	-0.003 (0.002)	-0.005 (0.006)
Bank overhead costs growth,percent of total assets: bocgrowth				-0.007* (0.004)		-0.007 (0.006)	0.003 (0.002)	0.011 (0.007)
Bank return on assets growth, in percent : broagrowth				0.0003* (0.0002)		0.0003 (0.0002)	-0.0006 (0.0010)	-0.0001 (0.002)
Bank return on equity growth,in percent : broegrowth				-0.00006 (0.0003)		-0.0002 (0.0003)	0.0003 (0.0007)	0.0005 (0.001)
Bank non-interest income to total income growth, in percent : bniirowth				0.004 (0.006)		0.001 (0.002)	0.01** (0.00)	0.02** (0.01)
Log(Gross capital formation as a % of GDP) : log(invest)					0.02 (0.03)	0.06*** (0.01)		-0.02 (0.07)
Log(Trade openness) : log(topeness)					0.004 (0.04)	0.02 (0.02)		0.0759387 (0.0766113)
Log(Government expenditures): log(expend)					-0.02 (0.02)	0.018 (0.04)		-0.147** (0.06)
Log(Human capital): log(humancap)					-0.10 (0.12)	-0.12** (0.05)		0.06 (0.14)
Log(Total factor productivity): log(tfp)					0.03 (0.03)	-0.03 (0.03)		0.057 (0.05)
Log(inflation): log(inflat)					-0.003 (0.003)	-0.001 (0.003)		-0.001 (0.007)
Log(Household consumption as percent of GDP)					-0.04 (0.05)	-0.11* (0.06)		0.07 (0.07)
Gross Loan Portfolio growth: glpimgrowth					-0.17 (0.35)			-1.32* (0.72)
Assets of microfinance institutions growth: amgrowth					0.16 (0.13)			-0.46 (0.51)
Bank credit to the private sector as percent of GDP growth: bcpsgrowth						0.03** (0.01)		-0.02 (0.02)
Bank assets, percent of GDP's growth : bagrowth						-0.09*** (0.03)		0.01 (0.058)
Constant	0.03*** (0.006)	-0.0008 (0.02)	0.05*** (0.02)		0.39 (0.43)		0.09** (0.04)	

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)

	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
Log(Gross capital formation as a % of GDP): log(invest)								
Log(Gross capital formation as a % of GDP) lag 1 for one period: log(investL1.)	0.86*** (0.15)	0.49*** (0.08)	0.93*** (0.19)	0.55*** (0.06)	0.46** (0.18)	0.61*** (0.17)	0.96*** (0.15)	0.93** (0.40)
Yield on gross portfolio: (ygp)		0.005 (0.05)	0.16 (0.11)		0.07 (0.08)		0.15 (0.14)	0.13 (0.16)
Return on assets: (roam)		-0.36 (0.35)	-0.34 (0.48)		-0.65 (1.15)		-0.16 (0.62)	-1.16 (2.18)
Operating expense / loan portfolio: (oelpm)		-0.09 (0.06)	-0.07 (0.15)		-0.18 (0.25)		-0.11 (0.22)	0.02 (0.46)
Operational self-sufficiency: (oss)		0.01 (0.07)	0.13 (0.13)		0.12 (0.32)		0.17 (0.14)	-0.53 (0.77)
Provision for loan impairment / assets: (plim)		-0.23 (0.41)	-1.61** (0.68)		-0.02 (1.61)		-1.85* (0.96)	-3.51 (2.25)
Profit margin: (pmm)		0.10 (0.12)	-0.14 (0.10)		-0.01 (0.31)		-0.21 (0.17)	0.48 (0.79)
Average loan balance per borrower / GNI per capita: (albbm)	0.01 (0.01)		0.03 (0.04)		-0.01 (0.06)		0.03 (0.06)	0.086* (0.048)
Percent of female borrowers: (fbm)	-0.03 (0.06)		-0.09* (0.05)		-0.13*** (0.05)		-0.11** (0.05)	-0.01 (0.05)
Number of active borrowers growth: (nabmgrowth)	-0.12 (0.09)		-0.08 (0.14)		-0.43 (0.58)		-0.14 (0.21)	1.04 (0.93)
Number of Active clients growth: (nacmgrowth)	-0.06 (0.06)		-0.06 (0.04)		-0.02 (0.04)		-0.05 (0.06)	-0.005 (0.09)
Banking system z-scores: (bzscore)				-0.001 (0.002)		-0.003 (0.002)	-0.004 (0.009)	-0.0004 (0.004)
Bank liquid assets to deposits and short-term funding: (blad)				-0.22** (0.08)		-0.02 (0.23)	0.03 (0.25)	1.67* (0.88)
Bank cost to income ratio, in percent: (bcir)				-0.06 (0.10)		0.03 (0.12)	0.02 (0.16)	0.04 (0.29)

Values in parentheses are robust standard errors.

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

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

Log(Gross capital formation as a % of GDP): log(invest)	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
Bank credit as percent of bank deposits growth: (bcdgrowth)				0.25** (0.10)		0.42 (0.32)	0.05 (0.17)	0.14 (0.43)
Bank interest revenue growth, percent of interest-bearing assets: birgrowth				0.01 (0.02)		0.01 (0.02)	-0.008 (0.02)	-0.05 (0.03)
Bank overhead costs growth, percent of total assets: bocgrowth				-0.02* (0.01)		-0.01 (0.011)	0.008 (0.02)	0.08** (0.03)
Bank return on assets growth, in percent: broagrowth				-0.0003 (0.0006)		-0.0014*** (0.0003)	-0.0003 (0.004)	-0.02* (0.01)
Bank return on equity growth, in percent: broegrowth				0.001* (0.0009)		0.003*** (0.0005)	0.001 (0.002)	0.007*** (0.002)
Bank non-interest income to total income growth, in percent: bniigrowth				0.01 (0.01)		-0.008 (0.01)	0.007 (0.03)	0.12 (0.09)
GDP per capita growth (annual %): gdpcgrowth					1.03 (0.81)	1.45** (0.67)		-1.04 (1.17)
Log(Trade openness): log(topeness)					0.59*** (0.17)	0.24* (0.12)		0.78*** (0.25)
Log(Government expenditures): log(expend)					0.03 (0.14)	-0.02 (0.17)		-0.28 (0.51)
log(Human capital): log(humancap)					0.19 (0.40)	0.39 (0.28)		0.02 (0.86)
Log(Total factor productivity): log(tfp)					-0.007 (0.08)	0.08 (0.22)		0.10 (0.43)
Log(inflation): log(inflat)					0.004 (0.01)	0.028* (0.01)		-0.02 (0.01)
Gross Loan Portfolio growth: glpmgrowth					0.49 (0.94)			-1.29 (1.27)
Assets of microfinance institutions growth: amgrowth					-0.23 (0.47)			0.48 (0.74)
Bank credit to the private sector as percent of GDP growth: bcpsgrowth						-0.03 (0.09)		-0.06 (0.06)
Bank assets, percent of GDP's growth: bagrowth						-0.23 (0.26)		0.63*** (0.23)
Constant	0.44 (0.49)		0.10 (0.70)				0.04 (0.59)	-2.28 (4.20)

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(household consumption) lag to one period: Log(consumpL1.)	0.32 (0.21)	0.31*** (0.11)	0.55*** (0.06)	0.47*** (0.08)	0.66*** (0.05)	0.37*** (0.13)	0.56*** (0.04)	0.71*** (0.07)
Yield on gross portfolio (ygp _m)		-0.03 (0.02)	-0.05 (0.03)		-0.0362977 (0.02)		-0.07** (0.02)	-0.06* (0.03)
Return on assets (roa _m)		0.09 (0.08)	0.06 (0.08)		-0.106 (0.11)		0.026 (0.07)	-0.38 (0.37)
Operating expense / loan portfolio (oelp _m)		0.009 (0.01)	0.07 (0.05)		0.03 (0.05)		0.08** (0.03)	0.05 (0.04)
Operational self-sufficiency (oss)		0.008 (0.01)	0.02 (0.03)		0.019 (0.027)		0.018547 (0.02)	0.01 (0.03)
Provision for loan impairment / assets (plim)		0.06 (0.07)	0.43 (0.27)		0.36 (0.25)		0.68** (0.31)	0.63* (0.37)
Profit margin: (pmm)		-0.007 (0.01)	0.02 (0.04)		0.06** (0.02)		0.03 (0.03)	0.09** (0.0422935)
Average loan balance per borrower / GNI per capita: (albbm)	-0.001 (0.005)		-0.01 (0.01)		-0.02 (0.01)		-0.01 (0.01)	-0.008 (0.01)
Percent of female borrowers : (fbm)	0.007 (0.02)		0.01*** (0.005)		0.02*** (0.008)		0.017* (0.01)	0.03*** (0.009)
Number of active borrowers (nabmgrowth)	-0.02 (0.11)		-0.05 (0.08)		-0.03 (0.05)		-0.04 (0.06)	0.02 (0.08)
Number of Active clients growth : (nacmgrowth)	-0.01 (0.02)		0.01 (0.01)		0.02 (0.01)		0.005 (0.01)	0.02 (0.02)
Banking system z-scores: (bzscore)				-0.001 (0.001)		0.0004 (0.0009)	-0.0002 (0.001)	-0.00002 (0.002)
Bank liquid assets to deposits and short-term funding : (blad)				0.02 (0.02)		-0.007 (0.03)	0.10** (0.05)	0.14** (0.07)
Bank cost to income ratio, in percent : (bcir)				-0.006 (0.02)		0.017 (0.02)	-0.01 (0.04)	-0.004 (0.05)

Values in parentheses are robust standard errors.

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

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

log(consump)	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
Bank credit as percent of bank deposits growth: bcbdgrowth				0.004 (0.02)		-0.04* (0.02)	0.09** (0.047)	0.03 (0.06)
Bank interest revenue growth, percent of interest-bearing assets : bigrowth				0.001 (0.006)		-0.0007 (0.005)	0.007 (0.007)	-0.003 (0.007)
Bank overhead costs growth, percent of total assets: bocgrowth				0.001 (0.004)		0.0002 (0.003)	-0.002 (0.006)	0.007 (0.006)
Bank return on assets growth, in percent: broagrowth				-0.0004*** (0.0001)		-0.0002 (0.0002)	-0.0006 (0.0007)	-0.0002 (0.001)
Bank return on equity growth, in percent: broegrowth				0.0004 (0.0002)		0.0003 (0.0003)	-0.0009** (0.0004)	-0.0009 (0.001)
Bank non-interest income to total income growth, in percent: bniigrowth				0.003 (0.003)		0.006 (0.005)	-0.002 (0.008)	0.009 (0.007)
GDP per capita growth (annual %): gdpcgrowth					-0.54*** (0.17)	-0.29*** (0.10)		-0.48*** (0.17)
Log(Gross capital formation as a % of GDP): log(invest)					0.01 (0.03)	-0.04** (0.02)		-0.02 (0.03)
Log(Trade openness): log(topeness)					-0.04 (0.05)	0.03 (0.03)		-0.01 (0.05)
Log(Government expenditures): log(expend)					-0.009 (0.04)	-0.08*** (0.01)		-0.06 (0.05)
Log(Human capital): log(humancap)					0.001 (0.007)	0.001 (0.003)		0.002 (0.005)
Gross Loan Portfolio growth: glpmgrowth					0.04 (0.07)			-0.09 (0.16)
Assets of microfinance institutions growth: amgrowth					-0.18* (0.10)			-0.24* (0.13)
Bank credit to the private sector as percent of GDP growth: bcpgrowth						0.02 (0.016)		0.01 (0.04)
Bank assets, percent of GDP's growth: bagrowth						0.08*** (0.02)		0.11** (0.05)
Constant	2.87*** (0.92)		1.86*** (0.26)		1.59*** (0.29)		1.78*** (0.18)	

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)

Log(human capital)	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
Log(human capital) lag for one period: log(humancapL1.)	0.74*** (0.05)	0.74*** (0.08)	0.72*** (0.11)	0.76*** (0.060)	0.64*** (0.13)	0.63*** (0.08)	0.71*** (0.09)	0.70*** (0.08)
Yield on gross portfolio: (ygp)		0.01 (0.01)	0.02 (0.02)		0.03 (0.02)		0.005 (0.02)	0.03 (0.03)
Return on assets: (roam)		-0.06 (0.09)	0.08 (0.12)		-0.02 (0.06)		0.11** (0.05)	-0.06 (0.09)
Operating expense / loan portfolio: (oelpm)		-0.02 (0.01)	-0.05 (0.04)		0.002 (0.04)		-0.03 (0.04)	0.02 (0.05)
Operational self-sufficiency: (oss)		-0.009 (0.01)	-0.008 (0.06)		-0.005 (0.07)		0.007 (0.03)	0.003 (0.04)
Provision for loan impairment / assets: (plim)		-0.01 (0.03)	0.13 (0.24)		0.03 (0.28)		0.15 (0.3)	0.004 (0.25)
Profit margin: (pmm)		0.01 (0.009)	-0.009 (0.05)		-0.01 (0.06)		-0.02 (0.03)	-0.01 (0.03)
Average loan balance per borrower / GNI per capita: (albbm)	-0.002 (0.003)		-0.008 (0.006)		-0.006 (0.005)		-0.01 (0.008)	-0.003 (0.009)
Percent of female borrowers: (fbm)	-0.0009 (0.01)		0.01 (0.01)		0.01 (0.01)		0.02 (0.02)	0.02 (0.01)
Number of active borrowers growth: (nabmgrowth)	0.009 (0.01)		0.005 (0.03)		0.13*** (0.05)		0.01 (0.03)	0.17*** (0.05)
Number of Active clients growth: (nacmgrowth)	-0.01 (0.01)		-0.01 (0.01)		-0.02 (0.01)		-0.01 (0.02)	-0.02 (0.02)
Banking system z-scores: (bzscore)				-0.0002 (0.0006)		-0.00001 (0.0004)	0.00008 (0.001)	0.0005 (0.001)
Bank liquid assets to deposits and short-term funding: (blad)				-0.05*** (0.02)		-0.03 (0.02)	0.02 (0.03)	0.06* (0.03)
Bank cost to income ratio, in percent: (bcir)				-0.01* (0.007)		-0.002 (0.008)	-0.03 (0.03)	-0.05 (0.04)

Values in parentheses are robust standard errors.

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

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

Log(human capital)	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
Bank credit as percent of bank deposits growth: (bcbdgrowth)				-0.02*** (0.009)		-0.01 (0.01)	0.07 (0.03)	0.08 (0.05)
Bank interest revenue, percent of interest-bearing assets: (birgrowth)				-0.004** (0.001)		-0.001 (0.002413)	0.005 (0.005)	0.004 (0.006)
Bank overhead costs, percent of total assets growth: (boegrowth)				0.001 (0.001)		0.0003 (0.0012)	-0.003 (0.004)	-0.0007 (0.004)
Bank return on assets growth: (broagrowth)				70.03e-06 (0.00002)		0.00001 (0.00003)	-0.001 (0.001)	-0.001 (0.0009)
Bank return on equity growth: (broegrowth)				-0.00005 (0.0001)		-0.0001 (0.0001)	-40.32e-06 (0.0008)	0.0003 (0.0008)
Bank non-interest income to total income: (bniigrowth)				70.06e-06 (0.001)		-0.0007 (0.002)	-0.007 (0.008)	0.002 (0.008)
GDP per capita growth (annual %): gdpgrowth					-0.22** (0.10)	-0.02 (0.03)		-0.30** (0.12)
Log(Gross capital formation as a % of GDP): log(invest					0.005 (0.02)	0.017* (0.009)		0.001 (0.02)
Log(Trade openness): log(topeness)					0.02 (0.02)	0.012 (0.009)		0.03 (0.02)
Log(Government expenditures): log(expend)					-0.013 (0.032)	0.005 (0.006)		-0.02 (0.03)
Log(inflation): log(inflat)					0.003 (0.004)	-0.0001 (0.001)		0.004 (0.004)
Gross Loan Portfolio growth: glpmgrowth					-0.27** (0.12)			-0.31*** (0.11)
Assets of microfinance institutions growth: amgrowth					0.10* (0.056)			0.12 (0.07)
Bank credit to the private sector as percent of GDP growth: bcpsgrowth						0.001 (0.004)		-0.01 (0.02)
Bank assets, percent of GDP's growth: bagrowth						-0.014** (0.006)		-0.02 (0.02)
Constant	0.35*** (0.07)		0.40*** (0.19)		0.42 (0.26)		0.39*** (0.14)	

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

GNI per capita growth (gnicgrowth)	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
GNI per capita growth lag to one period: (gnicgrowthL1.)	-0.30*** (0.06)	0.007 (0.06)	-0.36*** (0.06)	0.03 (0.06)	-0.31*** (0.11)	-0.05 (0.08)	-0.40*** (0.04)	-0.92 (0.56)
Yield on gross portfolio (ygp)		-0.01 (0.02)	0.002 (0.03)		-0.03 (0.04)		0.01 (0.03)	-0.06 (0.04)
Return on assets: (roam)		0.04 (0.10)	-0.11 (0.09)		-0.15 (0.20)		-0.05 (0.11)	0.21 (0.53)
Operating expense / loan portfolio: (oelpm)		0.02 (0.01)	0.011 (0.05)		0.11 (0.08)		0.004 (0.04)	-0.04 (0.16)
Operational self-sufficiency: (oss)		0.03 (0.02)	-0.05 (0.04)		-0.05 (0.09)		-0.02 (0.02)	0.14 (0.22)
Provision for loan impairment / assets: (plim)		-0.12 (0.11)	0.04 (0.43)		0.63 (0.73)		0.19 (0.31)	-0.41 (1.36)
Profit margin: (pmm)		-0.001 (0.02)	0.12* (0.07)		0.09 (0.09)		0.06 (0.04)	-0.18 (0.18)
Average loan balance per borrower / GNI per capita: (albbm)	0.004 (0.002)		0.0004 (0.006)		0.009 (0.008)		-0.004 (0.006)	-0.02 (0.02)
Percent of female borrowers: (fbm)	0.004 (0.008)		0.002 (0.006)		0.009 (0.008)		0.01 (0.011)	0.005 (0.008)
Number of active borrowers growth: (nabmgrowth)	0.003 (0.02)		0.17 (0.18)		0.34* (0.20)		0.19 (0.14)	0.07 (0.41)
Number of Active clients growth: (nacmgrowth)	-0.02* (0.01)		-0.01 (0.01)		-0.0004 (0.01)		-0.03** (0.01)	0.007 (0.02)
Banking system z-scores: (bzscore)				-0.0002 (0.001)		-0.0004 (0.001)	-0.001 (0.001)	-0.0008 (0.002)
Bank liquid assets to deposits and short-term funding: (blad)				0.05** (0.02)		0.07* (0.03)	0.002 (0.04)	0.05 (0.05)
Bank cost to income ratio, in percent: (bcir)				-0.02 (0.019)		-0.02 (0.04)	0.03 (0.04)	-0.02 (0.11)

Values in parentheses are robust standard errors.

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

GMM results with GNI per capita growth : continued

GNI per capita growth (gnicgrowth)	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
Bank credit as percent of bank deposits growth: (bcdgrowth)				0.07*** (0.02)		0.087* (0.05)	0.07 (0.049)	0.09 (0.07)
Bank interest revenue, percent of interest-bearing assets: (birgrowth)				-0.005 (0.008)		-0.005 (0.009)	0.004 (0.004)	0.02** (0.01)
Bank overhead costs, percent of total assets growth: (bocgrowth)				-0.006* (0.003)		-0.003 (0.005)	-0.005 (0.003)	-0.006 (0.004)
Bank return on assets growth: (broagrowth)				0.00005 (0.0002)		-0.00002 (0.0003)	0.0009 (0.001)	0.001 (0.001)
Bank return on equity growth: (broegrowth)				0.0001 (0.0003)		0.0001 (0.0004)	-0.0009 (0.0007)	0.0003 (0.001)
Bank non-interest income to total income: (bniigrowth)				0.003 (0.003)		0.005 (0.005)	0.013 (0.01)	-0.003 (0.01)
Logarithm of gross capital formation as a % of GDP: log(invest)					0.07*** (0.02)	0.05** (0.02)		0.08** (0.03)
Logarithm of Trade openness: log(topeness)					-0.04 (0.05)	0.01 (0.03)		-0.22 (0.15)
Log(Government expenditures): log(expend)					-0.04 (0.04)	-0.02 (0.03)		0.08 (0.11)
Log(Human capital): log(humancap)					-0.05 (0.07)	-0.08* (0.04)		0.11 (0.17)
Log(Total factor productivity): log(tfp)					0.001 (0.06)	-0.006 (0.03)		-0.01 (0.05)
Log(inflation): log(inflat)					-0.004 (0.005)	-0.001 (0.003)		-0.006 (0.007)
Log(Household consumption as percent of GDP)					-0.11 (0.08)	-0.006 (0.07)		-0.10 (0.13)
Gross Loan Portfolio growth: glpmgrowth					-0.23 (0.29)			2.03 (1.36)
Assets of microfinance institutions growth: amgrowth					0.20 (0.21)			-1.84 (1.53)
Bank credit to the private sector as percent of GDP's growth: bcpsgrowth						0.02 (0.02)		-0.01 (0.02)
Bank assets, percent of GDP growth: bagrowth						-0.10* (0.05)		-0.05 (0.04)
Constant	0.04*** (0.007)	-0.004 (0.03)	0.10*** (0.03)				0.06* (0.04)	

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(gross capital formation as a % of GDP): log(invest)								
Log(gross capital formation as a % of GDP) lag to one period :log(investL1.)	0.95*** (0.17)	0.73*** (0.11)	1.07*** (0.15)	0.67*** (0.08)	0.41* (0.22)	0.65*** (0.11)	0.95*** (0.10)	1.24* (0.72)
Yield on gross portfolio: (ygp)		-0.02 (0.04)	0.12 (0.11)		0.12 (0.18)		0.12 (0.11)	0.29 (0.74)
Return on assets: (roam)		-0.29 (0.31)	0.03 (0.30)		-1.37 (2.38)		-0.26 (1.15)	2.16 (2.33)
Operating expense / loan portfolio: (oelpm)		-0.06 (0.05)	-0.07 (0.11)		-0.63 (0.61)		-0.17 (0.19)	0.04 (1.005)
Operational self-sufficiency: (oss)		0.20*** (0.07)	0.28 (0.18)		-0.08 (1.17)		0.26 (0.18)	1.30 (1.20)
Provision for loan impairment / assets (plim)		-0.70* (0.37)	-1.24* (0.68)		0.90 (3.53)		-1.44* (0.87)	2.90 (4.37)
Profit margin: (pmm)		-0.15* (0.08)	-0.36 (0.23)		0.28 (1.19)		-0.33 (0.32)	-2.14* (1.19)
Average loan balance per borrower / GNI per capita: (albbm)	0.009 (0.01)		0.03 (0.03)		-0.01 (0.07)		0.03 (0.06)	0.15** (0.07)
Percent of female borrowers : (fbm)	-0.01 (0.05)		-0.07 (0.07)		-0.142** (0.063)		-0.10 (0.08)	-0.15** (0.07)
Number of active borrowers growth : (nabm)	-0.07 (0.10)		-0.33** (0.15)		-0.49 (0.57)		-0.31 (0.28)	-1.44 (1.09)
Number of Active clients growth : (nacmgrowth)	-0.04 (0.07)		-0.07 (0.04)		-0.024 (0.05)		-0.05 (0.08)	-0.06 (0.15)
Banking system z-scores: (bzscore)				-0.002 (0.003)		-0.0004 (0.003)	-0.01 (0.008)	-0.007 (0.01)
Bank liquid assets to deposits and short-term funding : (blad)				-0.10 (0.07)		-0.10 (0.12)	0.08 (0.26)	0.47 (0.98)
Bank cost to income ratio, in percent : (bcir)				-0.11** (0.05)		0.05 (0.124)	0.006 (0.12)	0.81 (0.83)

Values in parentheses are robust standard errors.

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

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

Log(gross capital formation as a % of GDP): log(invest)	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
Bank credit as percent of bank deposits growth: bcbdgrowth				0.13** (0.06)		0.006 (0.348)	0.06 (0.26)	0.21 (0.52)
Bank interest revenue growth, percent of interest-bearing assets : birgrowth				0.01 (0.01)		0.006 (0.01)	-0.0003 (0.02)	0.03 (0.05)
Bank overhead costs growth, percent of total assets: bocgrowth				-0.018 (0.015)		-0.003 (0.01)	0.0003 (0.01)	-0.01 (0.03)
Bank return on assets growth, in percent: broagrowth				-0.0007 (0.0005)		-0.0007** (0.0003)	-0.0002 (0.003)	0.005 (0.01)
Bank return on equity growth, in percent: broegrowth				0.002*** (0.0007)		0.002*** (0.0006)	0.001 (0.002)	0.009** (0.004)
Bank non-interest income to total income growth, in percent: bniirowth				-0.005 (0.009)		-0.01 (0.014)	0.003 (0.04)	-0.003 (0.12)
GNI per capita growth (gnicgrowth)					0.79 (0.55)	1.14*** (0.38)		2.04 (1.27)
Log(Trade openness): log(topeness)					0.48** (0.19)	0.25 (0.23)		0.59* (0.31)
Log(Government expenditures): log(expend)					0.05 (0.15)	-0.27 (0.31)		-0.23 (0.42)
Log(Human capital): log(humancap)					-0.05 (0.42)	0.13 (0.33)		0.79 (1.41)
Log(Total factor productivity): log(tfp)					0.05 (0.143)	0.06 (0.28)		-0.69 (0.48)
Log(inflation): log(inflat)					0.0009 (0.01)	0.004 (0.009)		0.01 (0.06)
Gross Loan Portfolio growth: glpmgrowth					0.13 (1.23)			1.979 (2.46)
Assets of microfinance institutions growth: amgrowth					0.72 (1.15)			0.06 (3.04)
Bank credit to the private sector as percent of GDP growth: bcpsgrowth						0.10 (0.11)		0.15 (0.19)
Bank assets, percent of GDP growth: bagrowth						-0.02 (0.13)		0.33 (0.24)
Constant	0.16 (0.51)		-0.46 (0.56)					-6.48* (3.60)

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(human capital): log(humancap)								
Log(human capital) lag for one period: log(humancapL1.)	0.74*** (0.25)	0.73*** (0.09)	0.62*** (0.10)	0.76*** (0.07)	0.47*** (0.16)	0.63*** (0.12)	0.62*** (0.13)	0.51*** (0.10)
Yield on gross portfolio: (ygp)		0.023* (0.01)	0.01 0.02		0.03 (0.03)		0.01 (0.02)	0.04 (0.03)
Return on assets: (roam)		-0.04 (0.08)	0.12* 0.06		-0.07 (0.07)		0.09 (0.07)	-0.09 (0.16)
Operating expense / loan portfolio: (oelpm)		-0.02 (0.01)	-0.06** 0.02		0.01 (0.05)		-0.02 (0.05)	0.0003 (0.04)
Operational self-sufficiency: (oss)		-0.01 (0.01)	-0.01 0.06		-0.01 (0.07)		-0.03 (0.06)	-0.006 (0.07)
Provision for loan impairment / assets (plim)		0.002 (0.03)	0.13 0.25		0.15 (0.22)		0.11 (0.28)	0.14 (0.40)
Profit margin: (pmm)		0.016 (0.014)	-0.003 0.03		0.01 (0.06)		0.007 (0.06)	-0.01 (0.03)
Average loan balance per borrower / GNI per capita: (albbm)	-0.0005 (0.003)		-0.01* 0.005		-0.009 (0.006)		-0.013** (0.006)	-0.007 (0.008)
Percent of female borrowers: (fbm)	0.007 (0.02)		0.02 0.01		0.02 (0.01)		0.02* (0.01)	0.02 (0.01)
Number of active borrowers growth: (nabm)	-0.009 (0.02)		-0.02 0.04		0.09 (0.06)		-0.03 (0.09)	0.07 (0.08)
Number of Active clients growth: (nacmgrowth)	-0.01 (0.01)		-0.01 0.01		-0.02 (0.02)		-0.02 (0.01)	-0.03*** (0.01)
Banking system z-scores: (bzscore)				-0.0003 (0.0006)		-0.00002 (0.0007)	60.43e-06 (0.001)	0.0005 (0.001)
Bank liquid assets to deposits and short-term funding: (blad)				-0.04* (0.02)		-0.03 (0.026)	0.02 (0.03)	0.04 (0.03)
Bank cost to income ratio, in percent: (bcir)				-0.007 (0.007)		0.002 (0.01)	-0.03 (0.03)	-0.03 (0.04)

Values in parentheses are robust standard errors.

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

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

Log(human capital): log(humancap)	GMM(1)	GMM(2)	GMM(3)	GMM(4)	GMM(5)	GMM(6)	GMM(7)	GMM(8)
Bank credit as percent of bank deposits growth: bcbdgrowth				-0.02** (0.009)		0.001 (0.01)	0.06 (0.04)	0.05 (0.03)
Bank interest revenue growth, percent of interest-bearing assets: birgrowth				-0.003** (0.001)		-0.001 (0.002)	0.002 (0.005)	0.002 (0.006)
Bank overhead costs growth, percent of total assets: bocgrowth				0.0009 (0.001)		0.0005 (0.001)	-0.001 (0.004)	-0.002 (0.003)
Bank return on assets growth, in percent: broagrowth				20.23e-06 (0.00001)		-90.27e-06 (0.00005)	-0.0011692 (0.0008)	-0.0007 (0.001)
Bank return on equity growth, in percent: broegrowth				-0.00005 (0.00008)		-0.00004 (0.0001)	0.0001 (0.0005)	-0.0001 (0.0008)
Bank non-interest income to total income growth, in percent: bniigrowth				0.00001 (0.001)		-0.0006 (0.002)	0.00005 (0.01)	0.006 (0.01)
GNI per capita growth (gnicgrowth)					-0.11 (0.09)	-0.05 (0.04)		-0.10 (0.09)
Log(Gross capital formation as a % of GDP): log(invest)					0.007 (0.02)	0.02* (0.009)		-0.007 (0.02)
Log(Trade openness): log(topeness)					0.03 (0.03)	0.01 (0.01)		0.05 (0.03)
Log(Government expenditures): log(expend)					-0.001 (0.02)	-0.009 (0.01)		0.006 (0.03)
Log(inflation): log(inflat)					0.004 (0.003)	0.0005 (0.001)		0.004 (0.004)
Gross Loan Portfolio growth: glpmgrowth						-0.47*** (0.17)		-0.41 (0.32)
Assets of microfinance institutions growth: amgrowth					0.23 (0.16)			0.19 (0.37)
Bank credit to the private sector as percent of GDP growth: bepsgrowth						0.001 (0.006)		0.006 (0.009)
Bank assets, percent of GDP growth: bagrowth						-0.02** (0.010)		-0.02 (0.02)
Constant	0.35 (0.35)				0.56** (0.27)		0.57** (0.24)	

Values in parentheses are robust standard errors.

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

Table C1 – Countries of our samples

World region	countries
Africa	Benin Ivory Coast Ghana Kenya Madagascar Mali Morocco Nigeria Senegal South Africa Togo Tunisia Uganda
Eastern Europe	Albania Armenia Bosnia and Herzegovina Georgia Kazakhstan Kyrgyzstan Russia Serbia
Latina america	Bolivia Colombia Dominican Republic Ecuador Honduras Mexico Nicaragua Paraguay Peru
Middle East and Asia	Bangladesh Cambodia India Mongolia Nepal Palestine Philippines Sri Lanka