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Banking and Microfinance Performance: Market Power, Efficiency, Performance, Outreach and Sustainability Perspectives

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Banking and Microfinance Performance: Market Power, Efficiency, Performance,
Outreach and Sustainability Perspectives

A Dissertation

Submitted to the Graduate Faculty of the
University of New Orleans
in partial fulfillment of the
requirements for the degree of

Doctor of Philosophy
in
Financial Economics

by

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Dedication

To my parents

To my wife, Rasha

Acknowledgment

I would like to extend my deepest appreciation to my dissertation chair, Dr. M. Kabir Hassan and to all members of my dissertation committee. Special thanks to all the faculty members of the Department of Financial Economics.

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Abstract

This dissertation consists of two empirical papers that explore recent phenomena in Banking and Microfinance Performance. Chapter 1, “Market Power and Bank Performance in MENA Countries,” examines the determinants of market power in 12 Middle Eastern and North African (MENA) countries in the aftermath of the Global Financial Crisis (GFC), specifically within six Gulf Cooperation Countries and six non-Gulf countries. We examine the dynamics of bank competition in MENA countries, provide an up-to-date assessment of market power, investigate the factors impacting bank competition, and explore the evolution of market power during the financial crisis. Our results show an overall increase in market power following the GFC for both regions. We find that bank size, capitalization, and diversification affect market power differently in the pre-crisis and post-crisis years. Larger banks enjoy cost advantages and the diversification impact on market power has decreased in the post-crisis years and the impact of capitalization on market power increased during the GFC. Overall, banks with higher capitalization can better weather the crisis. Chapter 2, “The impact of firm-level characteristic and county-specific attributes on the performance and efficiency of the Microfinance institutions,” estimates the impact of country-specific macro-variables and firm-specific attributes on the financial performance and the efficiency of microfinance institutions (MFIs). We use a large international up-to-date database consisting of over 10,000 firm-years for MFIs over 89 countries during the period 2008-2015. Several interesting findings emerge: a) regulation and outreach are negatively correlated. b) There is a negative and highly statistically significant correlation between the percentage of female borrowers and loan size, which is evidence of “mission drift”. c) An increase in the percentage of female board member has positive and statistically significant effect on MFIs profitability and ROA; which emphasizes the importance of female participation in leading position in MFIs.

Keywords: Market Power; MENA countries; Global Financial Crisis; Microfinance Institutions; Performance and efficiency; Macro and financial determinants; female empowerment

Chapter 1

Market Power and Bank Performance in MENA Countries

1. INTRODUCTION

During the last decade, many MENA countries implemented financial reforms to improve their business environments and promote financial development. The financial markets of several Middle Eastern countries have shown dramatic changes. Turkey emerged as a powerful regional leader with a strong economy and more developed financial system. The economies of the Gulf Arab countries have experienced tremendous growth, and their financial systems have experienced significant reforms. Espinoza (2014) reports that the classification of the UAE and Qatar has been upgraded from “frontier” market status to “emerging” market status.

The financial reforms in MENA countries affect several aspects of the financial system. Espinoza (2014) reports that “most countries in the region have reduced the share of state banks through restructuring and privatization and allowed the entry of new private banks, including foreign banks.” The Global Financial Crisis impacted financial systems around the world. Yet, its impact on MENA countries was less significant than elsewhere since the financial systems in these countries are less integrated than those used in the rest of the world.

The main objective of this study is to examine the dynamics of bank competition in MENA countries. Even though prior research on bank competition has been conducted for developed and emerging markets, little research exists for MENA countries. This work intends to fill this gap.

This paper contributes to the literature in the following ways: First, it provides an up-to-date assessment of market power in MENA countries. Second, it examines the determinants of bank competition in these countries. Third, it explores the evolution of market power in MENA countries during the Global Financial Crisis and examines the impact of this crisis on bank competition in these countries. Fourth, it examines the determinants of bank net interest margins (NIM) and explores the

impact of market structure, interest rates volatility, Legal Rights Index, and Credit Information Index on NIM.

2. LITERATURE REVIEW

2.1. The Determinants of Market Power in MENA Countries and the Impact of the Global Financial Crisis

Examining competitiveness in the banking sector of MENA countries is of considerable interest. This is due, first, to the reforms that are taking place in many MENA countries and policymakers' need for theoretical and empirical research. Second, there is a large body of literature that finds a strong correlation between competition and bank performance, efficiency, and stability.

2.1.1 Structural and Non-Structural Approaches

Research on bank competition is focused on two major approaches: structural and non-structural.

The structural approaches:

Two paradigms are covered under the structural approach: the structure-conduct-performance (SCP) and the efficient structure. Efthyvoulou and Yildirim (2014) define the SCP paradigm as the situation that occurs when market concentration increases and firms with higher monopoly power can charge higher prices and thus earn higher profits. Berger et al. (2003) argue that banking industry concentration and other barriers to competition create an environment that "affects bank conduct and performance in unfavorable ways from social points." The SCP hypothesis is tested using measures of concentration such as the Herfindahl-Hirschman Index (HHI) and the n-firm concentration ratio (CR_n).

Berger and Hannan (1998) test the "quiet life" hypothesis by finding whether firms with market power in concentrated markets can ignore minimizing costs without risking an exit from the industry. The authors show that when a firm is not under pressure to minimize costs, its cost efficiency will be reduced. Hannan (1991) assesses the relationship between bank behavior and market power, as measured by the HHI and the CR_n, and finds that firms exercising market power increase the rate charged for loans while decreasing the rate offered for these loans. The results are consistent with the SCP hypothesis. In contrast

to the SCP hypothesis, Smirlock et al. (1984) suggest the “efficient structure” hypothesis, which provides a different interpretation. These authors argue that market power emerges from competition. Competition occurs when firms have a comparative advantage, which they then use to be more efficient and thus earn economic rent. The authors find that the efficient structure hypothesis is better at describing the relationship between market structure and firm conduct. Rhoades (1985), Shepherd (1986), and Smirlock (1985) find results that provide support for the efficient structure hypothesis.

The non-structural approach:

In contrast to the structural approach, the non-structural approach suggests that market power does not exclude competition if firms are consumer-centric. Baumol (1982) argues that when there is completely free entry and exit, monopolists can prevent new entry if they provide the consumers with a competitive product. Lack of efforts to produce such a product makes the firms susceptible to “hit-and-run entry.” Besanko and Thakor (1992) confirm Baumol's result by finding that competition is driven by the threat of new entry. Baumol et al. (1982) show that market power is not the only indicator of competitiveness. Claessens and Laeven (2004) argue that testing for competition requires a structural, contestability approach. Banking market power is not the only factor that impacts bank conduct. It is important, they argue, to account for other factors such as entry barriers, along with foreign ownership, and the activity restrictions severity. These results are of considerable interest to policymakers in MENA countries who are undertaking series of reforms to better shape the banking system and promote economic growth.

2.1.2 The International Orientation of the New Research

Though early research was limited to local U.S. banking markets, the current literature has an international orientation that includes developed as well as developing countries. Some more recent studies focus on the European banking markets and the dynamics of bank competition, European banking system evolution, and the impact of deregulation and large-scale consolidation on competition. For example, Angelini and Cetorelli (2003) analyze the evolution of competitive conditions in the Italian

banking industry. Their findings support the hypothesis that deregulation contributes to bank competition improvement.

Unlike other studies that rely on a single indicator to determine the degree of banking market competition, Carbó et al. (2009) use five indicators of competition: net interest margin, Lerner index, return on assets, H-statistic, and HHI market concentration. The study shows that the five indicators comparison finds conflicting predictions of competitive behavior. This occurs across countries, within countries, and over time. The authors suggest that research should take country-specific factors into account when examining banking market competition. Bolt and Humphrey (2010) provide an alternative indicator to the Lerner index. They apply a competition frontier to a panel of 11 European countries from 1987-2006. The European countries were ranked by their dispersion from the competition efficiency frontier. They find that non-interest income generating activities have less competition, while activities that produce spread income have higher competition.

Weill (2013) analyzes the evolution and convergence in EU bank competition from 2002-2010. He uses the Lerner index and Rosse-Panzar model to estimate bank competition for all EU countries. He tests for beta and sigma convergence and finds an increase in bank competition during the 2000s. He also finds evidence that clearly supports the view of convergence in bank competition across European countries.

Berger et al. (2008) test the “competition-fragility” and “competition-stability” theories using data for 8,235 banks in 23 developed countries. Although the authors find some support for one of the elements of the ‘competition-stability’ view, the main result is that banks that have more market power also have less risk exposure overall, which is consistent with the “competition-fragility” view.

2.1.3 Variability of Bank Competition

Recent studies examine the factors impacting the variability and dynamics of bank competition. De Guevara et al. (2005) study how bank competition has evolved in five large European banking industries—Germany, France, Italy, Spain, and the United Kingdom—using the Lerner Index for the

period 1992-1999. The authors find that concentration is persisting in European banks despite the implementation of deregulation. They contend that this results from low level of bank integration. De Guevara and Maudos (2007) analyze Spanish banking system market power explanatory factors from 1986-2002. They find an increase of market power from the mid-1990s. The authors find that size, efficiency, and specialization have a significant impact on market power. This result allows them to conclude that there is no solid foundation for making economic policy decisions on accepting or refusing a bank merger process based on market concentration effects.

2.1.4 The Impact of Foreign Bank Participation in Bank Competition

More recent literature focuses on the impact of foreign bank participation on bank competition. This body of work is of particular interest to the research on MENA countries since these countries are in the process of restructuring the banking system and allowing the entry of foreign banks. Gelos and Roldos (2004) apply the Panzar and Rosse methodology in a sample of eight emerging countries. They find that although bank consolidation led to a decrease in the number of banks, concentration did not increase from this decline. They show that this result occurs for countries that allowed the participation of foreign banks and have lower barriers to entry. Fungáčová et al. (2010) analyze the Russian banking sector from 2001-2006 and did not find a persistence of competitiveness of foreign-owned banks over state-owned banks.

2.1.5 Bank Ownership and Market Power

Recent research focuses on the sources of market power and whether bank ownership impacts market power. Foreign bank performance improves over time, as they adjust to the new environment (Claessens and van Horen, 2012). Their results reflect that the performance improves when the home country has a closer geographical or cultural proximity (but not institutional) to the host country. Buch et al. (2013) use the Lerner index and study the impact of internationalization on market power and find that large banks that are internationally active banks possess considerable market power. Efthyvoulou and Yildirim (2014) explore how the Global Financial Crisis impacts market power by studying Central and

Eastern European banking markets. The authors find that convergence is present in country-level market power throughout the pre-crisis period and the Global Financial Crisis.

2.1.6 Islamic Banking

Recently, a new body of literature has focused on Islamic banking. Hassan et al. (2013) conduct a comparative analysis of foreign and domestic bank performance and examine the critical determinants of foreign bank entry in 24 selected Islamic countries for the period 1996- 2010. The authors find that foreign Islamic banks enjoy a higher net profit margin in host countries. And the domestic Islamic bank profitability has been strongly affected by the Global Financial Crisis. Ariss Rima Turk (2010) analyzes the competitive conditions in Islamic and conventional markets in a sample of banks in 13 countries from 2000-2006 and finds that Islamic banks are better capitalized and allot a larger proportion of their assets to financing activities in comparison to conventional banks. Hassan et al. (2014) explain the reasons behind the birth and growth of Islamic banking and finance and list the terms and contracts used in Islamic finance (Al-Wadia Principle, Al-Murabaha, Al-Musharka, Bai-Muajjal). They describe the financial landscape of the MENA region and conduct an empirical analysis of Islamic banking in MENA countries. They find that 1. The efficiency of Islamic banks in the MENA region is positively influenced by regulations related to the second and third pillars of Basel 2. Stricter regulations, related to the first pillar, such as capital requirements have a positive impact on Islamic banks profitability. Alam and Hassan (2015) analyze the competition and risk-taking behavior of 59 Islamic banks and 149 conventional banks in 10 emerging countries for the period 2006-2013. They find that “competition and risk are negatively related to conventional banks and inversely related to Islamic banks.”

Belkhir et al. (2016) examine the correlation between political risk and the variability of Islamic and conventional banks’ assets. Their results reflect that “political risk is positively related to the volatility of conventional banks’ assets but is not a statistically relevant factor in explaining the volatility of *Islamic banks’* assets.” Bitar et al. (2016) study the impact of types of bank capital on the profitability and efficiency of both conventional and Islamic banks. They find that capital of high quality improves the

profitability and efficiency of both systems. Yet, their results appear stronger for conventional banks. Bitar et al. (2016) investigate the determinants of Islamic bank capital ratios and determine that Islamic banks with higher capitalization are smaller, more profitable and highly liquid. Grira et al. (2016) study the ex-ante cost of equity of Islamic and conventional banks. Their findings show that the Islamic banks have, *on average*, higher equity financing costs than conventional banks. Bitar et al. (2016) examine the country-level determinants of Islamic bank capital and discover that smaller, more profitable and liquid Islamic banks are more highly capitalized.

2.2. Net Interest Margin

2.2.1 Macroeconomic and Microeconomic Factors Impacting the Margin

At the macroeconomic level, several factors are documented in the literature. Ho and Saunders (1981) argue that interest rate volatility is a major concern for banks and that this fact stems from the intermediary function of banks, since banks increasingly rely on interest-sensitive short-term liabilities, while making long-term loans that are insensitive to the interest rate. The authors develop a model that examines the determinants of interest rate margin. Their model was extended and tested by several other authors. Allen (1988) extends the model and demonstrates that when considering cross-elasticities of demand between bank products, pure interest spread may be reduced. Angbazo (1997) also extends the Ho and Saunders (1981) theory by testing the hypothesis that “banks with more risky loans and higher interest-rate risk exposure would select loan and deposit rates to achieve higher net interest margin.” The results support his hypothesis. Saunders and Schumacher (2000) test the model by examining the determinants of bank net interest margins (NIMs) in six European countries and the U.S. from 1988–1995. They find that, as banks’ monopoly power increases, their spreads go higher and interest rate volatility significantly impacts bank NIM.

Some of the literature focuses on the impact of the efficiency of the legal system. Bae and Goyal (2004) study the impact of property rights on loan spreads on international bank loans. They find that when creditors’ rights are weak, banks demand higher interest rates to compensate for risk. As the

protection of property rights increases, the spread decreases. Laeven and Majnoni (2005) find that by improving the enforceability of loan contracts, the cost of financial intermediation will be lower. Qian and Strahan (2007) find that the variability of the term of bank loans can be greatly explained by legal and institutional differences. Bae and Goyal (2009) find that “banks respond to poor enforceability of contracts by reducing loan amounts, shortening loan maturities, and increasing loan spreads.” These findings are important for MENA countries where the legal system is weak, and there is poor enforceability of contracts. Demirgüç-Kunt et al. (2004) find that liquidity and GDP growth have a negative impact on interest rate margins. Afanasieff et al. (2001) show that macroeconomic conditions are the main determinants of bank interest spreads in Brazil.

At the microeconomic level, several bank-specific or industry-specific factors that affect interest rates are documented in the literature. Demirgüç-Kunt et al. (2004) find that bank characteristics play a major role in explaining the within-country variation in financial intermediary costs. Claessens et al. (2001) find that the entry of foreign banks makes national banks more efficient and competitive. They also argue that one the downsides of foreign bank entry is that by increasing competition and thus reducing profits, national banks may become more vulnerable. And this may jeopardize the financial system. These results are of significant interest to policymakers in MENA countries who are assessing the impact of foreign bank entry on the efficiency and competition of the banking system. Claey's and Vander Vennet (2004) assert that concentration, operational efficiency, capital adequacy, and risk behavior are important determinants of margins in both the West and the East. Demirgüç-Kunt and Huizinga (1999) show that the net interest rate is smaller for countries with more competition in the banking sector and that it is higher for well-capitalized banks. Nys (2003) demonstrates that there is a positive and significant impact of default risk, administrative costs, and opportunity costs on NIM in most European countries. Estrada et al. (2006) analyze the determinants of interest margins in Colombia. Their results suggest that interest margins are primarily affected by credit institutions' inefficiency and by credit risk exposure and market power. Horváth (2009) examines the determinants of interest rate margins of Czech banks. He

finds that the determinants of interest rate margins of Czech banks are largely similar to those in developed countries.

2.2.2 The relationship Between Net Interest Margin and Non-Traditional Banking Activities

The literature shows that financial reforms lead to an increase in bank competition, especially on the part of non-banking financial institutions, which compete with traditional banks on deposits as well as on loans. And this, in turn, brings about a decline in NIMs. Smith et al. (2003) examine interest and non-interest income variability and their correlation in banking systems in EU countries. They find that non-interest income has increased in importance relative to net interest income. They also find that the evolution of non-interest income does not fully offset the reduction in the interest margin. Lepetit et al. (2008) investigate the relationship between bank risk and product diversification in the European banking industry. They find that banks expanding into non-interest income activities present a higher risk and higher insolvency risk than banks that mainly supply loans. Rogers and Sinkey (1999) examine the characteristics of banks that are heavily engaged in nontraditional off-balance-sheet activities. They find that these banks have smaller NIMs, have relatively fewer core deposits, and exhibit less risk.

Some of the recent literature focuses on the impact of the Global Financial Crisis on bank income diversification. Williams (2016) examines bank revenue composition and bank risk in Australia. He finds that banks with a lower level of non-interest income and high revenue concentration are less risky. DeYoung and Torna (2013) examine the failure of U.S. banks during the financial crisis. They find that "bank failure declined with pure fee-based nontraditional activities such as securities brokerage and insurance sales, but increased with asset-based nontraditional activities such as venture capital, investment banking and asset securitization." Engle et al. (2014) study the impact of bank concentration on the choice of business activities. They find that a one-to-one relationship is not always between non-traditional activities and the stability of global banks. Brunnermeier et al. (2012) find that banks that have higher non-interest income have contributed more to systemic risk than traditional banking."

3. METHODOLOGY

To examine market power, we follow Weill (2011), de Guevara et al. (2005), and Carbó et al. (2009) and estimate the Lerner index. Then, we employ an empirical specification to estimate the determinants of market power.

3.1 The Lerner Index

The Lerner index is defined as the difference between price and marginal cost, divided by price.

The cost function is specified by Weill (2011) as follows:

$$\ln\left(\frac{TC}{w_3}\right) = \alpha_0 + \alpha_1 \ln y + \frac{1}{2}\alpha_2 (\ln y)^2 + \alpha_3 \ln\left(\frac{w_1}{w_3}\right) + \alpha_4 \ln\left(\frac{w_2}{w_3}\right) + \alpha_5 \ln\left(\frac{w_1}{w_3}\right) \ln\left(\frac{w_2}{w_3}\right) + \frac{1}{2}\alpha_6 \left(\ln\left(\frac{w_1}{w_3}\right)\right)^2 + \frac{1}{2}\alpha_7 \left(\ln\left(\frac{w_2}{w_3}\right)\right)^2 + \alpha_8 \ln y \ln\left(\frac{w_1}{w_3}\right) + \alpha_9 \ln y \ln\left(\frac{w_2}{w_3}\right) + \sum_{i=1}^n Country_i \dots\dots\dots (1)$$

Where TC denotes total costs; y total assets; w_1 the price of labor (the ratio of personal expenses to total assets); w_2 the price of physical capital (the ratio of other non-interest expenses to total assets); w_3 the price of the borrowed funds (the ratio of paid interest to all funding); and $Country_i$ denotes a dummy variable for the country i . Total costs are the sum of personnel expenses, other non-interest expenses, and paid interest. The estimated cost function coefficients are used to compute the marginal cost.

3.2 The Determinants of Market Power: Model Specification

We follow Efthyvoulou and Yildirim (2014) in estimating the determinants of market power and employ the following empirical specification:

$$L_{it} = \beta X_{it} + \gamma Y_t + u_{it} \quad (2)$$

Where X is a vector of bank-level control variables; Y is a vector of macroeconomic control variables; u is an *i.i.d.* error term; and i, t index bank and time, respectively.

In the aftermath of the Global Financial Crisis and its impact on the world economy, analysis of the factors impacting market power in MENA countries is of great importance, especially for policymakers who are debating the type and intensity of reforms and regulations that will create an efficient and stable banking system. Such analysis will help policymakers answer the following question: what are the optimal bank capitalization, income diversification, size, assets risk, and funding preference?

3.2.1 Bank-Level Variables

- Bank capitalization is measured by total equity to total assets, which captures the impact of capitalization on bank performance. Efthyvoulou and Yildirim (2014) state that for well-capitalized banks, the excessive risks impact would be less profound. Thus, these banks can take advantage of highly profitable investment opportunities and achieve better performance and lower costs.
- Bank size is measured by total assets (log of total assets). This variable captures the probable cost advantages that are related to size (economies of scale) (de Guevara et al., 2005).
- Operational inefficiency is proxied by non-interest expenses to total revenue.
- Diversification is measured by the share of non-interest sources of income in total revenue. This captures the impact of diversification on bank performance.
- Customer deposits are measured by total customer deposits to total assets. This captures the percentage of customer deposits versus non-deposit funding.
- The non-performing loans to total loans ratio is a measure of asset quality and its impact on bank performance.

3.2.2 Macroeconomic Variables

- GDP growth rate and inflation are included because Angelini and Cetorelli (2003) suggest that business cycle dynamics and a bank's response to them may impact market power.

Table 1: Variable Definitions

| Variables | Definition |
|--------------------------|--|
| TC | Total costs |
| y | Total assets |
| W(1) | Price of labor (the ratio of personal expenses to total assets) |
| W(2) | Price of physical capital (the ratio of other non-interest expenses to total assets) |
| W(3) | Price of the borrowed funds (the ratio of paid interests to all funding) |
| Country(i) | Dummy variable for the country i |
| Total costs | Sum of personnel expenses, other non-interest expenses, and paid interests |
| capitalization | Measured by total equity to total assets |
| Bank size | Measured by total assets (log of total assets). |
| Operational inefficiency | Proxied by non-interest expenses to total revenue |
| Diversification | Measured by share of non-interest sources of income in total revenue. |
| Customer's deposits | measured by total customer deposits to total assets |
| Asset quality | Proxied by non-performing loans to total loans |
| GDP growth | |
| Inflation | |
| NIM | net interest margin |
| TETA | risk exposure |
| NEATA | reserve requirement |
| Fee proxy | implicit interest expense |
| Legal right index | Index measuring legal rights protection |
| Credit information index | Index measuring credit information |
| R_L | rate set on loans |
| R_D | rate set on deposits |
| r | expected risk-free interest rate, |
| a and b | fees that the bank charges for providing immediacy |
| s | $a+b$ |
| α/β | measures the monopoly rent element in bank margins |
| R | bank management's coefficient of absolute risk aversion |
| Q | the size of bank transactions |
| σ^2 | the volatility of the interest rate |
| X_{ji} | vector of control variables: fee proxy, NEATA and TETA |
| u_i | the residual |
| θ_o | reflects the impact of market structure on the pure spread |
| θ_1 | sensitivity of the pure spread to interest-rate volatility |

3.3. Net Interest Margin

As for interest rate margin, we modify the paper of Saunders and Schumacher (2000) to include additional factors such as the legal rights index and credit information index. The literature shows that legal rights protection affects loan spreads. Bae and Goyal (2004) argue that property rights protection impacts the lender's ability to reconstruct. "Loan reconstructing occurs when material deviations in the borrower's credit quality have occurred subsequent to initial contracting. Banks typically respond to declining credit quality by raising interest rates, demanding more collateral, shortening loan maturity, and further restricting future activities."

We follow Saunders and Schumacher (2000) and apply the two-step regression in studying the determinants of NIM: in the first step, we control for imperfections, such as implicit interest expense (fee proxy), reserve requirement (NEATA), and credit risk exposure (TETA) described in the model, and then we find the common pure spread for all banks. In the second step, we modify the model to include two additional variables: legal rights and credit information indices. Then, we run a second regression to analyze the relationship between the common pure spread as a dependent variable and the competitive structure of banking markets, interest-rate volatility, legal rights, and credit information indices as the independent variables. Saunders and Schumacher (2000) argue that such a study produces "potentially valuable public insights. For example, if a significant proportion of bank margins in each country is determined by interest rate volatility rather than monopolistic behavior by banks, then public policy attention might be better focused on government's macroeconomic policies as a tool for reducing the cost of intermediation services".

We write the essential parts of the Saunders and Schumacher (2000) paper below and include the modifications. The paper outlines the Ho and Saunders model and derives the empirical specification. A more detailed description of the model and the empirical specification can be found in the Saunders and Schumacher's paper (2000). The model considers the bank a risk-averse agent that acts as a dealer in a market that provides deposits and loans.

The dealership model was proposed by Ho and Saunders (1981) and developed further by Allen (1988) [1] and Angbazo (1997).

The rates are:

$$R_L = (r + b), R_D = (r - a) \dots \dots \dots (3)$$

$$R_L - R_D = (a + b) \dots \dots \dots (4)$$

R_L is the rate set on loans,

R_D is the rate set on deposits,

r is the expected risk-free interest rate,

and a and b are fees that the bank charges for providing immediacy and bearing interest rate risk.

The spread $s = (a + b)$ is:

$$S = (a + b) = \frac{\alpha}{\beta} + \frac{1}{2} R \sigma^2 Q \dots \dots \dots (5)$$

The first term α/β measures the monopoly rent element in bank margins. The second term depends on three factors: R , the bank management's coefficient of absolute risk aversion; Q , the size of bank transactions; and σ^2 , the volatility of the interest rate. Bank margins are larger when the degree of risk aversion is larger, the size of transactions is greater, and the volatility of interest rates is larger.

To study the determinants of NIM, we use two steps. In the first step, imperfections such as implicit interest expense (fee proxy), reserve requirement (NEATA), and credit risk exposure (TETA) are controlled for, and the common pure spread for all banks is found.

For the first step (first stage regression), we run the following regression:

$$NIM_i = \gamma + \sum \delta_j X_{ji} + u_i \dots \dots \dots (6)$$

NIM_i is the net interest margin of bank i in some period t , and X_{ji} is a vector of control variables (fee proxy, NEATA, and TETA). For each bank i in time period t , u_i is the residual and γ is the regression constant, i.e. the estimate of the pure spread component of the NIM for all i banks at time t .

$$NIM=f\{s(\alpha/\beta, R, Q, \sigma), \text{fee proxy, NEATA, TETA, } u\} \dots \dots \dots (7)$$

As a result, banks that have the same attitudes to risk (R) and the same size of transactions (Q) and face the same market structure (α/β) and interest-rate volatility (σ^2_1) will have the same pure spread (s) (i.e. $s_1=s_2= \dots s_n$). Nonetheless, this pure spread will change over time, as market structure and interest rate volatility change. In the second step, we run a second regression to analyze the relationship between the common pure spread and the competitive structure of banking markets, interest-rate volatility, legal rights, and credit information in these markets:

$$\gamma_t = \theta_0 + \theta_1\sigma + \theta_2\text{legal.right.index} + \theta_3\text{credit.information.index} \dots \dots \dots (8)$$

Where γ_t is a time series of pure spreads ($t= 1$ to 14). These values can be found from the intercepts of the regressions in step 1 above. θ_0 reflects the impact of market structure on the pure spread and θ_1 is the sensitivity of the pure spread to interest-rate volatility. θ_2 and θ_3 are the coefficients for the legal right index and the credit information index, respectively.

4. DATA AND RESULTS ANALYSIS

First, we start with the market power model (equations 1 and 2). The sample consists of an unbalanced panel of annual report data from 2003 to 2015 for a set of banks in 12 MENA countries, including six Gulf Cooperation Countries (GCC): United Arab Emirates, Qatar, Bahrain, Oman, Kuwait, and Saudi Arabia, and six non-Gulf Cooperation Countries (non-GCC): Egypt, Jordan, Lebanon, Morocco, Tunisia, and Algeria. The data is selected to cover the two sub-periods: pre- and post-Global Financial Crisis. The bank data comes from Bankscope. The data on GDP and inflation are from the World Bank.

4.1 The Evolution of Market Power

Table 2: Summary Statistics

This table shows the average output price, the marginal cost, and Lerner index for the GCC and non-GCC MENA countries for the period 2003-2015.

| Country | Variable | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|----------------------|--------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Bahrain | Price | 0.033 | 0.035 | 0.047 | 0.057 | 0.069 | 0.067 | 0.058 | 0.055 | 0.059 | 0.058 | 0.053 | 0.054 | 0.055 |
| | MC | 0.024 | 0.025 | 0.031 | 0.040 | 0.049 | 0.042 | 0.037 | 0.033 | 0.032 | 0.032 | 0.030 | 0.032 | 0.031 |
| | Lerner index | 0.298 | 0.347 | 0.347 | 0.289 | 0.250 | 0.330 | 0.333 | 0.351 | 0.377 | 0.383 | 0.380 | 0.378 | 0.411 |
| Kuwait | Price | 0.041 | 0.053 | 0.062 | 0.070 | 0.068 | 0.069 | 0.053 | 0.047 | 0.044 | 0.041 | 0.038 | 0.035 | 0.036 |
| | MC | 0.026 | 0.028 | 0.032 | 0.042 | 0.047 | 0.047 | 0.032 | 0.027 | 0.024 | 0.022 | 0.020 | 0.019 | 0.021 |
| | Lerner index | 0.368 | 0.458 | 0.475 | 0.394 | 0.315 | 0.318 | 0.407 | 0.436 | 0.464 | 0.462 | 0.470 | 0.454 | 0.439 |
| Oman | Price | 0.070 | 0.068 | 0.070 | 0.069 | 0.059 | 0.054 | 0.059 | 0.055 | 0.047 | 0.045 | 0.044 | 0.040 | 0.039 |
| | MC | 0.046 | 0.041 | 0.042 | 0.042 | 0.040 | 0.036 | 0.038 | 0.035 | 0.031 | 0.030 | 0.031 | 0.029 | 0.027 |
| | Lerner index | 0.345 | 0.391 | 0.40 | 0.395 | 0.264 | 0.319 | 0.364 | 0.367 | 0.336 | 0.298 | 0.267 | 0.275 | 0.290 |
| Saudi Arabia | Price | 0.047 | 0.045 | 0.057 | 0.068 | 0.063 | 0.054 | 0.043 | 0.036 | 0.033 | 0.032 | 0.032 | 0.031 | 0.032 |
| | MC | 0.027 | 0.024 | 0.034 | 0.043 | 0.041 | 0.035 | 0.023 | 0.018 | 0.018 | 0.017 | 0.017 | 0.016 | 0.017 |
| | Lerner index | 0.424 | 0.445 | 0.394 | 0.363 | 0.350 | 0.360 | 0.460 | 0.495 | 0.480 | 0.471 | 0.470 | 0.480 | 0.480 |
| Qatar | Price | 0.051 | 0.040 | 0.051 | 0.062 | 0.131 | 0.060 | 0.056 | 0.058 | 0.043 | 0.039 | 0.038 | 0.036 | 0.040 |
| | MC | 0.027 | 0.022 | 0.030 | 0.040 | 0.039 | 0.040 | 0.039 | 0.034 | 0.023 | 0.021 | 0.021 | 0.019 | 0.020 |
| | Lerner index | 0.470 | 0.437 | 0.424 | 0.357 | 0.447 | 0.340 | 0.309 | 0.410 | 0.447 | 0.435 | 0.443 | 0.474 | 0.479 |
| United Arab Emirates | Price | 0.052 | 0.053 | 0.067 | 0.072 | 0.065 | 0.063 | 0.075 | 0.070 | 0.068 | 0.073 | 0.053 | 0.051 | 0.051 |
| | MC | 0.028 | 0.029 | 0.064 | 0.044 | 0.041 | 0.038 | 0.042 | 0.037 | 0.034 | 0.034 | 0.026 | 0.025 | 0.025 |
| | Lerner index | 0.457 | 0.464 | 0.448 | 0.369 | 0.353 | 0.391 | 0.443 | 0.469 | 0.491 | 0.515 | 0.479 | 0.501 | 0.495 |
| Jordan | Price | 0.052 | 0.047 | 0.058 | 0.073 | 0.077 | 0.078 | 0.068 | 0.062 | 0.060 | 0.061 | 0.063 | 0.062 | 0.058 |
| | MC | 0.041 | 0.037 | 0.042 | 0.050 | 0.055 | 0.053 | 0.047 | 0.039 | 0.040 | 0.039 | 0.042 | 0.043 | 0.041 |
| | Lerner index | 0.200 | 0.207 | 0.247 | 0.312 | 0.287 | 0.316 | 0.315 | 0.357 | 0.332 | 0.357 | 0.356 | 0.311 | 0.280 |
| Lebanon | Price | 0.075 | 0.066 | 0.072 | 0.075 | 0.082 | 0.067 | 0.061 | 0.057 | 0.057 | 0.055 | 0.056 | 0.059 | 0.060 |
| | MC | 0.065 | 0.059 | 0.059 | 0.064 | 0.069 | 0.057 | 0.053 | 0.049 | 0.059 | 0.053 | 0.054 | 0.053 | 0.049 |
| | Lerner index | 0.157 | 0.087 | 0.153 | 0.136 | 0.127 | 0.134 | 0.144 | 0.150 | 0.109 | 0.086 | 0.092 | 0.116 | 0.150 |
| Tunisia | Price | 0.065 | 0.063 | 0.065 | 0.070 | 0.072 | 0.072 | 0.062 | 0.058 | 0.057 | 0.055 | 0.062 | 0.067 | |
| | MC | 0.054 | 0.053 | 0.054 | 0.053 | 0.053 | 0.051 | 0.045 | 0.043 | 0.044 | 0.045 | 0.096 | 0.054 | |
| | Lerner index | 0.163 | 0.157 | 0.160 | 0.213 | 0.250 | 0.273 | 0.251 | 0.252 | 0.233 | 0.182 | 0.189 | 0.189 | |

Table 2: Summary Statistics (Continued)

| Country | Variable | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------|--------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Morocco | Price | 0.060 | 0.056 | 0.053 | 0.052 | 0.048 | 0.047 | 0.047 | 0.052 | 0.048 | 0.048 | 0.052 | 0.054 | 0.051 |
| | MC | 0.043 | 0.041 | 0.040 | 0.038 | 0.036 | 0.037 | 0.036 | 0.038 | 0.037 | 0.037 | 0.038 | 0.040 | 0.037 |
| | Lerner index | 0.281 | 0.257 | 0.271 | 0.266 | 0.268 | 0.189 | 0.216 | 0.260 | 0.194 | 0.191 | 0.260 | 0.244 | 0.269 |
| Egypt | Price | | | | 0.057 | 0.062 | 0.094 | 0.079 | 0.074 | 0.090 | 0.100 | 0.100 | 0.096 | 0.092 |
| | MC | | | | 0.041 | 0.041 | 0.094 | 0.061 | 0.057 | 0.063 | 0.067 | 0.067 | 0.064 | 0.066 |
| | Lerner index | | | | 0.202 | 0.318 | 0.262 | 0.246 | 0.217 | 0.226 | 0.280 | 0.286 | 0.283 | 0.285 |
| Algeria | Price | 0.053 | 0.050 | 0.058 | 0.070 | 0.065 | 0.064 | 0.049 | 0.057 | 0.065 | 0.056 | 0.063 | 0.058 | |
| | MC | 0.038 | 0.029 | 0.028 | 0.031 | 0.034 | 0.035 | 0.028 | 0.036 | 0.039 | 0.033 | 0.035 | 0.032 | |
| | Lerner index | 0.292 | 0.401 | 0.529 | 0.515 | 0.483 | 0.459 | 0.325 | 0.387 | 0.340 | 0.270 | 0.426 | 0.526 | |

Table 3: Banking System Lerner Index for GCC and Non-GCC Countries

| Countries | Our results for 2003- 2015 | Our results for 2008- 2015 | World Bank results for 2002-2008 |
|-----------------|----------------------------|----------------------------|-------------------------------------|
| UAE | 0.452 | 0.473 | 0.438 |
| S. Arabia | 0.436 | 0.461 | 0.470 |
| Qatar | 0.421 | 0.417 | 0.501 |
| Oman | 0.332 | 0.314 | 0.399 |
| Kuwait | 0.420 | 0.431 | 0.412 |
| Bahrain | 0.344 | 0.368 | 0.375 |
| GCC Average | 0.401 | 0.411 | 0.435 |
| Tunisia | 0.210 | 0.224 | 0.211 |
| Morocco | 0.243 | 0.228 | 0.288 |
| Lebanon | 0.126 | 0.123 | 0.144 |
| Jordan | 0.298 | 0.342 | 0.309 |
| Egypt | 0.260 | 0.261 | 0.193 |
| Algeria | 0.413 | 0.390 | 0.473 |
| Non-GCC Average | 0.258 | 0.261 | 0.258 |
| Grand Average | 0.330 | 0.336 | 0.373 |

Note: The table shows the evolution of the Lerner index of the banking systems for the Gulf and non-Gulf countries for the period 2003-2015. We find the grand average for Gulf countries as well as the grand average for non-Gulf countries for the period 2003-2015. The grand average for all 12 countries and all years for the same period is also found. The results are compared with the ones done in the World Bank study for the period 2002-2008 from Anzoategui, Martinez Peria, & Rocha (2010).

Figure 1: GCC Countries

This figure shows the evolution of the output price, the marginal cost and the Lerner index of the banking systems for the GCC countries for the period 2003-2015.

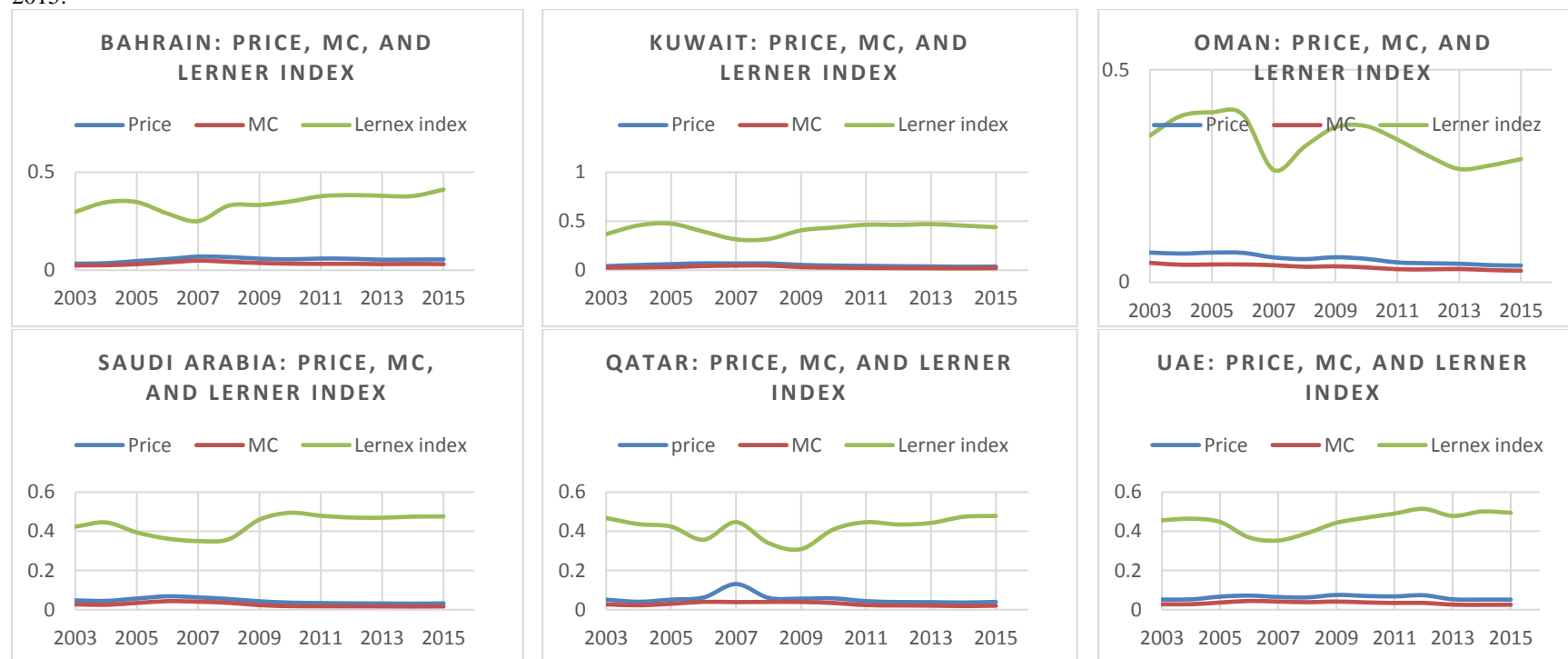
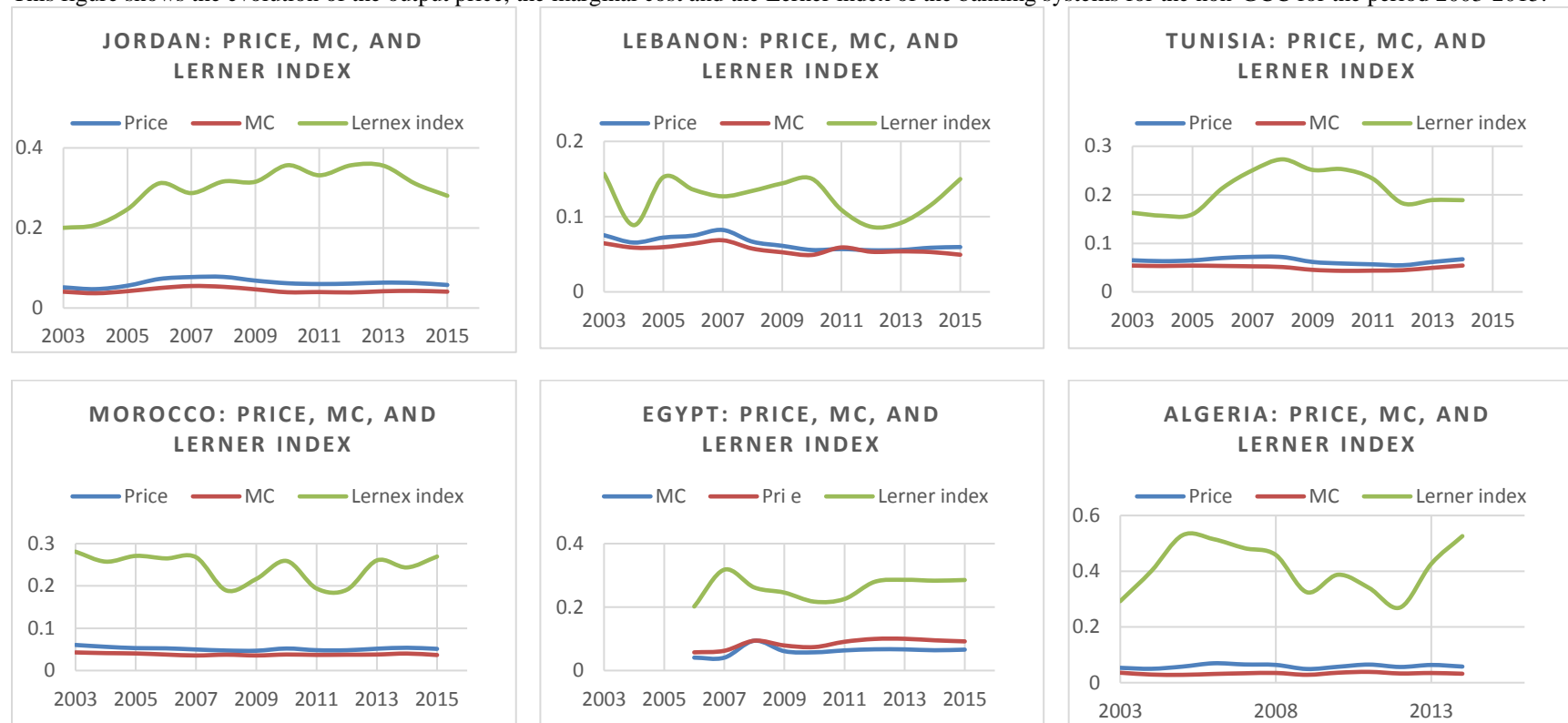


Figure 2: Non-GCC Countries

This figure shows the evolution of the output price, the marginal cost and the Lerner index of the banking systems for the non-GCC for the period 2003-2015.



Tables 2 and 3 and Figures 1 and 2 show the evolution of the output price, marginal cost, and Lerner index of the banking systems for the Gulf and non-Gulf countries from 2003 to 2015. The tables display the average output price, the marginal cost, and Lerner index for each country and each year. We find the following:

1. The grand average for all 12 countries and all years from 2003 to 2015 is 0.330. The figures are comparable to previous estimates. A World Bank study by Anzoategui et al. (2010) for the same 12 MENA countries for the period 2002-2008 finds the average Lerner index to be 0.373. The average for Gulf countries for the period 2003-2015 is 0.401 while the average for non-Gulf countries is 0.258. The World Bank's estimation for the period 2002-2008 for the two regions is 0.435 and 0.258 respectively (Table 3).
2. The evolution of competitive conditions varies between countries and over time, with non-GCC countries exhibiting more competitive behavior than GCC countries. The Global Financial Crisis impacted all 12 countries differently. When we split the sample into two sub-periods, pre-crisis (2003-2007) and post-crisis (2008-2015), we find that the average Lerner index increases following the financial crisis. For the GCC countries, the Lerner index increases from 0.378 to 0.411 and for the non-GCC countries from 0.257 to 0.261.
3. Although the Lerner index increases for both regions following the crisis, Figures 1 and 2 show that over time and between countries there is an absence of a common trend for the Lerner index. The absence of a common trend suggests as Efthyvoulou and Yildirim (2014) put it, that “countries experience the crisis differently and underline the importance of controlling for a broad range of country characteristics when examining the determinants of market power at the bank-level.”
4. Anzoategui et al. (2010) compare the Lerner index across various regions around the world and find that it is higher for MENA countries. We compare our results for MENA countries with the results for Central and Eastern European countries found in Efthyvoulou and Yildirim (2014).

Interestingly, we find that most countries in Eastern Europe with weak legal systems and poor credit information have Lerner indices comparable to those in MENA countries. For instance, the Lerner index in Belarus and Moldova from 2002 to 2010 is .276 and .259 respectively. Eastern European countries with a strong legal system and better rule of law exhibit more competitive behavior; the Lerner index in Poland and the Czech Republic for the same period is .118 and .159 respectively. Our findings support the World Bank's suggestions that for MENA countries to have a more competitive banking system, policymakers should promote a stronger legal environment and the rule of law.

4.2 The Determinants of Market Power

Table 4: The Determinants of Market Power

| Dependent variable: Lerner index | For all years | Before the crisis 2003-2007 | During and post-crisis 2008-2015 |
|---|--------------------------------|------------------------------------|---|
| Independent variables | Coefficient and p-value | | |
| Inefficiency | -0.3674 *** [0.00] | -0.2777*** [0.00] | -0.4201*** [0.00] |
| Capitalization | 0.0192 *** [0.00] | 0.0172*** [0.00] | 0.0204*** [0.00] |
| Bank size | .0311*** [0.00] | .0109*** [0.01] | .0404*** [0.00] |
| Diversification | 0.0800*** [0.00] | 0.0827*** [0.01] | 0.0741** [0.03] |
| Customer deposits | -0.0323 [0.21] | -0.0410 [0.32] | -0.0270 [0.42] |
| Non-performing loans to total loans | -.0008*** [0.00] | -.0013*** [0.01] | -.0009* [0.07] |
| GDP growth | -.0002 [0.82] | -.0011 [0.44] | .0011 [0.33] |
| Inflation | -.0004 [0.27] | .0008 [0.32] | -.0004 [0.30] |

Note: First, we estimate the bank-level variables and the macroeconomic variables impacting the market power for the full sample (2003-2015). Then, to analyze the impact of the Global Financial Crisis on market power, we split the sample into two sub-periods: the pre-crisis and the post-crisis years. *, **, and *** denote coefficients at the 10%, 5%, and 1% confidence level.

Table 4, column 2, shows the result of the estimation of equation (2) for the full sample period of 2003 to 2015. Starting with the bank-specific control variables, the coefficient on “bank size” is positive

and statistically significant at the 1% confidence level. This finding is consistent with de Guevara and Maudos (2007) who find that bank size impacts market power. As for “asset quality” proxied by non-performing loans to total loans, we find that it has a negative and statistically significant impact on margins. The larger the percentage of non-performing loans, the smaller the profit. The estimated coefficient on “diversification” is positive and highly statistically significant. The coefficient on “inefficiency” is negative and highly statistically significant. This finding supports the efficient structure hypothesis, which states that firms with inefficient management have higher costs and earn lower profits. We find that the coefficient on “customer deposits,” which captures the percentage of customer deposit versus non-deposit funding, is negative but not statistically significant. For “capitalization,” our findings indicate that well-capitalized banks enjoy higher margins. The coefficient on this variable is positive and statistically significant at the 1% confidence level. The results are consistent with Demirgüç-Kunt and Huizinga (1999) and Garza-Garcia (2012). With respect to the macroeconomic variables that capture the impact of the business cycle on market power, the coefficients are negative, but the results are not statistically significant.

4.3 The Impact of the Financial Crisis on Market Power in MENA Countries

To analyze the impact of the Global Financial Crisis on market power, we split the full sample into two sub-periods: pre-crisis and post-crisis (Table 4).

Several interesting findings emerge from the comparison of the two sub-periods:

1. The impact of bank size on market power increases dramatically from 0.0109 pre-crisis to 0.0404 post-crisis. The results are highly statistically significant. This is consistent with de Guevara et al. (2005), who demonstrate that larger banks enjoy cost advantages. Therefore, larger banks are better equipped to weather a crisis than small banks.
2. The impact of diversification on market power decreases during the crisis from 0.0827 to 0.0741. Both results are highly statistically significant. The involvement of banks in activities that generate fees, trading revenue, and other non-interest income negatively impacts market power

during the crisis. This is in line with Stiroh and Rumble (2006) who show that the gains from diversification are offset by exposure to risky activities.

3. The impact of non-performing loans to total asset on market power slightly increases from -0.0013 to -0.0009. This result is statistically significant.
4. The impact of capitalization on market power increases from 0.0172 to 0.0204. This means that banks with higher capitalization can better weather the crisis. This is consistent with Efthyvoulou and Yildirim (2014) who state that well-capitalized banks are impacted less profoundly by excessive risks. Thus, these banks can engage in highly profitable investment opportunities, reduce costs, and attain superior performance.

4.4 Factors Impacting Interest Rate Margin

Next, we examine the net interest margin (NIM) (Equations 3-8). The source of our data is the income statement and balance sheet information extracted from the Bankscope Data Base (2016) covering the period 2003–2015. The sample period selection is important because it covers the Global Financial Crisis and the efforts of central banks around the world to impose stricter supervisory and regulatory measures to ensure the safety and stability of the global financial system. Among the multiple measures imposed, banks had to increase their capital ratio to create a sufficient buffer to withstand future periods of severe economic and financial distress. In our study, we examine the impact of the capital ratio increase on the profitability of banks in the MENA region.

The main contribution of our study is including the legal rights and credit information indices as factors impacting NIM. Data for the indicator of legal rights and the depth of credit information are taken from the World Bank website. The indicator of legal rights has a scale from 1 through 12. A score of 12 indicates that legal rights are mostly protected. For the depth of credit information, the scale is from 1 through 8, where a score of 8 indicates that the credit information is completely available. Data on interest rate volatility is taken from the central banks of the countries involved. Twelve Middle Eastern and North African countries (MENA) were selected, namely six Gulf Cooperation Countries (GCC): United Arab

Emirates, Qatar, Bahrain, Oman, Kuwait, and Saudi Arabia, and six non-Gulf countries (Non-GCC): Egypt, Jordan, Lebanon, Morocco, Tunisia, and Algeria.

Table 5: OLS Regression for All the Country's Banks and All the Years

| Independent variables | Coefficient and p-value |
|---|-------------------------|
| <i>TETA</i> | 0.06*** [0.00] |
| <i>NEATA</i> | 0.31*** [0.00] |
| <i>Fee Proxy</i> | 9.15*** [0.00] |
| <i>Intercept</i> | 2.45*** [0.000] |
| <i>Note:</i> The dependent variable is the interest rate margin. The independent variables are Fee Proxy, which is Implicit interest rate = (Non-interest expense – non-interest revenue)/ total earning assets; NEATA, which is non-interest earning assets to total assets; and TETA: total equity to total assets. *, **, and *** denote coefficients at the 10%, 5%, and 1% confidence level. | |

Table 6: OLS for GCC Countries

Dependent variable: Interest rate margin. Independent variables: Fee Proxy: Implicit interest rate = (Non-interest expense – non-interest revenue)/ total earning assets. NEATA: Non-interest earning assets to total assets. TETA: total equity to total assets. The letter a, b, and c indicate significance at the 10%, 5%, and 1% levels, respectively.

| Country | Variable | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|-----------------------------|-----------|---------|---------|---------|---------|---------|---------|----------|---------|---------|---------|---------|---------|---------|
| Bahrain | TETA | 0.004 | -0.001c | 0.009 | 0.008 | 0.015 | 0.007 | 0.009 | 0.0163b | 0.02c | 0.0182b | 0.03c | 0.04c | 0.02c |
| | NEATA | 1.00 | 0.726c | 2.001c | 2.412c | 2.765c | 2.183c | 2.643c | -0.09 | 2.227c | 2.212c | 2.293c | 1.11 | 0.83 |
| | Fee Proxy | 1.047 | -1.140 | 0.898 | 1.629 | 2.581 | 1.719 | 1.541 | -0.268 | 3.073 | 3.081 | 5.328b | 3.260 | 2.233 |
| | Intercept | 2.497c | 2.594c | 2.413c | 2.371c | 2.183c | 2.465c | 2.292c | 2.583c | 2.175c | 2.306c | 2.166c | 2.269c | 2.233c |
| Kuwait | TETA | 0.075c | -0.003 | 0.084c | 0.042c | 0.067c | 0.053c | 0.033c | 0.060c | 0.087c | 0.075c | 0.087c | 0.108c | 0.076c |
| | NEATA | 1.525c | 0.804c | 2.497c | 3.114c | 3.030c | 3.484c | 5.102c | -0.082 | 3.439c | 2.197c | 1.756c | 1.555b | 0.752 |
| | Fee Proxy | 41.896c | -2.55 | 24.976c | 20.889c | 37.715c | 35.303c | -13.657c | -8.846c | 48.519c | 18.020c | 39.288c | 61.548c | 66.560c |
| | Intercept | 1.782c | 2.903c | 1.700c | 2.082c | 1.743c | 1.923c | 1.997c | 2.433c | 1.421c | 1.863c | 1.761c | 1.483c | 1.965c |
| Oman | TETA | 0.086c | 0.003 | 0.089c | 0.044c | 0.069c | 0.058c | 0.035c | 0.061c | 0.091c | 0.076c | 0.088c | 0.109c | 0.078c |
| | NEATA | 1.353c | 0.572b | 2.308c | 2.921c | 2.803c | 3.093c | 4.467c | -0.099a | 3.173c | 2.073c | 1.637c | 1.400b | 0.628 |
| | Fee Proxy | 47.868c | -0.026 | 26.664c | 21.859c | 39.248c | 40.120c | -11.412a | -9.087c | 53.860c | 19.359c | 41.224c | 69.609c | 76.120c |
| | Intercept | 1.711c | 3.058c | 1.802c | 2.227c | 1.838c | 2.001c | 2.307c | 2.631c | 1.430c | 2.004c | 1.847c | 1.449c | 1.894c |
| United Arab Emirates | TETA | 0.181c | 0.121c | 0.179c | 0.139c | 0.134c | 0.154c | 0.131c | 0.133c | 0.148c | 0.162c | 0.129c | 0.135c | 0.123c |
| | NEATA | 0.707 | -1.152c | 1.817c | 1.882c | 1.626b | 0.994 | 1.968b | -0.067 | 0.953 | 1.391c | 1.157c | 0.505 | -0.001 |
| | Fee Proxy | 77.017c | 21.157c | 54.058c | 40.560c | 56.277c | 73.073c | 27.083c | -3.662 | 75.656c | 50.695c | 50.543c | 75.455c | 86.217c |
| | Intercept | 0.793c | 2.044c | 0.757c | 1.334c | 1.385c | 1.164c | 1.351c | 1.709c | 1.178c | 0.958c | 1.509c | 1.457c | 1.690c |
| Qatar | TETA | 0.036c | 0.008 | 0.046c | 0.032c | 0.061c | 0.032c | 0.034c | 0.009c | 0.062c | 0.053c | 0.063c | 0.074c | 0.074c |
| | NEATA | 1.401c | 0.648c | 2.555c | 3.228c | 3.171c | 3.904c | 5.358c | -0.082 | 4.105c | 2.329c | 1.926c | 1.965c | 1.965c |
| | Fee Proxy | 37.180c | -0.599 | 17.376c | 20.376c | 36.870c | 30.693c | -12.545b | -8.481c | 38.737c | 15.037c | 37.103c | 53.591c | 53.591c |
| | Intercept | 2.161c | 2.788c | 2.127c | 2.190c | 1.753c | 2.123c | 2.000c | 2.548c | 1.612c | 2.095c | 1.975c | 1.783c | 1.783c |
| Saudi Arabia | TETA | 0.067c | -0.007 | 0.077c | 0.037c | 0.064c | 0.047c | 0.028c | 0.056c | 0.084c | 0.070c | 0.084c | 0.105c | 0.073c |
| | NEATA | 1.451c | 0.812c | 2.511c | 3.163c | 3.020c | 3.663c | 5.369c | -0.084 | 3.516c | 2.209c | 1.760c | 1.533c | 0.702 |
| | Fee Proxy | 41.652c | -2.490 | 23.569c | 20.949c | 37.499c | 33.936c | -14.599c | -8.780c | 47.751c | 17.359c | 39.365c | 63.055c | 68.609c |
| | Intercept | 1.883c | 2.973c | 1.820c | 2.174c | 1.806c | 2.015c | 2.123c | 2.494c | 1.494c | 1.956c | 1.818c | 1.515c | 1.985c |

Table 7: OLS for non-GCC Countries

Dependent variable: Interest rate margin. Independent variables: Fee Proxy: $\text{Implicit interest rate} = (\text{Non-interest expense} - \text{non-interest revenue}) / \text{total earning assets}$.

NEATA: Non-interest earning assets to total assets. TETA: total equity to total assets. The letters a, b, and c indicate significance at the 10%, 5%, and 1% levels, respectively.

| Country | Variable | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------|-----------|----------|----------|---------|---------|---------|----------|----------|---------|----------|----------|----------|----------|----------|
| Algeria | TETA | 0.025c | 0.020b | 0.022b | 0.030c | 0.032c | 0.023b | 0.020b | 0.050c | 0.034c | 0.031c | 0.039c | 0.047c | 0.034c |
| | NEATA | 2.140c | 1.875c | 1.553c | 1.672c | 1.400c | 2.218c | 2.524c | 0.149 | 1.923c | 2.110c | 1.880c | 1.782c | 1.845c |
| | Fee Proxy | -16.703c | -11.997c | -5.000 | -7.462b | -2.459 | -18.496c | -23.312c | -3.633 | -13.101c | -17.098c | -12.727c | -14.242c | -15.390c |
| | Intercept | 3.099c | 3.135c | 3.253c | 3.100c | 3.101c | 3.112c | 3.047c | 3.274c | 3.042c | 3.105c | 3.082c | 3.001c | 3.143c |
| Egypt | TETA | 0.094c | 0.052c | 0.108c | 0.074c | 0.082c | 0.084c | 0.070c | 0.087c | 0.093c | 0.091c | 0.094c | 0.109c | 0.087c |
| | NEATA | 1.422c | -0.208 | 2.300c | 2.646c | 2.795c | 2.775c | 3.364c | -0.070 | 2.776c | 2.008c | 1.660c | 1.611c | 0.876b |
| | Fee Proxy | 47.486c | 10.928c | 33.323c | 29.473c | 43.864c | 49.161c | 17.084c | -5.007c | 52.861c | 32.343c | 44.738c | 53.141c | 56.196c |
| | Intercept | 1.682c | 2.548c | 1.567c | 1.887c | 1.677c | 1.656c | 1.837c | 2.212c | 1.498c | 1.670c | 1.651c | 1.459c | 1.734c |
| Jordan | TETA | 0.076c | 0.008 | 0.070c | 0.040c | 0.066c | 0.052c | 0.031c | 0.054c | 0.085c | 0.067c | 0.081c | 0.100c | 0.072c |
| | NEATA | 0.998c | 0.564c | 1.617c | 1.953c | 1.769c | 1.552c | 2.205c | -0.081 | 1.531c | 1.795c | 1.426c | 0.917b | 0.805a |
| | Fee Proxy | 44.959c | 0.394 | 24.338c | 21.356c | 36.052c | 34.179c | -5.577 | -8.278c | 48.130c | 20.471c | 39.733c | 54.289c | 56.641c |
| | Intercept | 1.997c | 3.225c | 2.204c | 2.491c | 2.096c | 2.366c | 2.717c | 2.865c | 1.801c | 2.196c | 1.996c | 1.760c | 2.123c |
| Lebanon | TETA | 0.050c | 0.034c | 0.054c | 0.049c | 0.051c | 0.052c | 0.049c | 0.052c | 0.060c | 0.058c | 0.070c | 0.076c | 0.065c |
| | NEATA | 2.116c | 1.505c | 2.366c | 2.303c | 2.123c | 2.213c | 2.541c | 0.239c | 2.202c | 2.309c | 2.058c | 2.011c | 1.880c |
| | Fee Proxy | 26.186c | -3.823 | 17.188c | 19.510c | 25.253c | 22.607c | 7.845b | -0.663 | 23.437c | 16.254c | 26.007c | 27.003c | 27.647c |
| | Intercept | 1.543c | 2.153c | 1.601c | 1.632c | 1.609c | 1.622c | 1.666c | 2.340c | 1.531c | 1.600c | 1.482c | 1.436c | 1.547c |
| Morocco | TETA | 0.097c | 0.014 | 0.106c | 0.053c | 0.081c | 0.078c | 0.036c | 0.051c | 0.105c | 0.089c | 0.094c | 0.115c | 0.089c |
| | NEATA | -0.080a | -0.121b | -0.05 | -0.07 | -0.06 | -0.08 | -0.10 | -0.103b | -0.07 | 0.00 | -0.03 | -0.07 | -0.08 |
| | Fee Proxy | 64.691c | 9.699c | 36.250c | 27.753c | 41.270c | 59.221c | 12.071b | -6.412c | 68.681c | 42.758c | 62.802c | 82.919c | 85.009c |
| | Intercept | 1.839c | 3.082c | 2.103c | 2.629c | 2.243c | 2.163c | 2.890c | 2.905c | 1.739c | 2.142c | 1.957c | 1.607c | 1.858c |
| Tunisia | TETA | 0.079c | -0.005 | 0.086c | 0.041c | 0.067c | 0.053c | 0.042c | 0.060c | 0.089c | 0.074c | 0.087c | 0.109c | 0.079c |
| | NEATA | 1.556c | 0.805c | 2.475c | 3.197c | 3.152c | 3.828c | 3.632c | -0.090 | 3.772c | 2.198c | 1.732c | 1.592b | 0.675 |
| | Fee Proxy | 47.320c | -2.522 | 25.479c | 20.999c | 38.772c | 37.849c | -2.072 | -9.163c | 52.778c | 17.892c | 40.622c | 73.140c | 80.661c |
| | Intercept | 1.662c | 2.948c | 1.742c | 2.479c | 1.705c | 1.876c | 2.163c | 2.538c | 1.288c | 1.905c | 1.775c | 1.367c | 1.833c |

The bank capital ratios factor (TETA) in Table 5 is highly statistically significant and has the expected positive sign, which indicates that the higher the required capital ratio, the lower the bank's profitability. To compensate for the cost of holding a higher capital ratio, banks seek to increase their NIM. This result is consistent across all countries (Tables 6 and 7) and is predominantly statistically significant. The implicit interest rate (fee proxy) has a strong and positive impact on NIM. The variable is highly statistically significant, and this result supports the previous literature. Saunders and Schumacher (2000) explain that the restriction on paying explicit interest on deposits appears to be met by positive implicit payments (or subsidies to depositors instead). However, to finance these payments, banks must increase their loans rates and thus their actual NIM. The results are consistent across all countries (Tables 6 and 7) and are above all statistically significant. The reserve requirements variable in Table 5 has the positive expected sign, and the results are statistically significant.

In the second step, we run a panel regression to analyze the relationship between the common pure margin and the competitive structure of banking markets, interest rate volatility, and the legal rights and credit information indices in these markets.

Figure 3: Volatility of Interest Rates in the GCC MENA Countries

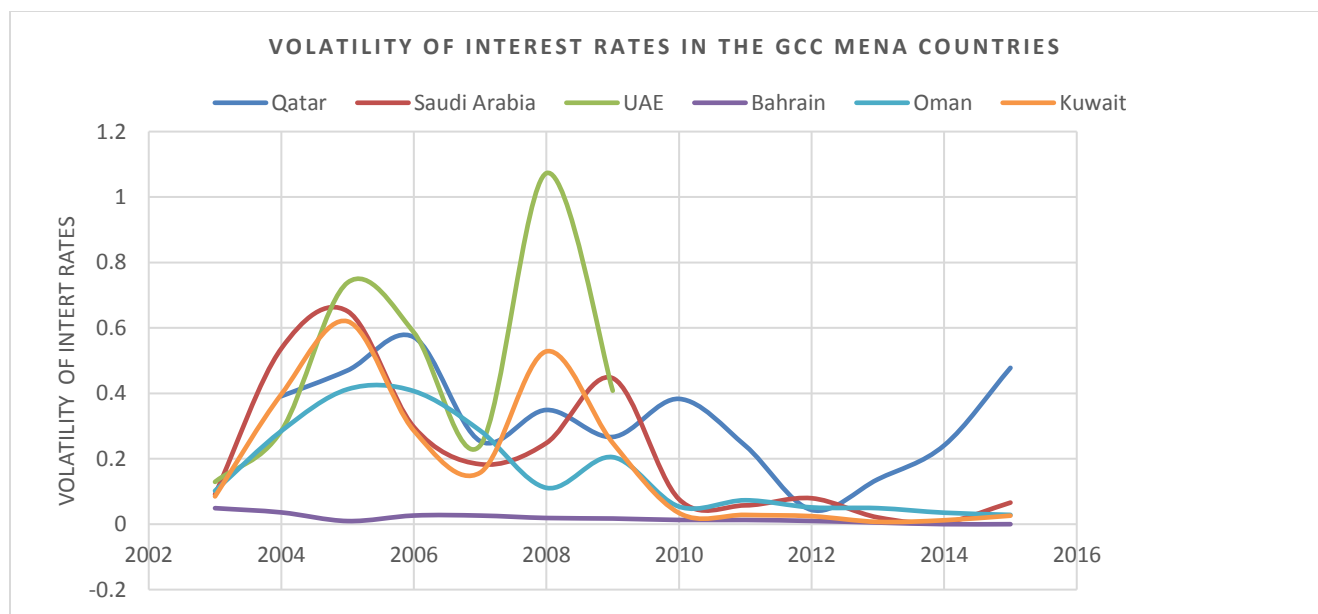
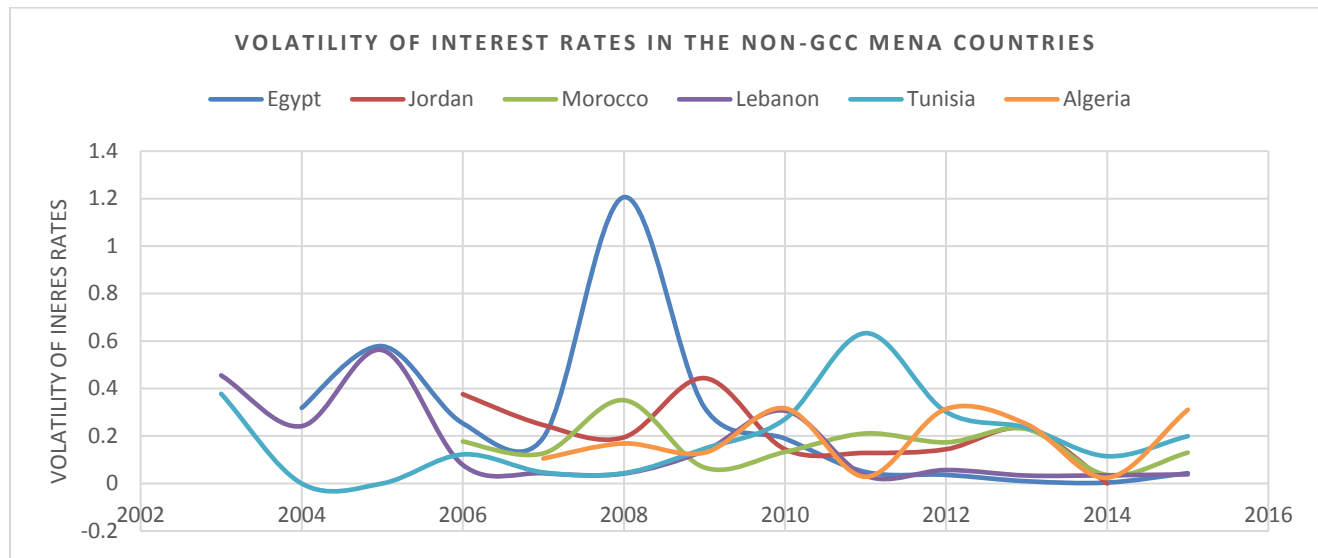


Figure 4: Volatility of Interest Rates in the Non-GCC MENA Countries



Figures 3 and 4 show the volatility of interest rates for the GCC and non-GCC MENA countries.

The data for interest rates is collected from the central banks of the selected countries. To compute the volatility of interest rates for each country and each year, we find the standard deviation of the monthly rates.

In the second step regression, we use the intercepts (the pure spread) estimated from the country-specific cross-sectional regression (Tables 6 and 7) as the dependent variables.

Table 8: Second Step Regression.

| Independent variables | Coefficient and p-value |
|--------------------------|-------------------------|
| Intercept | 2.70*** [0.00] |
| Volatility | -.65*** [0.00] |
| Legal right index | -.11*** [0.04] |
| Credit information index | -.08*** [0.00] |

Note: The dependent variable is the pure interest margin, which is the intercepts taken from the cross-sectional regressions in Tables 5 and 6. The independent variables are interest rate volatility, Legal right index, and credit information index. *, **, and *** denote coefficients at the 10%, 5%, and 1% confidence level.

Table 8 shows the results of the second-step regression. The table shows that volatility of interest rates has a negative impact on interest rate margins and the results are statistically significant, thus the higher the volatility, the lower the margin. Also, the table shows that the legal rights and credit information indices are highly statistically significant and have the expected negative signs. The more protected the legal rights and the more complete the credit information in a country, the more efficient the banking system and the lower the NIM. This result has major policy implications: MENA countries must improve their legal rights environment to improve the efficiency of their financial systems. This finding supports the results we obtain in the first model (the market power model).

We find that the banking markets in the selected MENA countries explain, on average, 2.52% of the pure spread. The variable is highly statistically significant. Overall, the results indicate that the banking markets in the selected MENA countries are less efficient than the markets in developed countries. Saunders and Schumacher (2000) find that the banking markets in six selected European countries and the U.S. are quite efficient, with the intercept variable suggesting that only approximately 0.20% of margins, on average, can be explained by market structure. The implication of these results is that MENA countries should improve their market structure to be more competitive.

5. CONCLUSION

This paper provides an up-to-date assessment of the evolution of competitive conditions in 12 Middle Eastern and North African countries (MENA) in the aftermath of the Global Financial Crisis, namely six Gulf countries (GCC): United Arab Emirates, Qatar, Bahrain, Oman, Kuwait, and Saudi Arabia, and six non-Gulf countries (non-GCC): Egypt, Jordan, Lebanon, Morocco, Tunisia, and Algeria. We find that the evolution of market power varies between countries and over time, with non-GCC countries exhibiting more competitive behavior than GCC countries. The total average of the Lerner index for all 12 countries and all years during the period 2003-2015 is 0.330. Taken separately, the total average for GCC countries is 0.401 while the average for non-GCC countries is 0.258. The World Bank's estimation for the period 2002-2008 for the two regions is 0.435 and 0.258 respectively.

Our results show an overall increase in market power following the financial crisis in both regions. We find that bank size, asset quality, diversification, inefficiency, and capitalization have statistically significant effects on market power. In analyzing the impact of the financial crisis, we find that bank size, capitalization, and diversification affect market power differently in the pre-crisis and post-crisis years; larger banks enjoy cost advantages, and diversification negatively impacts market power during the crisis and in the post-crisis years. The impact of capitalization on market power has increased. Banks with higher capitalization can better weather the crisis.

Analyzing the net interest margin (NIM), the major contribution of this research is to augment the Saunders and Schumacher (2000) model to include the legal rights indicator and credit information index as factors impacting NIM. We find that the legal rights index is highly statistically significant and has the expected negative sign. The more protected the legal rights in a country, the more efficient the banking system and the lower the net interest margin. This finding is consistent with the previous literature. This result has major policy implications: MENA countries need to improve the legal rights environment to improve the efficiency of their financial system.

We find that the bank capital ratios factor (TETA) is highly statistically significant and has the expected positive sign. The higher the required capital ratio, the lower the bank's profitability. To compensate for the cost of holding a higher capital ratio, banks seek to increase their NIM. The implicit interest rate (fee proxy) has a strong and positive impact on NIM. The variable is highly statistically significant. This result is in line with the previous literature. The reserve requirements variable has the expected positive sign, and the results are statistically significant.

In analyzing the competitive structure of banking markets, we find that the banking markets in the selected MENA countries explain, on average, 2.87% of the pure spread. The findings indicate that the banking markets in the selected MENA countries are less efficient than the markets in developed countries. The implication of these results is that MENA countries should improve their market structure to become more competitive with developed countries. We conclude that policymakers in MENA

countries should show a sustained commitment to promoting the rule of law, a stronger legal environment, deeper financial reforms, and a more competitive environment in the banking system.

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Chapter 2

The Impact of Firm-Level Characteristic and County-Specific Attributes on the Performance and Efficiency of the Microfinance Institutions

1. INTRODUCTION

The World Bank estimates that 10.7 percent of the world's population lives on less than US\$1.90 per day (World Bank, n.d.). Microfinance Institutions (MFIs) provide financial services to the populations poor, who are excluded from the traditional financial system. The services include collateral-free microcredit, savings, and insurance accounts. MFIs face major challenges in their way to financial inclusions; information asymmetry, financial sustainability, and outreach are some of the problems. A steady flow of literature covers these issues. With regard to information asymmetry, Attanasio, Augsburg, de Haas, Fitzsimons, and Harmgart (2015) find that borrowers with joint liability reduce agency problems by screening and monitoring each other. Gine, Goldberg, and Yang (2012) study how improvements in a lender's ability to determine borrowers' identities would impact the credit market. Lenders can decrease information asymmetry by penalizing past defaulters and rewarding good borrowers by withholding or expanding future loans. Recent studies center on financial sustainability. Unlike traditional financial institutions that have the goal of profit maximization, MFIs have social goals in addition to their financial objectives. There is a debate in the literature whether the future of microfinance lies in the for-profit vs. non-profit MFIs. Proponents of the for-profits MFIs argue that outreach to poor families cannot be expanded without the commercial transformation of MFIs. Conning and Morduch (2011) argue that the future of MFIs rests in combining the philanthropic and commercial forces. They propose a more rigorous "corporate finance of microfinance." A large body of literature emphasizes MFIs' outreach. Hermes, Lensink, and Meesters (2011) investigate the trade-off between outreach to the poor and efficiency of microfinance institutions. They find that outreach and efficiency are negatively correlated.

This study identifies and analyzes the impact of firm specific attributes and country characteristics on MFIs' performance. Our results have numerous policy implications.

This paper adds to the literature in the following ways:

First, it provides an up-to-date assessment of the performance and the efficiency of MFIs.

Second, a very large dataset of over 10,000 firm-years is used that cover MFIs in six major geographical regions in 89 countries. Thus, we can conduct a comparative analysis of the MFIs' performances in different sociocultural environments.

Third, our dataset for the period 2008-2015 covers the aftermath of the global financial crisis (GFC). The (GFC) has had a dramatic impact on countries around the world and drastically affected the financial institutions' activities, including the MFIs' performance. Imai, Gaiha, Thapa, Annim, & Gupta (2011) find that "under the continuous effect of the global financial crisis, the donor's investment in microfinance sector has shrunk". Chen, Rasmussen, and Reille (2010) reported that several countries have experienced a microfinance repayment crisis. And the global economic recession "was among the various contextual factors affecting borrowers' repayment capacity".

Fourth, we identify as country-specific variables (country GDP size and GDP growth, and inflation) as well as firm-specific features (MFI diamond rating of information self-disclosure, regulation status, firm maturity, asset size, number of offices, percent of women borrower, and percent of female board members) and we examine their impact on a set of performance measures such as outreach, efficiency, and profitability.

A literature review follows this introductory section. We review the academic literature to examine the challenges facing MFIs and the effectiveness of different microfinance techniques.

2. LITERATURE REVIEW

2.1 Group Lending vs. Individual Lending

Cassar and Wydick (2010) study group lending in five countries: India, Kenya, Guatemala, Armenia, and the Philippines finding that "societal trust positively and significantly influences group contribution rates", and "that peer monitoring can have perverse as well as beneficial effects".

Feigenberg, Field, and Pande (2011) examine group lending by assigning microfinance clients to various

repayment groups. They find that groups that meet more frequently “exhibit a higher willingness to pool risk with group members” and “they were also three times less likely to default on their second loan”. Gine, Krishnaswamy, and Ponce (2013) study the possibility of default in group lending and find that “Exposure to common shocks and strategic default are reasons for the deterioration in group repayment”. Gine, Jakiela, Karlan, and Morduch (2010) study the free-riding dilemma in group lending. They find that “Group contracts benefit borrowers by creating implicit insurance against investment losses, but the costs are borne by other borrowers, especially the most risk averse”. Some studies examine the behavioral aspect of microcredit. The literature shows that high-frequency payment is important to avoid loan delinquencies. Bauer, Chytilova, and Morduch (2012) draw “a link between self-control problems and the contractual mechanisms of microcredit”. Their survey shows that one third of participants have “hyperbolic preferences (more impatient now than in the future)”. The authors find that microcredit contracts are “helpful structure for people with self-discipline problems who seek to accumulate capital but who lack suitable contractual saving devices”. On the other hand, literature shows that frequent weekly repayment discourages the creation of new business. Field, Pande, Papp, and Rigol (2013) compare contracts that require that repayments start immediately after the loan vs. contract that includes a 2-month grace period. They find that “the provision of a grace period increased short-run business investment and long-run profits but also default rates”. Mersland and Strøm (2009) study the determinants of MFIs’ outreach to poor clients. The authors find that “outreach is lower in the case of lending to individuals than in the case of group lending”.

2.2 Interest Rate Elasticity of Demand

Rhyne (2011) examines the issue of why the interest rate in microfinance is so high. She emphasizes the need for sustainability to ensure outreach. Dehejia, Montgomery, and Morduch (2012) examine whether increasing interest rate will cause microfinance institutions to lose customers. The authors find that “Less wealthy accountholders are more sensitive to the interest rate than (relatively) wealthier borrowers (an elasticity of -0.86 compared to -0.26), and consequently the bank’s portfolio shifts away from its poorest borrowers when it increases the interest rate”. El Gamal, El Komi, Karlan, and Osman

(2014) propose an alternative way to expand microfinance. Since in Islamic religion, interest rate is prohibited, there are no interest rate payments in their model. The authors aim to “establish credit unions for the poor in which the bank plays the role of a guarantor in the familiar rotating savings and credit association (RoSCA)”. The authors test the model in laboratory experiments in the field and find that their “bank-insured RoSCA model generated significantly higher takeup and repayment rates than the Grameen model”.

2.3 Saving and Micro-Insurance Products

Beck (2015) names several barriers discouraging access to formal saving for low-income households, namely: “(i) geography, (ii) transaction cost, (iii) documentation requirements, (iv) behavioral constraints, and (v) lack of financial literacy”. Burgess and Pande (2005) study the issue of whether government expansion of saving facilities can have an impact on poverty. They find that “branch expansion into rural unbanked locations in India significantly reduced rural poverty”. Ashraf, Karlan, and Yin (2006) find that deposit collection exists in many developing countries. De Mel, McIntosh, and Woodruff (2013) conduct a field experiment in Sri Lanka. To collect deposits, the bank installs a savings lockbox rather than sending the deposit collector to the village. The authors find that “substantially less expensive deposit collection techniques are almost as effective as Weekly Home visits at generating deposits for the participating bank”. Dupas, Green, Keats, and Robinson (2015) conduct an experiment in Western Kenya to examine whether waving the bank’s account opening fee will increase saving. They find that “While 63% of people opened an account, only 18% actively used it. Survey evidence suggests that the main reasons people did not begin saving in their bank accounts are that: (1) they do not trust the bank, (2) service is unreliable, and (3) withdrawal fees are prohibitively expensive”.

Several studies examine customers’ behavioral constraints, Ashraf, Aycinena, Martínez, and Yang (2015) study the degree Salvadoran migrants in the United States value the opportunity to exert greater control over their saving in their home countries. They find that “Migrants offered the greatest degree of control accumulated the most savings”. Recent studies focus on the lack of financial literacy. Cole, Sampson, and Zia (2011) find that a financial education program has “modest effects on demand”

for financial services while “small subsidies greatly increase demand”. Karlan, Kutsoati, McMillan, and Udry (2011) examine the impact of risk mitigation on farmers’ investment decisions in Ghana. They propose farmers loans, in which the farmers are forgiven 50% of the loan repayment if crop prices drop below a certain price. They find that “loan uptake is high among all farmers and the indemnity component has little impact on uptake or other outcomes of interest”. In a field experiment conducted by Gaurav, Cole, and Tobacman (2011), 600 small-scale farmers in India were offered rainfall insurance, while simultaneously given financial literacy and insurance education. The authors find that “Financial education has a positive and significant effect on rainfall insurance adoption, increasing take-up from 8 to 16 percent. Only one marketing intervention, the moneyback guarantee, has a consistent and large effect on farmers’ purchase decisions”. Islam, Nguyen, and Smyth (2015) examine whether microcredit in rural Bangladesh can substitute informal lenders in village economies. They find that “poorer microcredit members are trapped in a circle of vicious debt, in which they have to keep borrowing from informal sources, in order to repay microcredit loans”.

2.4 Microfinance Sustainability

Recent literature investigates the sustainability of microfinance. The question is whether microfinance can be commercially viable. Cull, Demirgüç-Kunt, and Morduch (2009) using a data set that includes 346 of the world’s leading microfinance institutions and covers nearly 18 million active borrowers find that microfinance institutions were very successful in term of maintaining a high level of loan repayment, but “profit-maximizing investors would have limited interest in most of the institutions that are focusing on the poorest customers and women”. Gonzalez (2007) finds that “the three main drivers of operating expense ratio (OER) are relative loan sizes, ages, and scale”. The author also finds that the cost will decrease dramatically when the microfinance firm’s size grows beyond 2000 customers. Cull et al. (2009) find that it is costly for microfinance institutions to comply with regulation. Menkhoff, Neuberger, and Rungruxsirivorn (2011) select a representative sample from Northeast Thailand. They find that “lenders enforce collateral-free loans through third-party guarantees and relationship lending, but also through modifying loan terms, such as reducing loan size”. Servin Juarez, Lensink, and van den Berg

(2012) study the relationship between type of ownership and technical efficiency of MFIs in Latin America. They find that “non-governmental organizations and cooperatives have much lower interfirm and intrafirm technical efficiencies than non-bank financial intermediaries and banks. That indicates the importance of ownership type for technical efficiency”. Hartarska, Shen, and Mersland (2013) study the relationship between MFIs’ outreach and sustainability. Their results support “the existence of a trade-off between outreach and sustainability”.

2.5 Female Empowerment

Bellucci, Borisov, and Zazzaro (2010) find that “female entrepreneurs face tighter access to credit, even though they do not pay higher interest rates”. The paper also finds loan officers behave differently according to their gender: “female officers are more risk-averse or less self-confident than male officers, as they tend to restrict credit availability to new, unestablished borrowers more than their male counterparts”.

Demirgüç-Kunt, Klapper, and Singer (2013) analyze the Global Financial Database that measures how customers in 148 economies save, borrow, make payments, and manage risk. They find that “There are significant disparities in account penetration along gender lines” and that “the gender gap is particularly large in South Asia and the Middle East and North Africa”. Aterido, Beck, and Iacovone (2013), studying the gender gap in Sub-Saharan Africa, find that unconditional gender gap exists, but when “key observable characteristics of the enterprises or individuals are taken into account, the gender gap disappears. Yoong, Rabinovich, and Diepeveen (2012) study the gender effects for transfer programs. Their results show that “Findings for micro-credit remain highly controversial and inconclusive”. Strøm, D’Espallier, and Mersland (2014) examine whether gender plays role in MFI performance and governance. They find that female managed MFI have better performance, but the performance does not lead to improved governance.

3. DATA AND METHODOLOGY

3.1 Data

Microfinance data is collected from the MixMarket dataset (www.mixmarket.org). This dataset provides self-reported information of the participating Microfinance Institutions (MFIs) across the world. Country GDP, GDP growth, and inflation data are collected from the World Bank Database (World Bank, n.d.). Our overall sample consists of over 10,000 firm-years for MFIs in 89 countries for the period 2008-2015. Table 1 summarizes the composition of the overall sample and the six regional subsamples in terms of maturity, regulation, and number of countries in each sample.

Table 1: Maturity, Regulation and Composition of Geographic Subsamples

In Table 1, we present the composition of MFIs sample for each of the six geographic regions as well as the overall sample. We also report number of countries in each region and for overall sample.

| | Africa | East Asia | Eastern Europe & Central Asia | Latin America & Caribbean | North Africa & Middle East | South Asia | Overall Sample |
|---|--------|-----------|-------------------------------|---------------------------|----------------------------|------------|----------------|
| New | 21.64% | 16.74% | 17.09% | 6.35% | 13.16% | 13.15% | 14.72% |
| Young | 20.50% | 16.09% | 24.43% | 11.48% | 17.11% | 20.11% | 17.84% |
| Mature | 57.86% | 67.17% | 58.49% | 82.17% | 69.74% | 66.75% | 68.08% |
| Regulated | 87.73% | 78.76% | 91.12% | 44.13% | 50.92% | 67.49% | 79.43% |
| Not regulated | 12.27% | 21.24% | 8.88% | 55.87% | 49.08% | 32.51% | 20.17% |
| Number of Countries | 24 | 11 | 16 | 22 | 10 | 6 | 89 |
| Sample Period: 2008 to 2015 Annual Balance Sheet Data | | | | | | | |

3.2 Methodology

We follow Ashraf and Hassan (2011) in identifying the firm-specific as well as country-specific characteristics that explain MFIs' performance. We expand their work by including additional characteristics, such as percentage of female board members, and examine the impact of the female empowerment attribute on the performance and outreach of MFIs. We also include variables that allow us to investigate the efficiency of MFIs in the six major geographical regions. We employ up-to-date data to conduct the work.

As in Ashraf and Hassan (2011), we use regression analysis to measure the MFIs' performances in three sets of measures: a) outreach, b) efficiency and c) overall financial performances by using two sets of explanatory variables: i) country-specific variables and ii) firm-specific variables.

Equation (1) depicts the set of regression models that we use:

$$Y_{k,i} = X_{k,i,0} + \sum_{n=1}^{n=8} \gamma_{k,i,n} \cdot X_{k,i,n} + \varepsilon_{k,i} \quad (1)$$

Where, $i = 1, 2, \dots, 7$; for six regions and the total sample

$n = 1, 2, \dots, 10$; for three country specific variables and seven firm specific variables

$k = 1, 2, \dots, 8$; for eight performance measures of three broad categories

4. RESULTS ANALYSIS

4.1 Descriptive Statistics

In Table 2, we report the descriptive statistics for the country-specific and firm-specific exogenous variables

Table 2: Descriptive Statistics of Explanatory Variables

Table 2 presents the summary of descriptive statistics for the explanatory variables. The first and the second row for each variable correspond to the mean and the standard deviation (quoted within parenthesis) respectively.

| Variable Name | Variable Description | Africa | East Asia & Pacific | East Europe & Central Asia | Latin America & Caribbean | North Africa & Middle East | South East Asia | All |
|----------------------|--|--------------------|---------------------|----------------------------|---------------------------|----------------------------|----------------------|---------------------|
| INFLATION | <i>World Bank report</i> | 10.002 (17.409) | 5.4256 (4.683) | 10.537 (11.649) | 5.4256 (4.683) | 7.577 (9.919) | 7.824 (4.270) | 7.809 (10.509) |
| LN(GDP) | <i>natural log of country GDP size (GDP in million)</i> | 23.647 (1.339) | 25.542 (1.674) | 24.213 (3.274) | 25.542 (1.674) | 24.749 (1.202) | 26.544 (1.775) | 25.099 (2.308) |
| GDP GROWTH | <i>previous year GDP growth</i> | 5.418 (3.038) | 3.901 (3.102) | 5.126 (5.180) | 3.901 (3.102) | 4.536 (4.352) | 6.274 (2.630) | 5.220 (3.596) |
| DIAMONDS | <i>the composite rating of MFIs reported in MixMarket Database</i> | 2.803 (.973) | 3.647 (.975) | 3.117 (1.032) | 3.647 (.9759) | 3.280 (.9891) | 3.151 (1.270) | 3.211 (1.091) |
| REGULATED | <i>dummy that is one if MFIs are regulated by a legal entity and zero otherwise</i> | .876 (.329) | .4413 (.496) | .9116 (.283) | .441 (.496) | .5092 (.5005) | .6785 (.4672) | 0.693 (0.461) |
| FIRM' AGE | <i>discrete variable that takes 1, 2 and 3 if MFIs is ranked as New, Young or Mature</i> | 2.380 (.804) | 2.758 (.557) | 2.424 (.7686) | 2.758 (.5572) | 2.565 (.7142) | 2.535 (.715) | 2.547 (0.724) |
| LN(ASSETS) | <i>natural logarithm of MFIs asset size</i> | 15.013 (2.194) | 16.423 (2.014) | 15.719 (2.364) | 16.423 (2.014) | 16.317 (1.594) | 15.920 (1.913) | 15.778 (2.195) |
| NUMBER OF OFFICES | <i>number of offices</i> | 27.687 (60.680) | 26.363 (52.765) | 19.684 (47.462) | 26.363 (52.765) | 44.567 (99.286) | 139.727 (394.927) | 47.991 (193.713) |
| % OF FEMALE BOOROWER | <i>percentage of female borrower</i> | .2897 (.336) | .4673 (.322) | .3667 (.2641) | .4673 (.3222) | .4690 (.3381) | .7116 (.399) | 0.458 (0.370) |
| % OF FEMALE(BOARD) | <i>percentage of female board member</i> | .0974 (.196) | .130 (.223) | .138 (.238) | .130 (.223) | .1244 (.201) | .146 (.217) | 0.129 (0.225) |

4.2 Outreach Measures of MFI's

Table 3, 4, and 5 presents the regression results for three outreach measures: a) number of depositors, b) number of deposit accounts, and c) number of active borrowers, respectively. We scale the variables: number of active borrowers and the number of deposit accounts by dividing them by 10^4 , and the number of depositors by dividing it by 10^3 . We summarize the results in terms of the impact of the country-specific and firm-level variables on the selected outreach measures.

**Table 3: Number of Depositors
Outreach Measures of MFI's**

Tables 3 present the regression results for the Outreach Measure: Number of Depositors for: a) Overall Sample and b) six different geographic subsamples. In each panel, the first column of regression results corresponds to the Overall Sample, and column 2 through column 7 report results for 1) Africa, 2) East Asia, 3) East Europe & Central Asia, 4) Latin America and Caribbean, 5) North Africa and Middle East and 6) South East Asia.

Explanatory variables consist two types of variables: a) Country Specific Variables [Ln_GDP is the natural log of country GDP size and GROWTH is the GDP growth and INFLATION for inflation]; b) Firms Specific Variables [DIAMONDS is the composite rating of MFIs reported in MixMarket Database, REGULATED is the dummy that is one if MFIs are regulated by a legal entity and zero otherwise, NUMBERAGE is a discrete variable that takes 1, 2 and 3 if MFIs is ranked as New, Young or Mature, LN_ASSET is natural logarithm of MFIs asset size, OFFICES is number of branches, % FEMALE is the percentage of women borrower and % FEM.BOARD is the percentage of female board members.

| Number of Depositors | | | | | | | |
|-----------------------------|----------|-------------------------------|----------|-------------------------------------|-------------------------------------|--------------------|---------------------------------|
| | All | East Asia & the Pacific | Africa | East Europe & Central Asia | North Africa & Middle East | South East Asia | Latin America & Caribbean |
| C | -0.807 | -1.106 | -14.966a | 1.75 | 0.545 | -7.919 | 0.215 |
| LN_GDP | -0.909c | -0.945c | -0.547b | -0.960c | -0.963c | -0.641c | -0.936c |
| GROWTH | -0.007 | -0.044 | -0.015 | 0.000 | -0.027 | 0.080 | 0.017 |
| INFLATION | 0.108a | 0.123b | 0.090 | 0.128b | 0.111a | 0.109a | 0.117a |
| DIAMONDS | -1.630c | -1.578c | -1.248b | -1.664c | -1.656c | -1.899c | -1.755c |
| REGULATED | -1.578 | -1.930a | -2.371b | -1.252 | -2.055b | -1.071 | -1.208 |
| NUMBERAGE | -1.620b | -1.716b | -1.395a | -1.711b | -1.675b | -1.590a | -1.670b |
| LN_ASSET | 2.432c | 2.507c | 2.577c | 2.389c | 2.499c | 2.433c | 2.384c |
| OFFICES | 0.202c | 0.202c | 0.202c | 0.202c | 0.202c | 0.205c | 0.203c |
| % FEMALE | -10.347c | -10.567c | -9.813c | -10.749c | -10.354c | -7.506c | -10.092c |
| % FEM.BOARD | 2.721 | 2.396 | 2.888 | 2.772 | 2.606 | 2.400 | 2.730 |
| R-squared | 0.47 | 0.47 | 0.47 | 0.47 | 0.48 | 0.48 | 0.47 |
| F-statistic | 570.80 | 520.43 | 523.43 | 519.35 | 522.12 | 522.54 | 518.96 |
| Prob(F-stat) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Superscripts of a, b, and c correspond to statistical significance of 10%, 5% and 1% respectively

**Table 4: Number of Deposit Accounts
Outreach Measures of MFI's**

Tables 4 present the regression results for the Outreach Measure: Number of deposit accounts for: a) Overall Sample and b) six different geographic subsamples. In each panel, the first column of regression results corresponds to the Overall Sample, and column 2 through column 7 report results for 1) Africa, 2) East Asia, 3) East Europe & Central Asia, 4) Latin America and Caribbean, 5) North Africa and Middle East and 6) South East Asia.

Explanatory variables consist two types of variables: a) Country Specific Variables [Ln_GDP is the natural log of country GDP size and GROWTH is the GDP growth and INFLATION for inflation]; b) Firms Specific Variables [DIAMONDS is the composite rating of MFIs reported in MixMarket Database, REGULATED is the dummy that is one if MFIs are regulated by a legal entity and zero otherwise, NUMBERAGE is a discrete variable that takes 1, 2 and 3 if MFIs is ranked as New, Young or Mature, LN_ASSET is natural logarithm of MFIs asset size, OFFICES is number of branches, , % FEMALE is the percentage of women borrower and % FEM.BOARD is the percentage of female board members.

| Number of Deposit Accounts | | | | | | | |
|-----------------------------------|----------|-------------------------------|----------|-------------------------------------|------------------------------------|--------------------|--------------------------------|
| | All | East Asia & the Pacific | Africa | East Europe & Central Asia | North Africa& Middle East | South East Asia | Latin America &Caribbean |
| C | 38.762c | 38.670c | 26.837c | 40.998c | 40.291c | 30.239c | 43.347c |
| LN_GDP | -1.518c | -1.528c | -1.216c | -1.564c | -1.573c | -1.195c | -1.636c |
| GROWTH | -0.076 | -0.086 | -0.089 | -0.072 | -0.102 | 0.025 | 0.024 |
| INFLATION | 0.083 | 0.087 | 0.067 | 0.100 | 0.085 | 0.084 | 0.121 |
| DIAMONDS | -1.417b | -1.404b | -1.098a | -1.446b | -1.461b | -1.744c | -1.978c |
| REGULATED | -1.413 | -1.517 | -2.060 | -1.129 | -1.916 | -0.801 | 0.285 |
| NUMBERAGE | -1.410 | -1.437 | -1.195 | -1.491 | -1.486 | -1.370 | -1.657 |
| LN_ASSET | 0.821b | 0.843b | 0.947b | 0.789b | 0.893b | 0.823b | 0.611 |
| OFFICES | 0.30c | 0.305c | 0.305c | 0.305c | 0.305c | 0.308c | 0.307c |
| % FEMALE | -14.151c | -14.210c | -13.768c | -14.528c | -14.151c | -10.748c | -13.059c |
| % FEM.BOARD | 3.991 | 3.910 | 4.119 | 4.028 | 3.910 | 3.581 | 3.989 |
| R-squared | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 |
| F-statistic | 742.27 | 674.77 | 677.22 | 674.98 | 677.76 | 678.78 | 676.76 |
| Prob(F-stat) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Superscripts of a, b, and c correspond to statistical significance of 10%, 5% and 1% respectively

**Table 5: Number of Active Borrowers
Outreach Measures of MFI's**

Tables 5 present the regression results for the Outreach Measure: Number of active borrowers for: a) Overall Sample and b) six different geographic subsamples. In each panel, the first column of regression results corresponds to the Overall Sample, and column 2 through column 7 report results for 1) Africa, 2) East Asia, 3) East Europe & Central Asia, 4) Latin America and Caribbean, 5) North Africa and Middle East and 6) South East Asia.

Explanatory variables consist two types of variables: a) Country Specific Variables [Ln_GDP is the natural log of country GDP size and GROWTH is the GDP growth and INFLATION for inflation]; b) Firms Specific Variables [DIAMONDS is the composite rating of MFIs reported in MixMarket Database, REGULATED is the dummy that is one if MFIs are regulated by a legal entity and zero otherwise, NUMBERAGE is a discrete variable that takes 1, 2 and 3 if MFIs is ranked as New, Young or Mature, LN_ASSET is natural logarithm of MFIs asset size, OFFICES is number of branches, % FEMALE is the percentage of women borrower and % FEM.BOARD is the percentage of female board members.

| Number of Active Borrowers | | | | | | | |
|----------------------------|----------|-------------------------------|----------|-------------------------------------|------------------------------------|--------------------|--------------------------------|
| | All | East Asia & the Pacific | Africa | East Europe & Central Asia | North Africa& Middle East | South East Asia | Latin America &Caribbean |
| C | -39.303c | -40.023c | -38.888c | -38.388c | -38.758c | -40.719c | -39.717c |
| LN_GDP | 0.725c | 0.690c | 0.715c | 0.706c | 0.705c | 0.779c | 0.736c |
| GROWTH | 0.097 | 0.046 | 0.098 | 0.097 | 0.091 | 0.113 | 0.087 |
| INFLATION | 0.035 | 0.054 | 0.036 | 0.041 | 0.036 | 0.036 | 0.032 |
| DIAMONDS | -0.114 | -0.048 | -0.124 | -0.137 | -0.118 | -0.160 | -0.056 |
| REGULATED | -1.606b | -2.048c | -1.583b | -1.488b | -1.803b | -1.509b | -1.772b |
| NUMBERAGE | -0.875a | -0.963a | -0.882a | -0.903a | -0.907a | -0.877a | -0.850a |
| LN_ASSET | 1.469c | 1.567c | 1.464c | 1.459c | 1.496c | 1.470c | 1.487c |
| OFFICES | 0.209c | 0.209c | 0.209c | 0.208c | 0.208c | 0.209c | 0.208c |
| % FEMALE | 0.663 | 0.412 | 0.648 | 0.516 | 0.619 | 1.187 | 0.559 |
| % FEM.BOARD | -4.132c | -4.382c | -4.138c | -4.089c | -4.136c | -4.194c | -4.140c |
| R-squared | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 |
| F-statistic | 1644.01 | 1504.23 | 1494.37 | 1494.64 | 1496.79 | 1494.94 | 1494.47 |
| Prob(F-stat) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Superscripts of a, b, and c correspond to statistical significance of 10%, 5% and 1% respectively

Results show that country GDP has positive and highly statistically significant correlation with the number of active borrowers as for the overall sample as well as for the entire six geographic subsamples. The results are consistent with Demirgüç-Kunt and Klapper (2013), which imply that with inclusive financial systems, poor people can borrow to invest in their education and become entrepreneurs—and small enterprises can borrow as well to pursue promising growth opportunities. And this can contribute to higher economic growth. We find that the GDP has a negative and statistically significant impact on the number of depositors and the number of deposit account across the entire

geographic subsamples. Dupas and Robinson (2013) report survey evidence in poor countries suggesting that among the main reasons people did not save is that they do not trust the bank and service is unreliable. Chaia et al. (2009) find that only about 20% of households in Sub-Saharan Africa have access to banking. Ahlin, Lin, & Maio's (2010) results "suggest that the country context is an important determinant of MFI performance, though not more so than MFI-specific factors".

We find that MFIs' outreach is not responsive to country GDP growth for all three outreach measures and across all the six geographic subsamples. Our results show that inflation has impact on the number of depositors in all geographic regions, except for Africa, but has no effect on the number of active borrowers and the number of deposit accounts.

MFIs' Diamond rating reflects the level of information disclosed by MFIs to the MarketMix dataset. The results show that Diamond rating is not statistically significant for the number of active borrowers, while it is statistically significant for the number of depositors and the number of deposit account. The interpretation could be that borrowers may not care about the rating in choosing their MFI partner, since they are borrowing and not depositing money, while depositors has to be careful in selecting their MFI partner. Some interpretation in the literature is that MFIs customers may have no choice in selecting their MFI partner or not informed about rating.

The variable "regulated" show whether the MFI is regulated by a legal entity or not. Our results show that regulation has negative and statistically significant impact on the number of active borrowers.

Our finding support Makame and Murinde (2006), who find evidence for a negative relationship between regulation and outreach. Also, Cull et al. (2009) find that complying with regulation increases the cost to MFIs, so they respond by curtailing outreach to customers who are costly to reach. Christen, Lyman, and Rosenberg (2003) estimate the compliance costs of regulation and find that it is 5 percent of total assets during the first year and decreases to 1 percent after that.

We find that the impact of MFIs' maturity on two outreach measures: the number of depositors and number of borrowers is negative and statistically significant across the different geographic

subsamples. This can be explained by the fact that new MFIs are more proactive and have more innovative techniques to attract borrowers and depositors than mature firms.

Our results show that increasing the number of offices increases MFIs' outreach. The results are statistically significant across all the different geographic subsamples. So MFIs can indeed increase outreach by increasing the number of offices. But this may make sustainability an issue for MFIs because cost increases dramatically, especially in remote rural areas. Nonetheless, literature shows that new innovative techniques can assist in this matter. De Mel et al. (2013) find that installing a savings lockbox is less expensive, while it is as effective as sending a deposit collector to the village.

We find that MFI size has positive and statistically significant impact on all three outreach measures for all geographic regions. Large MFIs have a cost advantage due to their economy of scope.

We find that increasing the percent of female board member has negative and statistically significant impact on the number of depositors and the number of deposit accounts for all the geographic regions. Table 6 present the regression results of an additional outreach measure: the average loan balance per borrower.

Table 6: Average Loan Balance Per Borrower Outreach Measures of MFI's

In Table 6 we report regression results for the Outreach measure: Average loan balance per borrower for: a) Overall Sample and b) six different geographic subsamples. In each panel, the first column of regression results corresponds to the Overall Sample, and column 2 through column 7 report results for 1) East Asia, 2) Africa, 3) East Europe & Central Asia, 4) North Africa and Middle East, 5) South East Asia, and 6) Latin America and Caribbean.

Explanatory variables consist two types of variables: a) Country Specific Variables (Ln_GDP is the natural log of country GDP size and GROWTH is the GDP growth and INFLATION for inflation); b) Firms Specific Variables (DIAMONDS is the composite rating of MFIs reported in MixMarket Database, REGULATED is the dummy that is one if MFIs are regulated by a legal entity and zero otherwise, NUMBERAGE is a discrete variable that takes 1, 2 and 3 if MFIs is ranked as New, Young or Mature, LN_ASSET is natural logarithm of MFIs asset size, OFFICES is number of branches, , % FEMALE is the percentage of women borrower and % FEM.BOARD is the percentage of female board members

| Average Loan Balance Per Borrower | | | | | | | |
|--|---------|-------------------------|---------|----------------------------|----------------------------|-----------------|---------------------------|
| | All | East Asia & the Pacific | Africa | East Europe & Central Asia | North Africa & Middle East | South East Asia | Latin America & Caribbean |
| C | -3.122c | -3.076c | -1.154a | -5.431c | -3.013c | -4.228c | -2.907c |
| LN_GDP | 0.056c | 0.058c | 0.005 | 0.105c | 0.052c | 0.097c | 0.050b |
| GROWTH | -0.021a | -0.018 | -0.018 | -0.019a | -0.022a | -0.009 | -0.016 |
| INFLATION | -0.001 | -0.002 | 0.003 | -0.016c | -0.001 | 0.000 | 0.001 |
| DIAMONDS | -0.003 | -0.007 | -0.052 | 0.054 | -0.004 | -0.039 | -0.033 |
| REGULATED | 0.062 | 0.091 | 0.166a | -0.237b | 0.023 | 0.139 | 0.150 |
| NUMBERAGE | -0.315c | -0.309c | -0.347c | -0.248c | -0.321c | -0.317c | -0.328c |
| LN_ASSET | 0.361c | 0.354c | 0.340c | 0.386c | 0.366c | 0.363c | 0.351c |
| OFFICES | -0.002c | -0.002c | -0.002c | -0.002c | -0.002c | -0.001c | -0.002c |
| % FEMALE | -2.755c | -2.737c | -2.822c | -2.373c | -2.764c | -2.343c | -2.699c |
| % FEM.BOARD | 0.409b | 0.426b | 0.378b | 0.301a | 0.409b | 0.362b | 0.413b |
| R-squared | 0.1052 | 0.1062 | 0.1162 | 0.1480 | 0.1074 | 0.1133 | 0.1060 |
| F-statistic | 75.39 | 78.40 | 86.70 | 114.63 | 79.14 | 84.33 | 78.21 |
| Prob(F-stat) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Superscripts of a, b, and c correspond to statistical significance of 10%, 5% and 1% respectively.

Results show that country GDP has positive and highly statistically significant correlation with the average loan balance per borrower for the overall sample as well as for the entire six geographic subsamples, except for Africa. We find that GDP growth negatively impacts the average loan per borrower except for two regions: East Europe & Central Asia and North Africa & Middle East. Inflation has no impact on average loan per borrower except for Eastern European & Central Asian region, where the impact is negative and statistically significant. MFIs' size has a positive and statistically significant impact on the average loan per borrower. Larger firms have the means to increase loan size and are better equipped to mitigate the credit risk. Number of MFIs' branches has a negative and statistically significant

effect on loan size. It is possible that too many branches especially in remote areas increase cost and cause firms to decrease the amount for each loan. We find that an increase in the percentage of female board members leads to larger loan size. The results are statistically significant for the entire six geographic subsamples. That is an interesting result, given Bellucci et al. (2010) finding that “female officers tend to restrict credit availability to new, unestablished borrowers”. One interpretation could be that female executives are risk averse to new unreliable borrowers, but they are more comfortable in providing larger loans to established, less risky borrowers.

A very interesting finding about the outreach depth emerges from our results. It adds to the debate centered on the commercial transformation of MFIs and the best strategy to expand outreach to socially marginalized population. We find a negative and highly statistically significant correlation between the percentage of female borrowers and loan size. This means that MFIs are increasingly focused on wealthier clients; a phenomenon termed by Cull, Demirgüç-Kunt, and Morduch (2007) a “mission drift”, which shows the existence of a trade-off between efficiency and outreach. One advantage of our dataset (2008-2015) is that it covers a period when more and more commercially oriented microfinance institutions entered the market. This fact ignites a key debate about the ultimate goals of microfinance (social vs. commercial goals), a debate between proponents of for-profits versus non-profit strategies in MFIs’ activities. Our results support the position of Mohammad Yunus, Grameen Bank founder and Nobel Peace Prize winner, who argues against the complete commercialization of microfinance. Yunus (2011), argued that “commercialization has been a terrible wrong turn for microfinance, and it indicates a worrying ‘mission drift’ in the motivation of those lending to the poor”. Indeed, there are undesired consequences for such phenomenon. Conning and Morduch (2011) report that “By the start of 2011, the Indian microfinance sector was in a full-blown crisis, with politicians accusing micro-lenders of aggressive loan collection practices, over-lending to indebted customers, and exploitative interest rates” .

In this paper, we are not arguing for a strictly philanthropic path in MFIs’ activities. We are aligned with the advocates of a balance between the philanthropic and the commercial directions in MFIs’ activity.

4.3 Efficiency of MFIs

**Table 7: Cost Per Loan
Efficiency of MFIs**

In Table 7 we report regression results for the efficiency measure: Cost per loan for: a) Overall Sample and b) six different geographic subsamples. In each panel, the first column of regression results corresponds to the Overall Sample, and column 2 through column 7 report results for 1) East Asia, 2) Africa, 3) East Europe & Central Asia, 4) North Africa and Middle East, 5) South East Asia, and 6) Latin America and Caribbean.

Explanatory variables consist two types of variables: a) Country Specific Variables (Ln_GDP is the natural log of country GDP size and GROWTH is the GDP growth and INFLATION for inflation); b) Firms Specific Variables (DIAMONDS is the composite rating of MFIs reported in MixMarket Database, REGULATED is the dummy that is one if MFIs are regulated by a legal entity and zero otherwise, NUMBERAGE is a discrete variable that takes 1, 2 and 3 if MFIs is ranked as New, Young or Mature, LN_ASSET is natural logarithm of MFIs asset size, OFFICES is number of branches, , % FEMALE is the percentage of women borrower and % FEM.BOARD is the percentage of female board members

| Cost per loan | | | | | | | |
|----------------------|---------|-------------------------------|---------|-------------------------------------|------------------------------------|--------------------|--------------------------------|
| | All | East Asia & the Pacific | Africa | East Europe & Central Asia | North Africa& Middle East | South East Asia | Latin America &Caribbean |
| C | 4.845c | 4.995c | 5.052c | 2.245c | 4.976c | 3.150c | 5.242c |
| LN_GDP | 0.023 | 0.028 | 0.017 | 0.087c | 0.018 | 0.091c | 0.013 |
| GROWTH | -0.073c | -0.066c | -0.073c | -0.071c | -0.075c | -0.054c | -0.064c |
| INFLATION | 0.006 | 0.004 | 0.007 | -0.010 | 0.006 | 0.009 | 0.011 |
| DIAMONDS | 0.009 | -0.001 | 0.003 | 0.069 | 0.007 | -0.059 | -0.049 |
| REGULATED | -0.099 | -0.030 | -0.088 | -0.349c | -0.145 | 0.042 | 0.054 |
| NUMBERAGE | -0.860c | -0.850c | -0.865c | -0.803c | -0.863c | -0.891c | -0.893c |
| LN_ASSET | 0.120c | 0.103c | 0.118c | 0.141c | 0.125c | 0.120c | 0.103c |
| OFFICES | -0.001c | -0.001c | -0.001c | -0.001c | -0.001c | -0.001c | -0.001c |
| % FEMALE | -3.956c | -3.913c | -3.962c | -3.564c | -3.960c | -3.298c | -3.850c |
| % FEM.BOARD | 0.352 | 0.399 | 0.349 | 0.252 | 0.348 | 0.266 | 0.359 |
| R-squared | 0.0985 | 0.1019 | 0.0986 | 0.1212 | 0.1005 | 0.1117 | 0.1002 |
| F-statistic | 67.33 | 63.55 | 61.27 | 77.27 | 62.66 | 70.46 | 62.40 |
| Prob(F-stat) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Superscripts of a,b, and c correspond to statistical significance of 10%, 5% and 1% respectively

Examining the efficiency of the MFIs, our results show that MFIs' age, number of branches, and GDP growth have negative impact on efficiency. Also, the percentage of female borrowers has negative and highly statistically significant impact on the cost of loan. This finding is consistent with Hermes et al. (2011), who find that outreach and efficiency are negatively correlated.

4.4 Financial Performance of MFIs

Next, we analyze the results of three financial performance measures of MFIs: a) operational self-sufficiency, b) return on asset, c) and profit margin. Table 8 presents regression results for the operational self-sufficiency of the MFIs.

**Table 8: Operational Self Sufficiency
Overall Financial Performance of MFIs**

In Table 8 we report regression results for the overall financial performance measure: Operational self-sufficiency for: a) Overall Sample and b) six different geographic subsamples. In each panel, the first column of regression results corresponds to the Overall Sample, and column 2 through column 7 report results for 1) East Asia, 2) Africa, 3) East Europe & Central Asia, 4) North Africa and Middle East, 5) South East Asia, and 6) Latin America and Caribbean.

Explanatory variables consist two types of variables: a) Country Specific Variables (Ln_GDP is the natural log of country GDP size and GROWTH is the GDP growth and INFLATION for inflation); b) Firms Specific Variables (DIAMONDS is the composite rating of MFIs reported in MixMarket Database, REGULATED is the dummy that is one if MFIs are regulated by a legal entity and zero otherwise, NUMBERAGE is a discrete variable that takes 1, 2 and 3 if MFIs is ranked as New, Young or Mature, LN_ASSET is natural logarithm of MFIs asset size, OFFICES is number of branches, , % FEMALE is the percentage of women borrower and % FEM.BOARD is the percentage of female board members

| Operational Self Sufficiency | | | | | | | |
|-------------------------------------|---------|-------------------------------|----------|----------------------------------|---------------------------------|--------------------|--------------------------------|
| | All | East Asia & the Pacific | Africa | East Europe & Central Asia | North Africa& Middle East | South East Asia | Latin America &Caribbean |
| C | 0.7195c | 0.7122c | 0.9980c | 0.5149c | 0.6769c | 0.6139c | 0.6396c |
| LN_GDP | -0.0040 | -0.0045 | -0.0111b | 0.0006 | -0.0025 | 0.0000 | -0.0018 |
| GROWTH | 0.0085c | 0.0079c | 0.0089c | 0.0087c | 0.0091c | 0.0097c | 0.0066b |
| INFLATION | 0.0014 | 0.0016 | 0.0019 | 0.0000 | 0.0013 | 0.0014 | 0.0006 |
| DIAMONDS | 0.0143 | 0.0150 | 0.0070 | 0.0189a | 0.0145 | 0.0106 | 0.0252b |
| REGULATED | -0.0182 | -0.0235 | -0.0028 | -0.0455b | -0.0023 | -0.0109 | -0.0511b |
| NUMBERAGE | 0.0007 | -0.0002 | -0.0035 | 0.0071 | 0.0036 | 0.0007 | 0.0058 |
| LN_ASSET | 0.0212c | 0.0223c | 0.0182c | 0.0233c | 0.0190c | 0.0212c | 0.0248c |
| OFFICES | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| % FEMALE | 0.1157c | 0.1125c | 0.1032c | 0.1458c | 0.1180c | 0.1554c | 0.0955c |
| % FEM.BOARD | 0.0597 | 0.0569 | 0.0570 | 0.0503 | 0.0600 | 0.0549 | 0.0577 |
| R-squared | 0.0059 | 0.0065 | 0.0102 | 0.0127 | 0.0131 | 0.0075 | 0.0080 |
| F-statistic | 4.44 | 4.44 | 6.96 | 8.69 | 8.97 | 5.08 | 5.44 |
| Prob(F-stat) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Superscripts of a, b, and c correspond to statistical significance of 10%, 5% and 1% respectively

We find that GDP growth and MFIs' size have positive and statistically significant effects on operational self-sufficiency. One more interesting result emerges: we find that an increase in the percentage of female borrower will increase MFI self-sufficiency. The results are consistent with the previous literature. Armendáriz de Aghion and Morduch (2007) find that female borrowers are less risky, as they are more risk averse in their investment decisions. Beck, Behr, and Güttler (2013) find that repayment rates among female borrowers are higher than for male. Table 9 presents regression results for the return on asset.

Table 9: Return on Assets
Overall Financial Performance of MFIs

In Table 9 we report regression results for the overall financial performance measures: Return on assets for: a) Overall Sample and b) six different geographic subsamples. In each panel, the first column of regression results corresponds to the Overall Sample, and column 2 through column 7 report results for 1) East Asia, 2) Africa, 3) East Europe & Central Asia, 4) North Africa and Middle East, 5) South East Asia, and 6) Latin America and Caribbean.

Explanatory variables consist two types of variables: a) Country Specific Variables (Ln_GDP is the natural log of country GDP size and GROWTH is the GDP growth and INFLATION for inflation); b) Firms Specific Variables (DIAMONDS is the composite rating of MFIs reported in MixMarket Database, REGULATED is the dummy that is one if MFIs are regulated by a legal entity and zero otherwise, NUMBERAGE is a discrete variable that takes 1, 2 and 3 if MFIs is ranked as New, Young or Mature, LN_ASSET is natural logarithm of MFIs asset size, OFFICES is number of branches, , % FEMALE is the percentage of women borrower and % FEM.BOARD is the percentage of female board members

| Return on Assets | | | | | | | |
|-------------------------|----------|-------------------------------|----------|----------------------------------|---------------------------------|--------------------|--------------------------------|
| | All | East Asia & the Pacific | Africa | East Europe & Central Asia | North Africa& Middle East | South East Asia | Latin America &Caribbean |
| C | -0.1586c | -0.1605c | -0.1188c | -0.1934c | -0.1624c | -0.1817c | -0.1688c |
| LN_GDP | 0.0016c | 0.0014b | 0.0005c | 0.0023c | 0.0017c | 0.0024c | 0.0018c |
| GROWTH | 0.0013c | 0.0012c | 0.0014c | 0.0014c | 0.0014c | 0.0016c | 0.0011c |
| INFLATION | 0.0003b | 0.0004b | 0.0004c | 0.0001 | 0.0003b | 0.0003b | 0.0002 |
| DIAMONDS | 0.0023a | 0.0025b | 0.0013 | 0.0031b | 0.0023a | 0.0015 | 0.0037c |
| REGULATED | 0.0018 | 0.0004 | 0.0040 | -0.0028 | 0.0032 | 0.0034 | -0.0024 |
| NUMBERAGE | 0.0111c | 0.0109c | 0.0105c | 0.0122c | 0.0114c | 0.0111c | 0.0118c |
| LN_ASSET | 0.0046c | 0.0049c | 0.0042c | 0.0050c | 0.0044c | 0.0046c | 0.0051c |
| OFFICES | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| % FEMALE | 0.0042 | 0.0034 | 0.0024 | 0.0093b | 0.0044 | 0.0129c | 0.0016 |
| % FEM.BOARD | 0.0259c | 0.0252c | 0.0255c | 0.0243c | 0.0259c | 0.0249c | 0.0257c |
| R-squared | 0.021 | 0.024 | 0.0268 | 0.0336 | 0.025 | 0.026 | 0.023 |
| F-statistic | 16.33 | 16.57 | 18.62 | 23.44 | 17.31 | 18.03 | 16.03 |
| Prob(F-stat) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Superscripts of a, b, and c correspond to statistical significance of 10%, 5% and 1% respectively

We find that Country GDP size and GDP growth have positive and statistically significant impacts on the return on asset (ROA) for the overall sample as well as for the entire six geographic subsamples.

So MFIs are more likely to earn better ROA in larger GDP countries. This makes MFIs sustainability more difficult is poorer, less developed countries.

MFIs' Diamond rating has a positive and significant impact on ROA for the all geographic regions except for Africa and South East Asia. We find that the percentage of female borrowers, the number of branches, and MFI regulation have no impact on ROA, while MFIs' size, age, and the

percentage of female board members have positive and statistically significant impact on ROA. Table 10 presents regression results for the profit margin.

Table 10: Profit Margin
Overall Financial Performance of MFIs

In Table 10 we report regression results for the overall financial performance measures: Profit margin for: a) Overall Sample and b) six different geographic subsamples. In each panel, the first column of regression results corresponds to the Overall Sample, and column 2 through column 7 report results for 1) East Asia, 2) Africa, 3) East Europe & Central Asia, 4) North Africa and Middle East, 5) South East Asia, and 6) Latin America and Caribbean.

Explanatory variables consist two types of variables: a) Country Specific Variables (Ln_GDP is the natural log of country GDP size and GROWTH is the GDP growth and INFLATION for inflation); b) Firms Specific Variables (DIAMONDS is the composite rating of MFIs reported in MixMarket Database, REGULATED is the dummy that is one if MFIs are regulated by a legal entity and zero otherwise, NUMBERAGE is a discrete variable that takes 1, 2 and 3 if MFIs is ranked as New, Young or Mature, LN_ASSET is natural logarithm of MFIs asset size, OFFICES is number of branches, , % FEMALE is the percentage of women borrower and % FEM.BOARD is the percentage of female board members

| Profit Margin | | | | | | | |
|----------------------|---------|-------------------------------|---------|----------------------------------|------------------------------------|--------------------|--------------------------------|
| | All | East Asia & the Pacific | Africa | East Europe & Central Asia | North Africa& Middle East | South East Asia | Latin America &Caribbean |
| C | 12.779 | 12.935 | 15.115 | 13.725 | 12.955 | 11.689 | 15.760 |
| LN_GDP | 0.201 | 0.212 | 0.142 | 0.181 | 0.195 | 0.243 | 0.120 |
| GROWTH | -0.089 | -0.075 | -0.087 | -0.090 | -0.092 | -0.077 | -0.017 |
| INFLATION | -0.110 | -0.115 | -0.106 | -0.103 | -0.109 | -0.109 | -0.078 |
| DIAMONDS | -0.386 | -0.405 | -0.442 | -0.409 | -0.387 | -0.425 | -0.812 |
| REGULATED | -2.810 | -2.684 | -2.681 | -2.687 | -2.879 | -2.732 | -1.548 |
| NUMBERAGE | -3.922b | -3.899b | -3.957b | -3.951b | -3.932b | -3.926b | -4.121b |
| LN_ASSET | -0.165 | -0.192 | -0.190 | -0.175 | -0.156 | -0.164 | -0.302 |
| OFFICES | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.002 |
| % FEMALE | -0.625 | -0.537 | -0.726 | -0.776 | -0.636 | -0.204 | 0.172 |
| % FEM.BOARD | 8.092a | 8.169a | 8.066b | 8.133a | 8.090a | 8.044a | 8.179a |
| R-squared | 0.0016 | 0.0017 | 0.0017 | 0.0016 | 0.0016 | 0.0017 | 0.0019 |
| F-statistic | 1.19 | 1.10 | 1.10 | 1.09 | 1.09 | 1.09 | 1.27 |
| Prob(F-stat) | 0.2948 | 0.3564 | 0.3585 | 0.3673 | 0.3675 | 0.3659 | 0.2348 |

Superscripts of a, b, and c correspond to statistical significance of 10%, 5% and 1% respectively

Several interesting findings emerge. Our results show that an increase in the percentage of female board member has a positive and statistically significant effect on MFIs' profitability. This is true for the overall sample as well as for the entire six geographic regions. The results are consistent with Mersland and Strøm (2009) who find that financial performance improves with a female CEO. We find that female empowerment improves profitability for MFIs as well as ROA. So Microfinance institutions, policymakers, and regulators should promote female participation in leading positions in MFIs and help women break existing glass ceilings.

We did not find a negative and statistically significant correlation between the percentage of female borrowers (which measures the depth of outreach) and profitability. This results point to another interesting finding: outreach does not lead to decreased profitability. That means we do not detect evidence of a trade-off between profitability and outreach, a key debate among policymakers and practitioners. Yunus (2011) argues that it is “possible to harness investment in microcredit—and even make a profit—without working through either charities or global financial markets” .

Indeed, we argue that outreach does not necessarily exclude profitability. We recognize that achieving profitability is a challenging task for MFIs given the multiple barriers facing them. Information asymmetry, the lack of collateral, illiteracy, and several other factors make it very costly for MFIs to provide financial services to the poor. Nonetheless, MFIs have created various innovative techniques that mitigate the cost and the risk. Beck (2015) lists several such techniques “including (i) joint liability lending, (ii)dynamic incentives, (iii) high repayment frequency, and (iv) focus on women” . Also we believe that MFIs should provide a better management in running their activities. Hassan and Sanchez (2009) investigate technical and scale efficiencies of MFIs in three regions and find inefficiency is higher in some regions. More importantly, they find that “the source of inefficiency is pure technical rather than scale, suggesting that MFIs are either wasting resources or not producing enough outputs (making enough loans, raising funds, and getting more borrowers)” . So good management matters in MFIs’ activity.

In conclusion, we believe that MFIs can indeed achieve both profitability and outreach given they implement the various cost- and risk-reducing techniques and provide better management.

5. CONCLUSION

The objective of this paper is to estimate the impact of country-specific macro-variables and firm-specific attributes on the financial performance and the efficiency of microfinance institutions (MFIs). We use a large international up-to-date database consisting of over 10,000 firm-years for MFIs in over 89 countries during the period 2008-2015. Results show that country GDP has positive and highly statistically significant correlation with the number of active borrowers for the overall sample as well as for the entire six geographic subsamples, while it has a negative and statistically significant impact on the

number of depositors and the number of deposit account. We find that MFIs' outreach is not responsive to country GDP growth for all three outreach measures and across all six geographic subsamples. Diamond rating has no impact on the number of active borrowers, while it affects the number of depositors and the number of deposit account. Regulation has negative and statistically significant impact on the number of active borrowers. The impact of MFIs' maturity on two outreach measures: the number of depositors and number of borrowers is negative and statistically significant across the different geographic subsamples. Increasing the number of offices increases MFIs outreach. We find that country GDP has positive and highly significantly correlation with the average loan balance per borrower for the overall sample as well as for the entire six geographic subsamples, while inflation has no impact on it except for Eastern European & Central Asian region where the impact is negative and statistically significant.

Our results show that MFIs' size has a positive and statistically significant impact on the average loan per borrower. Larger firms have the means to increase loan size and are better equipped to mitigate credit risk. We find a negative and highly statistically significant correlation between the percentage of female borrowers and loan size, which means that MFIs are increasingly focused on wealthier clients; a phenomenon termed by Cull et al. (2007) a "mission drift." Our results show that MFIs age, the numbers of branches, and GDP growth have negative impact on efficiency. And the percentage of female borrowers has a negative and highly statistically significant impact on the cost of loan. We find that GDP growth and MFIs' size have positive and statistically significant effects on operational self-sufficiency. One interesting results on female empowerment is that an increase in the percentage of female borrowers will increase MFI self-sufficiency. GDP growth has a positive and statistically significant impact on the return on asset (ROA) for the overall sample and as well as for the entire six geographic subsamples. So MFIs are more likely to earn better ROA in larger GDP countries.

We find that MFIs' size, age, and the percentage of female board members have positive and statistically significant impact on ROA. Our results show that female empowerment improves profitability for MFIs as well as ROA. So Microfinance institutions, policymakers, and regulators should

promote female participation in leading position in MFIs and help women break existing glass ceilings.

We do not detect evidence of a trade-off between profitability and outreach.

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